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Interdependent Work Teams, Incentives and Performance: A Longitudinal Study

by

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ABSTRACT

This research focussed on the performance of individuals in work teams. The purpose of this study was to investigate the nature of the team processes which could explain time-associated differences, in the performance outcomes of individuals within work teams, in teams whose members had moderately interdependent tasks and received hybrid pay incentives. The extant literature has a large body of work on teams in general; there also exists a large amount of work on currently understood relationships between task-interdependence, pay incentives, team processes, and performance. However, although task-interdependent work teams with hybrid pay incentives are common in many labour-intensive business environments, the current literature is thin on the identification of specific team processes which link long-term performance differences in comparable teams. Secondly, few studies on work-team performance, in the current literature, incorporate time as a predictor variable. This research investigated the effects of the introduction of performance-based hybrid pay incentives to members of work teams; the research also investigated the nature of explanatory, time-linked team processes which could be associated with performance variances between these work teams. A review of the literature on work team effectiveness, pay incentives and performance in work teams, resulted in hypothesised relationships between the interdependent tasks of work team members, hybrid pay incentives for supervisors, and overall team performance over time. The research focussed on variances between the team processes for good and poor teams to design a work team process and performance model, which could be used to predict performance variance between teams over time in the field.

The study was conducted on bulk-cash deposit processing teller work teams. These work teams were located at geographically dispersed processing centres (18 cash centres), where each work team was composed of an average of 6 members, comprising a team supervisor, and a combination of permanently employed tellers (regular tellers) and tellers on renewable fixed term contracts (contract tellers), in a financial services firm.

Using a longitudinal research design, the study used mixed methods, incorporating a control group time-series design. Quantitative performance data included the number and accuracy of deposits processed and attendance records; the data also included ratings on behavioural measures for professionalism. Individual and team-

level performance related data was collected from over 480 individuals, in monthly buckets over a period of thirty four months (N=16,358 teller data months), during which a pay incentive for performance was introduced as the first intervention (IV_1), followed - after eight months - by a second intervention (IV_2), which was the allocation of tellers into teams, whose supervisors received hybrid pay incentives. Using a multiple case study approach, qualitative data was collected using semi-structured individual and group interviews incorporating rating scales, for individuals and focus groups, in two phases of data collection periods. The interviews were lagged to findings from analyses performed on the quantitative data collected.

Using a combination of repeated measures analysis of variance (ANOVA) for the quantitative component of the study, emerging-themes analysis for the qualitative component, and structural modelling techniques, 1) as expected, the introduction of pay incentives for regular tellers was associated with statistically significant increases in the volumes of deposits processed per unit time, with a large effect size; 2) the introduction of individual pay incentives for regular tellers was associated with statistically significant increases in overall individual performance, with a medium effect size; 3) the combination of the introduction of individual and hybrid incentives, and the allocation of supervisors to teams, was associated with statistically significant additional increases in the volumes of deposits processed per unit time and accuracy of deposit processing for both regular and contract tellers, within high performing teams; 4) internal team processes (intra-team communication, target-setting and coaching, progress monitoring and feedback) explained the variance in inter-team performance over time; 5) team coordination and target-setting were the intervening variables in the relationship between pay incentives and team performance.

A predictive performance model for performance in interdependent work teams with a combination of individual and hybrid pay incentives was developed, based on the quantitative and qualitative findings from this study.

DECLARATION

I, Mbusi Makhosezwe Dlamini, declare that this thesis, which I hereby submit for the degree of Doctor of Business Administration at the University of Pretoria, is my own work and has not previously been submitted by me for a degree at this or any other tertiary institution.

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Mbusi Dlamini

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CHAPTER 1: INTRODUCTION TO THE RESEARCH

1.1 INTRODUCTION

The competitiveness of a firm within a chosen market space depends significantly on how the firm best uses its resources (Barney, 1991; Coff & Kryscynski, 2011; Prahalad, 1983; Shaw, Park, and Kim, 2013). For a large number of firms, a key resource to manage is labour (Coff, 1997; Crook, Todd, Combs, Woehr, and Ketchen, 2011; Hitt, Bierman, Shimizu, and Kochhar, 2001). For this reason, it is critical that firms continue to explore practices which will support and improve labour productivity (Huselid, 1995; Datta, Guthrie, & Wright, 2005; Ployhart, Weekley & Ramsey, 2009).

In most firms, work is designed in such a manner that it is performed using some form of collaborative effort amongst people, and also between people and machines (Messersmith, Patel, & Lepak, 2011). In those firms where labour is a key resource, collaboration happens largely between people, where aspects of the work effort may involve individuals working alone, and some aspects of work design require people to work in teams in order to achieve the firm’s desired outcomes.

Although all the people in the firm are assumed to be working towards the firm’s desired common goals, individuals and groups within the firm cooperate and compete as they apply themselves to their tasks (Kozlowski & Ilgen 2007; Johnson, Johnson & Roseth, 2012; Muruyama & Elliot, 2012), as was already confirmed by Morton Deutsch as far back as 1949 (Deutsch, 1949). The result of this is that individuals and defined groups of individuals (teams) produce different levels of output even within similar contexts. Finding the balance between collaborative and competitive tendencies between individuals and between teams within firms (interdependency) appears to be at the heart of how firms can optimise human resource efforts in support of the firm’s objectives (Cohen & Bailey, 1997; Devine, Clayton, Philips, Dunford, & Melner, 1999; Wagner, Humphrey, Meyer, & Hollenbeck, 2012).

Firms tend to also structure financial incentives in such ways as to support their desired outcomes (Jenkins, Mitra, Gupta, & Shaw, 1998; Wagner et al., 2012). Part of the intent in the deliberate structuring of rewards by firms is to support the necessary level of interdependencies within and between teams, and between individuals (Jenkins, et al. 1998; Wageman, 1995; Wagner, et al., 2012).

Despite the prevalence of work teams within organizations (Devine et al., 1999), extant literature shows a gap in studies of performances in teams which have moderately interdependent tasks and hybrid incentives for supervisors, despite the fact that these types of work-teams are common in practice within labour intensive work environments.

This study draws on well-established theories, and builds on the extant literature on cooperation and competition (e.g. Beersma, Hollenbeck, Humphrey, Moon, Conlon, & Ilgen, 2003; Deutsch, 1949; Koffka, 1935; Johnson & Johnson, 2005; McGrath, 1984), pay incentives and performance (Barnes, Hollenbeck, Jundt, DeRue & Harmon, 2011; Jenkins et al., 1998; Milkovich & Newman, 1999) and team processes (Cohen & Bailey, 1997; Kozlowski & Ilgen, 2006; Marks, Mathieu & Zaccaro 2001). This literature is used in the study to research the effects of both direct team-member pay incentives, and supervisor-level hybrid pay incentives on moderately interdependent team tasks and performance, for individuals who are located within work teams, in a field setting. Using a control-group time-series design, the study aimed to capture the influence of time on individual and team-based practices and behaviours as they affect performance, as time progressed. A mixed methods design (Tashakkori & Teddlie, 2003; Teddlie & Yu, 2007) was used to explore performance variance at individual and team levels, using quantitative techniques. Findings from some of these analyses were used to conduct lagged, and purposively selected semi-structured individual and group interviews, combined with observational qualitative reports as a means to explore process issues more in-depth (Ployhart & Vandenberg, 2010; Van de Ven, 2007).

1.2 KEY TERMS

This section provides definitions of some of the key terms and concepts which were used within the study. The section outlines how each concept will be used within this study.

1.2.1 EMERGENT STATES

Emergent states are “cognitive, motivational, and affective states of teams, as opposed to the nature of their member interaction” (Marks et al., 2001). Accordingly, emergent states represent “products of team experiences (including team processes) and become new inputs to subsequent processes and outcomes” (Marks et al., 2001).

1.2.2 HYBRID INCENTIVES

For the purposes of this study, hybrid incentives are described as those incentives which are based on a combination of both individual performance outcomes and group performance outcomes. This description was based on the various definitions of hybrid incentives from Allen, Sargent, & Bradley (2003), Wageman (1995) and Wageman & Baker (1997).

1.2.3 TASK INTERDEPENDENCE

Task interdependence, is described by Wageman as work that is structured such that it requires the “input of several people to complete it” (Wageman, 1995: 145).

1.2.4 TEAM PROCESSES

Marks et al. (2001) define team processes as “members’ interdependent acts that convert inputs to outcomes through cognitive, verbal, and behavioural activities directed toward organizing taskwork to achieve collective goals”. Marks et al. 2001distinguish between transition processes – which is what teams do between “performance episodes” – interpersonal processes, and action processes - which is what teams do during task performance episodes.

1.2.5 WORK TEAMS

Hackman (1987) defined work teams as intact social systems that perform one or more tasks within organisational settings. Cohen and Bailey (1997) described work teams as "..continuing work units responsible for producing goods or providing services. Their membership is typically stable, usually full-time, and well defined. Work teams are found in both manufacturing and service settings.." (Cohen & Bailey, 1997: 242). For this research, the Cohen and Bailey definition of work teams was adopted.

1.3 BACKGROUND

Practitioners and scholars have for some time now, recognised the team, as an important organisational work form for delivering performance improvements within firms (Beersma, Hollenbeck, Humphrey, Moon & Conlon, 2003; Cohen & Bailey, 1997; Devine et al. 1999; Mathieu, Maynard, Rapp & Gilson, 2008). In firms, teams are found at different levels of the organisational structure, including executive teams, production teams, business units etc. (Devine et al., 1999; LePine, Piccolo, Jackson & Saul, 2008). These various teams also differ in focus, resulting in different types of teams, such as work teams, management teams, project teams (Cohen & Bailey, 1997). The impact of the use of teams on performance has similarly been studied at various levels (Devine et al. 1999; Guzzo & Dickson, 1996), including at the team level and at the organisational level (Banker, Field, Schroeder & Sinha, 1996); teams have also been studied within laboratory settings and within live working environments (Banker et al. 1996; Guzzo & Dickson, 1996). Team-based performance research and reviews of studies on teams demonstrate that a wide range of research settings have been used to develop knowledge in this field over a long period of time; for this reason, there is an abundance of knowledge on team performance available. Despite some scepticism on the foundations of effectiveness of teams on performance (Allen & Hecht, 2004), the overriding usefulness of teams in improving performance, contingent on other local factors, is largely undisputed in practice or in the research carried out on teams (Devine et al., 1999; LePine et al., 2008; Wageman, 1995; Wageman & Baker, 1997).

In much the same way, over the years, various studies have focussed on the effects of pay incentives on performance improvements for teams and individual (Beersma et al., 2003; Gerhart, Rynes, & Fulmer, 2009; Barnes et al., 2011); these studies include meta-reviews (Jenkins et al., 1998; Mathieu et al., 2008). Some studies have looked at the effects of a combination of reward systems in different types of teams (Beersma et al., 2003). In general, these studies highlight the positive influence of the judicious use of both individual and team-based pay incentives on performance; the studies also highlight the indirect relationships between pay incentives and performance, highlighting the role of intervening variables, such as goal setting.

From the literature, it is clear that, structured-properly, both work teams and pay incentives have a positive relationship with performance. What needs further examination though is, how does differential performance in work teams come about over time, in a live-working environment, for teams with moderately interdependent tasks and whose supervisors earn hybrid pay incentives.

1.4 PROBLEM STATEMENT

Despite comparable demographic compositions, skills sets, resources, tasks and pay incentives, some work teams show significant performance differences over time. The causes of the observed sustained variances in performances amongst individuals and between comparable teams are an on-going and an intriguing constraint in the work environment. The complexities which surround the design of work-team research located within live working environments, has resulted in limitations to the examination of the nature of differences in performances for these teams (Mathieu et al., 2008) and for individuals within these teams. Ruth Wageman's work (Wageman, 1995) was an important contribution to research on work-teams, where varying levels and combinations of tasks and rewards administered on existing teams. Wageman's research concluded that a combination of hybrid tasks with hybrid incentives was the worst configuration of work-teams in that, teams with this structure were associated with the poorest performances. The delineation of processes associated with work team performance by Cohen and Bailey, (1997) and by Marks et al., (2001), greatly enhanced the ability to design and study differential team performance. Following the framework from Marks and colleagues, several researchers (Allen et al., 2003;

Ilgen, Hollenbeck, Johnson, & Jundt, 2005; Kozlowski & Ilgen, 2006) used the model from Marks and colleagues to study and make recommendations on various aspects of team processes, as they related to performance.

None of these studies on work teams have got closer to the examination of individual performance within teams which have combinations of moderately interdependent tasks and hybrid supervisor pay incentives, despite their prevalence in the work environment. In addition, work team studies which examine change in performance and team processes through time are lacking within the team literature (Bell & Marentette, 2011; Ployhart & Vandenberg, 2010; Stewart, 2010; Sonnentag, 2012).

South Africa has relatively strict controls on employment contracts (Vietor, 2007, Behar, 2012), which can make labour an expensive resource within the mix of resources which firms have at their disposal. The World Economic Forum Global Competitiveness Index for 2013 ranked South Africa last out of 144 countries on labour-employer relations. According to a World Bank report in 2007, “Over the last 25 years, the world has seen a dramatic drop in trade barriers for goods”. With increases in global trade and changes in trade policies to allow increased trade in goods and services around the world (Worldbank, 2007), employment will increasingly come under severe pressure, as more skilled labour will be used in the production of goods and the provision of services. It becomes critical for management teams within these contexts to find innovative ways in which labour productivity can be fostered, if companies in South Africa are to remain competitive on an international scale. The 2007 World Bank report went on to state “with declining labour forces in some countries and declining labour force growth in all, productivity will play a more prominent role in maintaining economic growth over the next 25 years”.

The basis for this research was this: 1) an examination of the differential effects of pay incentives on individuals, 2) given that work-teams with moderate levels of task interdependence exist in abundance in practice, and given existing frameworks of team processes, it is in the interests of both practitioners and scholars to give a fuller examination to some of the causes of differential performance among such teams, where performance could potentially be enhanced through the alignment of overall team goals using a combination of individual team member pay incentives and a hybrid incentive pay structure for team supervisors.

1.5 RESEARCH OBJECTIVES

This research, which was based within a live-working environment, had two key objectives: Objective 1) to use existing theories on interrelationships between task-interdependent work teams, pay incentives and performance as a foundation, to test the effects of pay incentives on individual performance within work teams. Objective 2) Using existing theories on the effects of pay incentives and work team processes on team performance as a foundation, the second objective of the study was to explain the sources of differential performances between similar work teams, and to track any additional emerging explanations for the observed performance patterns.

Objective 1 of the study: Testing of existing theories using variance logic

This research tracked the performances of individuals located within work teams along key performance driver dimensions in a production area. The intention of the research was to understand the performance of each individual and team using a matrix of performance dimensions, following the introduction of pay incentives, and following the allocation of individuals into work teams. To do this, the research tracked findings on the performance dimensions. Findings were tested against the theoretically expected effects from the interventions. The research also compared the performances of teams over time. In this sense, the research was theory testing within a live production environment; hence, this part of the research incorporated the testing against research hypotheses and followed variance modelling logic (Van de Ven, 2007) in a longitudinal design (Ployhart & Vandenberg, 2010). Variance analyses examined differences in performance between individuals, and between different teams. In addition, surveys were used to further improve understanding of variance between individuals and between teams. Among the main theories tested in this component of the study were goal interdependence theory (Deutsch, 1949) and social interdependence theory (Johnson & Johnson, 1989), as they pertain to the structuring of common goals within interdependent individuals in work teams; expectancy theory (Vroom, 1964) as it pertained to expected pay incentives for individuals; the testing of expected work team performance trends as found in the works of Wageman and Baker (Wageman, 1995; Wageman & Baker, 1997; Stewart & Barrick, 2000) against findings from the study.

Objective 2 of the study: Process modelling incorporating the temporal dimension

The research also sought to find explanations for differences in patterns of performance, emerging within an environment of moderate task interdependence in work teams, and hybrid supervisor rewards. The research tracked performance using individual and hybrid supervisor performance in a performance matrix.

The research design was a time-series assessment of cohorts using quantitative and qualitative data analytic techniques. The units of observation were individuals within a team; the units of analysis were both individuals and teams. This form of multi-level analysis has a well-established tradition in teams' research (Mathieu et al., 2008; Kozlowski & Klein, 2000). Performance data and surveys were used to measure individual and team based behaviours associated with performance. For instance, at the individual level, behaviours associated with emphasis on either speed or accuracy of counting were surveyed (Jenkins et al., 1998; Elliot, Helsen & Chua, 2001). At the team level, behaviours associated with goal-setting and feedback (Locke & Latham, 1990; Van Der Vegt, Emans & Van De Vliert, 2001), team processes (Cohen & Bailey, 1997; Marks et al., 2001) including intra-team coordination (Marks et al., 2001; Stewart, 2006) were assessed.

Using a multiple case-study approach and purposive sampling, individual and focus group interviews were conducted where necessary, the aim of which was to capture emerging trends on issues such team processes (LePine et al., 2008; Kozlowski & Ilgen, 2006; Marks et al., 2001) and the influence of temporal dynamics (McGrath, 1991; Ployhart & Vandenberg, 2010; Sonnentag, 2012; Stewart, 2010).

1.6 RESEARCH QUESTIONS

This section of the study deals with the questions which the research aimed to answer, and in so doing, satisfy the objectives set out for the research.

Research Question 1 (RQ1): Over time, what are the effects of introducing pay incentives on individual performance?

This question was designed to monitor, compare and explain patterns of observed versus expected changes on certain performance dimensions, over the duration of the study, for both individuals and the team. The question required tracking patterns of variance (Van de Ven, 2007) over the duration of the study. The measurement was done both at the individual and team levels. The theoretical foundations for the study are derived in-part from extrinsic motivation theories (Milkovich & Newman, 1999; Spector, 2003), such as reinforcement theory (Komaki, Coombs & Schepman, 1996) and also from intrinsic motivation theories (Milkovich & Newman, 1999; Spector, 2003), such as expectancy theory (Lawler, 1971, 1973; Vroom, 1963), goal-setting theory (Locke & Latham, 1990), and self-efficacy theory (Bandura, 1982, 2012).

Research Question 2 (RQ2): What are the effects of introducing hybrid pay incentives for supervisors, on team member performance over time?

This question was designed to track the effects on individual team-member performance following the introduction of a hybrid pay incentive structure for team supervisors. From the theory, it was expected that further improvements in performance would be achieved in both individual performance, and on overall team performance, given that the incentive structure of the work team supervisor had components of both personal and team-derived outcomes. The foundation for this question was derived largely from the work of Wageman (1995), which study showed that different high and low levels of task and rewards interdependence resulted in high levels of work team performance, while moderate levels of task and reward interdependence resulted in poor overall work team performance. This differentiation of the compensation structure for only the supervisor was being explored, within the context of moderately interdependent work teams.

Research Question 3 (RQ3): What themes emerge to explain persistent performance variance between work teams over time?

This question was intended to examine the presence of persistent variance (Van De Ven, 2007) in performance between work teams comparable on tasks and reward structures. The question was also an attempt to unearth possible explanations for differences in performance outcomes among teams, through the use of observation, surveys and interviews of participants. The question sought to explain some of the causes of observed team performance variance, and to improve the understanding of pertinent team processes (Marks et al., 2001; Van De Ven, 2007), both of which could be used explain and model persistent performance variance between comparable teams. The main theories and literature guiding this research question were, the team effectiveness model (Kozlowski & Ilgen, 2006; Marks et al., 2001) incorporating team processes (Cohen & Bailey, 1997; Marks et al., 2001). The team processes framework subsumed goal-setting and feedback (Lee, Locke & Phan, 1997; Locke & Latham, 1990) and intra-team coordination (Stewart, 2006).

1.7 RELEVANCE OF THE RESEARCH

From the literature there is evidence that, where people are organised into work teams, and where the compensation systems are able to cater for this organisation and to reward people equitably, it is highly likely that high levels of performance improvement will result (Wageman, 1995; Wageman & Baker, 1997; Weisberg, 1996). This organisation of work around the team-structure is common in manufacturing firms, and it generally follows the input – process – output model as captured by Steiner (1972), McGrath (1984), and Hackman (1987). The literature on interdependent work teams and the literature on pay incentives suggest that certain combinations of these two variables tend to result in predictable performance output and performance improvement (McGrath, 1984; Cohen & Bailey, 1997; Wageman, 1995; Wageman & Baker, 1997).

In practice, work teams are organized to produce measurable outputs, such as the number of units produced per unit time. The structure of the team is dictated by the level of interdependency of the tasks required to produce desired outcomes. Compensation structures are then generally aligned to the desired outcomes, where the outcome is measured either at the level of the individual or at the level of the team (Wageman, 1995). For instance, some work teams could have largely individual tasks, but they could be held together on the basis of the total output of the team. The opposite situation could also be true in some teams, where the team could link on the basis of the high interdependency of their tasks to achieve and outcome, while the incentives are structured around individual output.

Over the years, studies on teams have progressed from research done within experimental settings, using largely static group compositions (Huber, 1985; Latane, Williams & Harkins, 1979; Latham & Saari, 1979; Peters, Chassie, Lindholm, O'Connor & Kline, 1982) , to studies based with field settings (Cummings, 2004; Gladstein, 1984; Griffin, Patterson & West, 2001; Langfred, 2000) and the recognition and incorporation of factors such as the environment of the team and the dynamism of team compositions (Ancona & Caldwell, 1992; Gladstein, 1984; Kouchaki, Okhuysen, Waller & Tajeddin, 2012) and the incorporation of temporal effects in team studies (Harrison, Mohammed, McGrath, Florey & Vanderstoep, 2003; Marks et al., 2001; Mohammed & Nadkarni, 2011). In addition, consideration has been given to the fact that teams within organisations are nested within different contexts (i.e. there are teams within departments, and departments within an organisation and geographic location) (Ilgen et al., 2005; Mathieu et al., 2008).

The incorporation of such dynamic variables to the studies has improved the understanding of the complexity of team functioning. The result of this was a realisation by researchers of the need to perform team research using, among other designs, longitudinal designs for team analysis. In addition, research into teams has increasingly begun to employ designs which incorporate multiple levels of analysis (Stewart, 2010). McGrath (1991) in the Theory of Time, Interaction and Performance captured these types of designs. Gully, Incalcaterra, Joshi, and Beaubien (2002) demonstrated that there was a higher effect-size when performance of teams was analysed at the level of the team as opposed to analysis done at the individual level.

The functioning of work teams relies a great deal on the degree and form of interdependence of the tasks of team members – high positive interdependence largely associated with better individual performance output in interdependent work teams (Wageman, 1995). The outputs of interdependent team members can be influenced through the use of individual incentive rewards and group outputs can also be influenced through the use of collective incentive rewards systems.

Some of the important productivity performance elements within the control of manufacturing managers include work designs which optimise the utilisation of labour (e.g. should people work in defined teams; should people work as individuals; should people work in hybrid formats – both as individuals and in teams?). Another element within the control of the production manager is to find the optimum utilisation of performance incentives, within the chosen work design structure.

From a practitioner standpoint, some of the questions which the study aimed to answer and contribute to the work team discourse were: i) what combination of team-type and reward structure is suitable to achieve maximum but sustainable performance improvement for moderately interdependent teams? ii) Over what period does the performance improvement get sustained – that is, if there is an improvement in performance in the period after the introduction of incentives and the organisation of people into teams, for how long does this level of improvement last? iii) In environments where different work teams are given comparable resources, what are the causes of differences in performance between teams? iv)

Given that many forms of work-teams are moderately interdependent (as opposed to being highly or lowly-interdependent), and given that the literature suggests that moderately interdependent work teams are less-than-ideal for achieving maximum performance improvements (Wageman, 1995), to what extent can work-teams optimise the benefits of appropriately designed team and reward structures?

From an academic standpoint, some of the questions which the study was aimed at included the following: i) can we replicate (and thus corroborate) improved performances for individuals nested within teams with moderately interdependent tasks within a live-working environment, given appropriate pay incentive structures, as suggested in the extant literature? ii) What are some of the key variables involved in explaining performance variance over time between teams (which are based within a live-working environment in South Africa), and how do these variables compare to the existing literature? iii) How are the key variables working together to produce the results found within the current research context (i.e. what are the types of interrelationships involved between the variables) to explain variance in team performance?

The efficient use of resources is a critical strategy which both firms and countries need to focus on and leverage, if they are to be competitive (Barney, 1991; Prahalad, 1983; Vietor, 2007). Methods to improve labour productivity are required by most manufacturing organisations (World Bank, 2007), more so within the context of developing country economies, such as those found in Africa.

The following section deals with the challenges on labour productivity within the South African context.

1.8 THE RESEARCH WITHIN THE CONTEXT OF SOUTH AFRICA

South Africa was the largest economy on Gross Domestic Product (GDP) in Sub-Saharan Africa, according to the World Bank report (World Bank, 2007). The population size in South Africa was estimated at 50, 5 million, with GDP of 408 billion USD. According the 2012-2013 Global Competitive Index, the Sub-Saharan region is falling behind the rest of the world on competitiveness: “More generally, sub-Saharan Africa as a whole lags behind the rest of the world in competitiveness, requiring efforts across many areas to place the region on a firmly sustainable growth and development path going forward” (World Economic Forum, 2012).

Despite the trends between 1970's and 1990s' showing decreasing levels of reliance on the use of unskilled labour in South Africa, a relatively high level of use of labour within production environments predominates (Bhorat & Hodge, 1999). This high degree of dependence on labour is expected to continue, as a means to sustain employment creation in the light of the "job-shedding growth" trends (Edwards, 2004) which the South African economy has experienced. Unionisation of labour in South Africa is very well developed (Behar, 2010; Vietor, 2007), supported by two pieces of legislation, the Labour Relations Act of 1995, and the Basic Conditions of Employment Act of 1997, as amended. These pieces of legislation (and others) govern the relationships between employer and employee, and are supported through the use of sector Bargaining Councils which negotiate wage increases for sector employees. Bargaining councils are also key in negotiating working conditions such as working hours, leave schedules (such as the duration of maternity, paternity, family responsibility and sick leave). Uneasy tension between organised labour, government and employers exists (Vietor, 2007; WEF, 2013). A culmination of this tension was brought into glaring visibility in the tragic shooting to death of 37 protesting mineworkers in a mining town of the North West province of South Africa, called Marikana, in 2013. While the Global Competitiveness Report for 2012-13 noted that progress had been made in South Africa on a number of areas, including strong financial market development (ranked 3rd out of 144, accountability of private institutions (ranked 2nd), goods market efficiency (ranked 32nd), the following is an extract from the report about South Africa: "However, in order to further enhance its competitiveness, the country will need to address some weaknesses. South Africa ranks 113th in labour market efficiency (a drop of 18 places from last year), with rigid hiring and firing practices (143rd), a lack of flexibility in wage determination by companies (140th), and significant tensions in labour-employer relations (144th)".

Firms which operate within the South African environment and which rely on labour productivity as a key competitive advantage, need to continue to find productivity improvements if they are to remain competitive in the future (Edwards & Golub, 2004; van Dijk, 2003). Similarly, labour productivity requires continuous improvement in order to ensure factor productivity competitiveness. South African manufacturing productivity performance is no different, and needs to be improving, if the country is to remain competitive.

The learning from research in this area within the South African context should also begin to clarify some previously poorly delineated issues in the research on the use of hybrid pay incentives for work teams, within environments where teams have interdependent tasks. It was the aim of this study to improve understanding on how hybrid-pay and task structures in teams affect performance, over time. Given the importance of labour in productivity, it is critical for business and scholars to more clearly understand how the productivity elements within the control of managers may be used to improve performance. Even more important however, is the need for more in-depth understanding of impact, over time, of some the levers which managers use to improve performance - such as pay incentives and work-team structures. Moreover, managers need to understand how sustained differences in performance can arise, as a means to improve overall productivity and competitiveness of work teams within the South African business context. For scholars, the incorporation of time as an input variable within the team effectiveness framework, enriches the understanding of how some of the covariates in the team effectiveness model gain prominence as time passes, on the relationships between work-teams and overall team effectiveness.

1.9 SUMMARY AND ORGANISATION OF THE RESEARCH CHAPTERS

This section of the research describes how the rest of the study is organised, and the flow of the topics within the study.

Chapter 2 of the study is a review of the pertinent literature. The logic of the sequencing of topics in the study is based on the team processes model. The introduction to the chapter begins with an examination of social interdependence theory, which is the underlying theory used in the study. Following the foundation theory are topics which underpin the team processes model, beginning with the interdependence construct. This is followed by topics on team tasks, incentives in teams, and various topics of constructs which influence the relationships between teams and performance, as outlined in the team effectiveness model. The chapter concludes with an examination of the team effectiveness, construct, as this forms the basis of the model and design of the study.

Chapter 3 outlines the relationships for team effectiveness, which are described in the literature. These literature-derived relationships are used to construct a literature-based model for work-team performance; this model is described and presented at the end of the same chapter. From the literature-derived model, research hypotheses were then formulated, based on the expected changes in performance variables and trends, following the introduction of the two interventions (the two interventions are described in more detail in chapter 4, section 4.5 of the study).

Chapter 4 focusses on the research methods used, dealing with the research design, the research methodology, and the pilot study - including brief descriptions of some of the nuances of the research environment which were relevant to this study. Chapter 4 also describes the two interventions, their roles and their timing within the research; the section on interventions will show where and how these interventions fit into the overall research design. The chapter concludes with an in-depth description of the quantitative and qualitative data sources, uses and the analytical techniques employed to examine the data.

Chapter 5 contains the results of the study, beginning with the results of the pilot study. The sequencing of the presentation of the results, follows the sequence of the research questions.

Chapter 6 is an in-depth discussion of the study results, focussing on the research objectives posed in section 1.5, and following the sequence of the research questions posed in section 1.6.

Chapter 7 is the concluding chapter. The chapter begins by summarising the main findings from the research. The summary is followed by detailing the contributions of the study to the literature on work-team effectiveness, the contributions of the study to research methods and the contributions of the study on work-teams to practitioners. The chapter is concluded with recommendations to practitioners and recommendations for further research, based on the findings the study.

CHAPTER 2: REVIEW OF LITERATURE

2.1 INTRODUCTION TO THE LITERATURE REVIEW

The literature review section of the research provides an outline of the main themes and constructs intended for research. Social interdependence theory (Johnson and Johnson, 1989) is presented as the over-arching theory for this research. The premise for social interdependence theory is that people working together are held together by the structure of their goals; where the structuring of the goals promotes cooperation, people will cooperate, and where the goals are structured to encourage competition, people will compete. Social interdependence theory draws largely on goal interdependence theory which was advanced by Morton Deutsch as early as 1949 (Deutsch, 1949). Drawing on the empirical works of, amongst others, Levine & Moreland (1990), and Steiner (1972). Joseph McGrath (McGrath, 1984) developed frameworks mapping out group interaction processes. These frameworks were later to be developed by Susan Cohen & Diane Bailey (Cohen & Bailey, 1997) in their review and summary of team studies from 1990 to 1996. Further development of the team processes framework were to be made by Michelle Marks, John Mathieu and Stephen Zaccaro (Marks et al., 2001), which culminated in current predominant framework of team effectiveness used, a version of which is shown in Figure 1 below. In the literature, there is also enough empirical evidence, in support of the links between the use of pay incentives to improve performance and, more importantly, the use of pay incentives to align individual goals within work team structures (Jenkins et al., 1998; Wageman, 1995; Wageman & Baker, 1997). The use of properly structured pay incentives, combined with an understanding of the levers within the team effectiveness framework which foster sustained performance over time, supports the propositions encompassed within social interdependence theory, and the use of this theory as an overarching framework for this study. In their study on team cooperation, competition and performance, Beersma and colleagues (Beersma et al., 2003) used goal interdependence theory as a foundation theory.

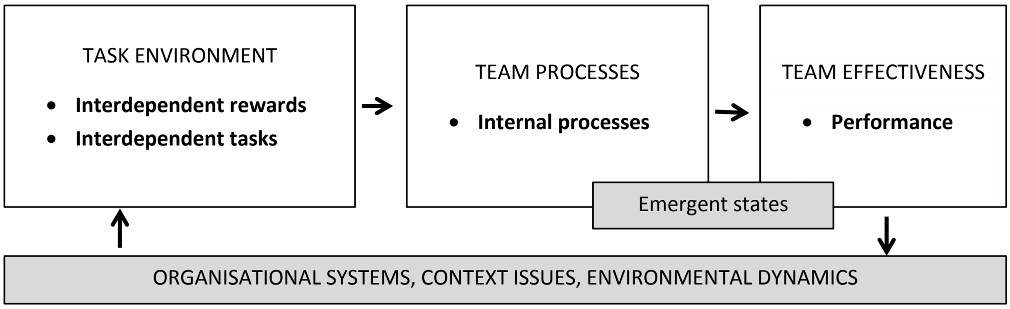

Figure 1: Relationships to be studied within team effectiveness model

Figure 1 shows the components of the team effectiveness model which this study addressed. The structure of the literature review follows the framework shown in Figure 1, although the literature review will also deal with pay incentives and social interdependence theory, both of which do not form part of the team effectiveness model. This literature review section begins with a section which deals in more detail with social interdependence theory, and its derivations, because the theory forms the basis which this study used to examine task interdependence, work teams and goal alignment. The section on social interdependence theory is followed by a review of the interdependence construct, particularly as it pertains to positive interdependence and task interdependence. The next section deals with team tasks which addresses the types of team tasks performed by work teams, and the trade-offs which team members make in performing the tasks. The section reviews two dimensions of tasks (speed and accuracy) in relation to performance.

The next section of the literature review deals with the effects pay incentives have on performance. This section will deal with the motivations for the use of pay incentives, and the empirical evidence surrounding their use. The section also deals with the issues surrounding the use of hybrid incentives. Although pay incentives form a critical part of the study, it is important to note that they do not form part of the formally recognised framework for team effectiveness, which is why they are not shown in figure 1.Next, the section deals with the literature on teams, and the section discusses what is known on work-teams in particular. The section also deals with the features of teams, the types of teams, team effectiveness, team behaviours and the consequences of these variables on performance.

2.2 SOCIAL INTERDEPENDENCE THEORY

The structure for understanding cooperation and competition was conceptualised by Morton Deutsch in his "A Theory of Cooperation and Competition" (1949). The foundations for Deutsch's monograph were developed based on the works of Chester Barnard (1938), Charles Child (1924), Fritz Heider (1946), Ernest Hiller (1933), Kurt Lewin (1947) and Kurt Koffka (1935) among others. In time, various approaches to the cooperation and competition have led to the conceptualisation of the interdependence construct and its associated theories; some of these theories include social interdependence theory, which is largely associated with Johnson and Johnson (1989) and goal interdependence theory (Van Der Vegt, Emans & Van Der Vliert, 2001; Beersma et al., 2003), which is effectively what Deutsch's theory is called today by most researchers, based on the original monograph.

Deutsch's goal interdependence theory of cooperation and independence categorised situations which, when structured in one way led to cooperation, while if structured in another way, led to competitive / independent behaviour. The monograph described and clarified the concepts of groups, forms of cooperation within groups, and differences in types of interdependence. According to Beersma et al., (2003), "theory and empirical data associated with goal interdependence theory suggest that the reward structure employed in a given context needs to match the task at hand". The performance of teams and the alignment of goals through competitive and cooperative tasks and reward structures has subsequently been studied and reviewed in meta-analytic studies extensively (Bettenhausen, 1991; Cohen & Bailey, 1997; Stewart, 2006).

The next sections of the study introduce extensions of the original conceptualisation of the theory of cooperation and competition, using modifications of and extensions to the concept of interdependence. Before embarking on this however, here are some important definitions, which were adopted in this research; they were extracted from Johnson and Johnson (2005).

Johnson and Johnson (2005) describe a goal as "a desired future state of affairs". Using this notion, the manner in which goals are structured (goal structure) specifies the type of interdependence which prevails among individuals (positive or negative). The type of interdependence which prevails defines how individuals interact to achieve their goals (Beersma et al, 2003; Johnson & Johnson, 2005; Marks et al., 2001).

The emphasis of the social interdependence theory is on the effects of the goal structure on the interaction patterns which emerge from people as a result of that goal structure. A goal is described as a “desired future state of affairs” (Johnson & Johnson, 2005) and interaction is described as “individuals’ simultaneous or sequential actions that affect the immediate and future outcomes of the other individuals involved in the situation” (Johnson & Johnson, 2005). Interaction can be “direct” or “indirect”, promotive or competitive, and outcomes are thus the “consequences of the interaction” (Johnson & Johnson, 2005).

Because both goal interdependence theory and social interdependence theory are extensions of Deutsch’s *A Theory of Cooperation and Competition* monograph, the two theories are largely similar, except for at least one important distinction: while goal interdependence theory concerns itself with goals (outcomes), social interdependence theory deals with the interaction patterns which transpire between individuals as a result of the manner in which goals are structured.

While performance is an important variable of focus for this research, the interaction patterns in the independent variables, are the major area of interest. The interaction patterns and actions taken by individuals and the manner in which these variables are associated with performance, are examined over time in a live working environment. Social interdependence theory is therefore examined in more detail in the sections which follow.

Johnson and Johnson (2005) define interaction as “individuals’ simultaneous or sequential actions that affect the immediate and future outcomes of the other individuals involved in the situation”. It is within interaction that the opportunity exists to (a) promote and facilitate the goal attainment of others (b) obstruct and block others’ goal attainment. According to the Johnson and Johnson, such interactions may be either direct or indirect.

“Direct interaction takes place through such means as oral, written or electronic communication. Indirect interaction occurs when a person acts in a way that increases or decreases the other person’s chances for successful goal accomplishment without actual interaction taking place” (Johnson & Johnson, 2005). The authors further state that the “interaction patterns determine outcomes”, however, the way in which goals are structured determines the level of direct and indirect interaction patterns.

2.2.1 BASIS OF SOCIAL INTERDEPENDENCE THEORY (SIT)

Social Interdependence theory is based on the premise that "the structure of the goals of the people in the situation determines how participants interact and the interaction patterns determine the outcomes of the situation" (Johnson & Johnson, 2005). Social interdependence theory is composed of the construct social interdependence, which is underpinned by actions, psychological processes, interaction patterns and the outcomes associated with either positive or negative interdependence (Johnson & Johnson, 2005).

In their review of developments of the social interdependence theory, Johnson and Johnson (2005) demonstrated how the theory has found applicability in various fields, since its inception by Deutsch. Among the fields in which Social Interdependence theory has found relevance and used extensively are in education, conflict resolution (Tjosvold, 1991; Tjosvold & Johnson, 1983) and in business contexts (Tjosvold, 1991; Johnson & Johnson, 2005).

2.2.2 MEDIATING VARIABLES IN SOCIAL INTERDEPENDENCE

In work done on cooperative learning, a vast amount of research effectively isolated several key mediating variables. These variables, as summarised by Johnson and Johnson (2005) included i) individual accountability, ii) Promotive interaction, iii) social skills iv) group processing and v) positive interdependence.

2.2.3 TASKS IN SOCIAL INTERDEPENDENCE

In the literature, there are differences of opinion on the role of tasks in interdependence. Review studies done by Miller and Hamblin (1963) and Zajonc (1965) concluded that simple repetitive and unitary tasks lend themselves to competitive interdependence work designs, while conceptual tasks are better supported by cooperative interdependence work designs. This distinction and findings between repetitive and conceptual tasks were however not supported conclusively in subsequent research (Johnson & Johnson, 1979, 1981). In studies carried out in the school learning environment in particular, Johnson and Johnson (1989) found that cooperative interdependence was more effective than competitive interdependence in supporting performance in every task studied.

2.2.4 Social Interdependence Theory in the Business environment

The team based approach is a fundamental work structure within many businesses (Tjosvold, 1989; Johnson & Johnson, 2005). In the business environment, the team structure can be found in the form of departments, work teams, brainstorming teams and many other forms. In these environments, social interdependence has been applied as a means to better understand the functioning of the team structure, and some of this understanding has been used to inform the appropriate reward structures (team and individual reward systems which target overall team performance).

2.2.5 Boundaries of the Social Interdependence construct

The concept of interdependence, as conceptualised by Deutsch (1949) had two features: positive interdependence and negative interdependence.

Using Johnson and Johnson's (2005) description, positive interdependence exists where "individuals perceive that they can attain goals if and only if, the other individuals with whom they are cooperatively linked attain their goals". Negative interdependence exists where "individuals perceive that they can obtain their goals if and only if the other individuals with whom they are competitively linked fail to obtain their goals". Finally, no interdependence (or individualistic effort) exists when "individuals perceive that the achievement of their goals is unrelated to the goal achievement of others".

In formulating social interdependence theory, positive interdependence is characterised by effective actions which are taken by participants, while bungling is employed by participants in the case of negative interdependence. Effective actions are actions which are employed in order to improve chances of success in goal achievement, while bungling actions are actions taken with the aim of reducing the chances for goal achievement. Effective actions are associated with promotive interaction patterns in positive interdependence, while bungling actions are linked to contrient/oppositional interaction patterns in the case of negative interdependence.

Promotive interaction is defined by Johnson and Johnson (2005) as "individuals engaging in actions that increase the likelihood of each other's success in achieving the joint goal." The components of promotive interaction according to Johnson and Johnson include (a) mutual help and assistance, (b) the exchange of required resources, (c) effective communication, (d) mutual influence, (d) trust, (e) constructive conflict management.

Johnson and Johnson (2005) describe oppositional interaction as situations in which "individuals engage in actions that reduce the likelihood of other's successful achievement of the joint goal; individuals focus both on increasing their own productivity and on preventing any other person from producing more than they do". The variables associated with oppositional interaction include (a) the obstruction of each other's goal achievement efforts, (b) distrust, (c) striving to win in conflicts.

This research focuses on the examination of positive interdependence in a work environment. In particular, the research focusses on the actions taken by individuals in a work team, together with their patterns of interaction, as they try to achieve positive interdependence. The research does not deal with negative interdependence in any great detail, other than to allude to the concept where it may be relevant in influencing either actions or interaction patterns between team members. The research also does not deal with the psychological processes involved between team members.

2.3 INTERDEPENDENCE

The concept and study of interdependence as a construct in human relations traces its origins to Gestalt Psychology and Lewin' s Field Theory in the 1900's (Johnson & Johnson, 2005). Gestalt (or "whole") psychology focussed on the how people perceive the world as composed of integrated events of "wholes", as opposed to viewing events in isolation. In Gestalt psychology, the world is thus perceived as an integrated whole, composed of interdependent elements. For interdependence to exist among people, there would then need to be "more than one person" involved, and the people "must impact each other, in that a change in the state of one causes a change in the state of the others" (Johnson & Johnson, 2005).

A lot of work has been done in the field of cooperation, competition and interdependence over the years (Johnson & Johnson, 1989; Miller & Hamblin, 1963; Wageman, 1995; Guzzo & Dickson, 1996; Langfred, 2000; Van Der Vegt et al., 2001; Beersma et al., 2003). Various models of interdependence have been developed as a means to improve understanding of the concept (Johnson & Johnson, 1992). The formats which have been developed to study the interdependence construct include studies on interdependence of task inputs and processes (Wageman, 1995), goals (Van Der Vegt et al., 2001 and performance rewards (Wageman, 1995; Saavedra, Earley & Van Dyne, 1993)

Wageman describes task interdependence as work that is structured such that it requires the “input of several people to complete it” (Wageman, 1995: 145). Wageman (1995) contrasts this to individual work which “can be structured to be highly independent and to be performed by individuals” (Wageman, 1995: 145). Wageman (1995) describes four sources of interdependence – two input oriented sources of interdependence and two output oriented forms of interdependence. The two input oriented interdependence sources described by Wageman are input tasks associated with the work to be performed and the input processes through which work outcomes are achieved. These were named task interdependence by Wageman. The two outcome oriented sources of interdependence are the manner in which outcomes are defined and the manner in which performance is rewarded.

Wageman (1995) describes task interdependence as a “structural feature of work…” where “tasks can be designed to be performed at varying levels of interdependence” (Wageman, 1995: 146-147). Wageman describes outcome interdependence as “the degree to which significant outcomes an individual receives depends on the performance of others”, where a “non-interdependent reward is one given exclusively for individual excellence”. (Wageman, 1995: 147).

The concepts of positive and negative interdependence derive a lot of credence from the work of Deutsch (1949), and Lewin (1935), where interdependence was shown to be a result of how goals are structured between people. Johnson and Johnson (1989) also show how both positive and negative interdependence can further be subdivided into means interdependence, boundary interdependence and outcome interdependence. Means interdependence, describes situations where participants are linked by the resources which they share and need, in order to complete a task; boundary interdependence describes those instances where participants are interdependent because of the delineations or boundaries between their roles; outcome or goal interdependence is defined by those instances where the final goal is the main method linking participants. In the case of goal interdependence, the method of reward can also be classified as part of outcome interdependence.

Van Der Vegt et al., (2001) further describe a concept they call "goal interdependence" as a form of interdependence "that captures both group goals and group feedback" (Van Der Vegt et al., 2001, p. 52); they describe goal interdependence as "the degree to which group members are assigned joint group goals and receive group feedback".

The classifications and definitions of interdependence listed above are adopted for the purposes of the current research.

Wageman (1995) has shown that high interdependence is a feature generally associated with the aim of putting together teams: that the collective knowledge and learning which accrues in such designs can be associated with higher performance of the teams along outcome measures. Wageman's research also shows that low levels of interdependence result in higher individual performances. Along this continuum of interdependence, is a moderate form of interdependence, where a combination of individual and team effects come together.

Wageman (1995) and Saavedra et al., (1993) have shown in different studies that both high levels and low levels of interdependence can be associated with higher performance compared to moderate levels of interdependence (i.e. the relationship between performance and interdependence is curvilinear – in the form of a U shape). The literature has little in-depth information on the effects of medium forms of interdependence on performance, although these forms of interdependence are to be found in practice. On the overall impact of the interactive effects of hybrid tasks and hybrid rewards, Wageman (1995) cautions thus: "It remains possible, nonetheless, that congruence between the level of interdependence of tasks and outcomes may be critical for group performance". Wageman (1995) concluded that the lower performance associated with hybrid models of tasks and rewards - moderately interdependent teams with moderately interdependent tasks - could be due to reduced to helping behaviours and learning among teammates. In addition, this research speculated that "it may be that when hybrid tasks are combined with hybrid outcomes, groups perform better than when hybrid tasks and outcomes are combined with group or individual outcomes and tasks" (Wageman, 1995). In a cross-sectional study of 45 production teams, Stewart and Barrick (2000) however found that the relationship between interdependence and performance in teams concerned with behavioural tasks was curvilinear in the form of an inverted U-shape.

Within the South African context – with a high level of labour intensity and high unemployment - more in-depth understanding of the effects of moderate interdependence is warranted. Within the context of a developing and largely labour intensive economy, it is important to spend effort to improve the knowledge around the work-structure of moderately interdependent teams.

The literature on incentives suggests specific reward structures be used for different levels of interdependent work-team structures (Wageman & Baker, 1997; Wageman, 1995; Rosenbaum, Moore, Cotton, Cook, Hieser, Shovar & Gray, 1980). In the current study, moderately interdependent teams are the focus of further study due to the need to improve understanding of the performance complexities which are associated with this work structure. The findings from this study will be applicable is settings where there is a need for improved understanding of moderately interdependent teams, by both scholars and management practitioners.

The alignment of goals within teams (as per Deutsch's 1949 goal setting theory) is a critical component of performance within the team work structure (Cf. Beersma et al., 2003, p. 573-574). Goal alignment and performance in teams has subsequently been reviewed in several other meta-analytic studies (Cf. Bettenhausen, 1991; Cohen & Bailey, 1997; Stewart, 2006). These meta-analytic reviews show support for Deutsch's (Deutsch, 1949) goal-setting theory. In their review of studies on goal setting, Locke and Latham (1990) also identify the criticality of goal-setting with group feedback to team performance.

2.3.1 POSITIVE INTERDEPENDENCE

Deutsch (1949), and Johnson & Johnson (2005) describe positive social interdependence as existing in situations where individuals' actions are directed at working towards the achievement of common goals, and "individuals perceive that they can attain their goals if, and only if, the other individuals with whom they are cooperatively linked attain their goals" (Johnson & Johnson, 2005.) Positive interdependence results is characterised by promotive interaction patterns and cooperation between the individuals involved. Positive interdependence is fostered by the alignment of goals – goal interdependence (Johnson & Johnson, 2005).

According to Johnson and Johnson (2005), a critical variable mediating cooperation is that the participants must perceive that positive interdependence exists. According to the authors, this means that all members of the group must perceive that they are working together to accomplish joint targets. In researching social interdependence in the learning environment, simply creating positive interdependence, was found not to be a sufficient condition to compel learners to contribute to group goals. In these studies, it was found that it was necessary to create individually specific goals which contributed to the overall desired outcome.

As a means to practically implement positive interdependence among team members, research has resulted in several theoretical distinctions, based on the approach used to achieve interdependence. Johnson and Johnson (2005) list means interdependence, boundary interdependence and outcome interdependence as three such distinctions of ways in which positive interdependence can be practically accomplished. Some examples quoted by authors who have used this process in other research settings include, the division of resources among participants; assigning of specific workspaces for team members; assigning roles for each player within the group and rewarding output, based on group effort, and also rewarding of individuals based on individual effort only.

2.3.2 NEGATIVE INTERDEPENDENCE

Deutsch (1949), and Johnson and Johnson (2005) describe negative social interdependence as situations where the actions of individuals work against another person's desired goals; and where "individuals perceive that they can obtain their goals if and only if the other individual with whom they are competitively linked fail to obtain their goals" (Johnson and Johnson, 2005).

2.4 TASKS

In this research I define individual tasks as those tasks that can be performed solely by the individual with little or no dependence on other members of the team. Group tasks are tasks which are dependent on team cooperation and effort, while hybrid tasks are tasks which combine aspects of individual and group effort for accomplishment. Hybrid tasks are accomplished through hybrid teams. The concept of task interdependence however needs to be conceptually separated from independent tasks which can be shared (and interdependent tasks which can be separated and decoupled in order to make them to feel independent (Wagner et al.,, 2012).

Tasks have been classified in various formats. The work of McGrath (1984) forms the basis for the most widely accepted typology of tasks performed by teams within actual work environments (Stewart & Barrick, 2000). McGrath's typology classifies work performed by teams into four: 1) generating ideas and plans (planning); 2) choosing between alternatives (deciding); 3) negotiating conflicts of interest (negotiation) 4) executing. This typology also shows that team tasks can be placed along a continuum ranging from one end as conceptual tasks and behavioural tasks on the other end of the continuum. The typology makes it clear that teams can move back and forth along the continuum, depending on the work type that they perform. Figure 2 illustrates McGrath's typology.

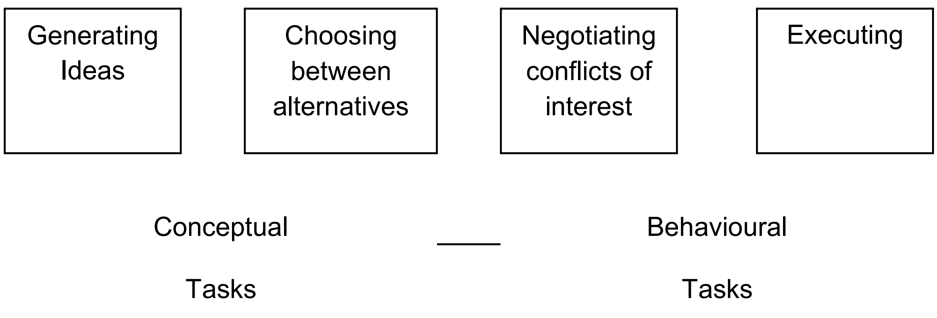

Figure 2: McGrath's typology of tasks

In a meta-study reviewing group effectiveness research between January 1990 and April 1996, Cohen and Bailey (1997), the types of teams found within operational environments were organised by the researchers into a heuristic classification, one of which was work teams. The work teams from this study can be re-classified as doing predominantly behavioural tasks according to McGrath's typology of tasks, since these teams are mainly concerned with executing.

Task types and the design of tasks in teams have been shown to affect team performance (Cohen & Bailey, 1997; Stewart & Barrick, 2000; Wageman, 1995; Wageman & Baker, 1997). In his quantitative meta-analytic review of team studies, Stewart (2006) shows that at the level of the team, intra-team coordination and task meaningfulness have a relationship with team performance, depending on the task type.

2.4.1 TASK DIMENSIONS

Tasks have different dimensions. Common dimensions of tasks include the speed and the accuracy with which a task can be performed. The extent to which task execution can be accomplished by different individuals, depends, to some extent on the impact of the different dimensions on the task. For instance, some tasks can be performed with very high accuracy, while sacrificing speed. The ability to perform tasks also differs, depending on the degree to which the tasks can be performed using independent action or group action. Complex tasks generally require a combination of speed and accuracy (Beersma et al., 2003), but there is a trade-off between speed and accuracy when performing these tasks (Elliot et al., 2001). Incentives appear to have different influences on the degree of emphasis on speed and accuracy in teams (Jenkins et al., 1998). Condly, Clark & Stolovitch, (2003) found that incentives positively affected both task speed and task accuracy following a review of a sample 45 out of 600 studies on the effects of incentives on team performance. From the literature, it would be expected then that, in cases where speed and accuracy were equally important in the performance of a task, more emphasis would be placed on getting through the work quicker, thus sacrificing the accuracy of the task. The challenge in both task and reward design, would then be how to design the work structure recognising the importance of the trade-off.

2.5 INCENTIVES AND PERFORMANCE

Based largely on the works of Allen et al., (2003); Wageman, (1995); Wageman & Baker, (1997), in this research, incentives are defined as follows: individual incentives as those incentives which accrue to the individual only. These incentives are based largely on measurable and objective outcomes of the individual. I define group incentives as those incentives which accrue in some form of pro-rated distribution to team members, largely based on the assessment of overall performance of the group (group outcomes). Finally, I describe hybrid incentives as those incentives which are based on a combination of both individual performance outcomes and group performance outcomes (i.e. hybrid incentives include components of both group and individual incentives).

The relationship between financial incentives and performance has been an area of much thought, assumption, theorising and empirical research for a long time (Jenkins et al., 1998), both within business settings and for researchers (Jenkins, 1986; Marriott, 1957; Opsahl & Dunnette, 1966; Lawler, 1971, 1973; Vroom, 1964; Deci, 1971, 1972a, 1972b; Deci & Ryan, 1985; Wright, 1989; Barnes et al., 2011; Wagner et al., 2012). There are several theoretical foundations which drive the approaches to compensation and performances, the most prominent of these being individual motivation. These theoretical foundations can be classified into three categories: intrinsic motivation theories (e.g. Expectancy theory), extrinsic motivation theories (e.g. Reinforcement theory) and interactive factor theories (e.g. Social and Information Processing theory). Prevalent frameworks used to explore the relationships between money and performance includes equity theory (Adams, 1965) expectancy theory (Lawler, 1971, 1973; Vroom, 1963), reinforcement theory (Komaki et al., 1996), goal-setting theory (Locke, Latham, & Erez, 1988) and cognitive evaluation theory (Deci, 1971, 1972a, 1972b; Deci & Ryan, 1985).

Examples of intrinsic motivation theories include Vroom's Expectancy Theory, Maslow's Hierarchy of Needs. These theories focus largely on internally driven derivations of performance outcomes (Milkovich & Newman, 1999). Expectancy theory is premised on the notion that people are inclined to link their efforts to particular expectations of reward or performance outcomes. In this way, the individual will place additional effort in expectation of a defined outcome of both performance output and associated rewards. The Social and Information

Processing Theory (SIP) is an example of individual motivation theory which focuses on the role of factors outside the control of the individual - such as co-worker performance, supervisor-set targets – to positively affect the performance outputs of individuals (Milkovich & Newman, 1999).

Largely credited to Vroom (1964), expectancy theory is based on the relationship between the amount of effort made to carry out a task and the expected rewards associated with the effort exerted. The basis of the theory has three elements: expectancy, instrumentality and valence. Expectancy relies on the individual's own expectation that they have the ability to perform a task. Instrumentality emanates from belief in the compensation system (i.e. the individuals must believe that the organisation has the ability to deliver on the pay promise). Valence addresses the value associated with achieving the task by the individual (Milkovich & Newman, 1999).

The theory makes certain predictions about pay-based-performance (PBP): firstly, the theory predicts that in order for PBP compensation systems to work effectively, individuals must be clear about the boundaries of their jobs. The theory also predicts that PBP rewards must be large enough to be seen / perceived by individuals as being meaningful. Third, the theory predicts that individuals will follow practices that deliver the largest expected reward, given their own limitations (Milkovich & Newman, 1999).

The SIP theory is an example of an extrinsic motivation theory (Milkovich & Newman, 1999). SIP theory focuses on interactive factors which motivate individuals, where people pay attention to what the environment is signalling. An example of an Interactive factor theory is one that identifies factors resulting from working in an interactive space as important factors. Examples of interactive factors would include consideration of competition and participation to assess individual commitment and performance; these theories include the work of Locke et al., (1988). Social and information processing theory predicts that social pressure and information non-verbal cues from the surroundings result in people acting differently. This theory is applicable in team situations, where peer-pressure can force an upward performance curve, where other peers are performing better. The theory has close ties with social loafing (Locke et al., 1988).

There are other theories of motivation which are important in understanding and developing rewards, including Adams' Equity Theory (Adams, 1965). This theory suggests that people are motivated when their individual contribution is recognised and rewarded accordingly in comparison to their surroundings.

Skinner's Reinforcement theory (Skinner, 1953) suggests that creating deliberate reward links to specific performance outputs increases performance. Goal setting and Agency Theory (Milkovich & Newman, 1999) postulates that it is possible to obtain higher goals (and hence, performance) levels when financial incentives are linked to the goals. Cognitive evaluation theory (Deci, 1971) states that when rewards are linked to performance, this association leads individuals to lose intrinsic motivation, and that this may affect task performance negatively.

2.5.1 USES OF INCENTIVES

Proponents for the use of financial incentives argue that performance improvements of employees are strongly associated with the use of these incentives, and that the use of financial incentives is in addition associated with the re-enforcement of "desired behaviours" in employees (Baker, Jensen, & Murphy, 1988; Jenkins et al., 1998; Jenkins & Gupta, 1982; Locke, Feren, McCaleb, Shaw, & Denny, 1980; Locke, Shaw, Saari, & Latham, 1981; Skaggs, Dickinson, & O'Connor, 1992). Productivity improvements have been demonstrated to be linked to the introduction of financial incentives (Barnes, 1949; Reiners & Broughton, cited in Marriott, 1968; Wyatt, Langdon, & Marriott, cited in Marriott, 1968); similarly, productivity declines have been shown to be associated with the removal of financial incentives (Jacques, Rice, & Hill, 1951; Opsahl & Dunnette, 1966). Employers successfully use financial incentives to reward positive "marginal" productivity variances of employees and to reduce the costs associated with dysfunctional behaviours of employees (Abelson & Baysinger, 1984; Jenkins et al., 1998). To employees, financial incentives not only mean more money, but the incentives represent much more than their monetary value (Steers, Porter, & Bigley, 1996), including "recognition and status" (Jenkins et al, 1998). In a quantitative meta-review of 39 studies on the relationship between financial incentives and performance, Jenkins et al., (1998) found that, although financial incentives were somewhat associated with increased individual performance quantity, this relationship did not exist with performance quality. This finding was similar to findings in an earlier qualitative meta-review by Jenkins (1986).

The use of financial incentives has shown that, while the incentives appear to control the externalised behaviours of employees, the incentives also appear to reduce both the intrinsic motivation (Eisenberger & Cameron, 1996; Kohn, 1993; Skaggs et al., 1992) and the self-determination of employees (Deci & Ryan, 1985). Financial incentives were also found to reduce desirable risk taking behaviours of the employees (Jenkins et al., 1998). In addition, financial rewards appear to have a negative effect on the relationships between employees and their supervisors (Meyer, 1975). Kohn (1993), Demming (1986), Huselid (1995) are among those who are more sceptical about the role of incentives on performance. In his Harvard Business Review article, Kohn (1993) argues that incentives only help in securing temporary compliance. He argues that incentives do not motivate; they are punitive and destroy relationships; they ignore reasons, discourage risk taking, and they undermine interest. To support his argument, Kohn uses a large amount of evidence from scholars ranging from Herzberg (1968), Deci and Ryan (1985), and many other authors. However, what Kohn's review fails to address is the role of intervening variables between incentives and performance.

It would appear that those scholars who defend the role of incentive programs tend to ascribe the failures of some incentive programs to the management of the underlying incentive program (Kohn, 1993). On the other hand, sceptics of financial incentive programs attack the programs from the angle that the programmes are based on fundamentally flawed psychological assumptions.

2.5.2 INCENTIVES AND TEAMS

Incentives in teams have been studied in a variety of settings. These settings include studies in which the incentives are totally independent (i.e. the incentive is paid for individual performance) (Barnes et al., 2011; Shaw, Gupta & Delery, 2002) to settings where the incentives are interdependent (i.e. the incentive is paid for some level of group performance) (Allen et al., 2003; Barnes et al., 2011; Bussin, 2011; Shaw, et al., 2002; Wageman, 1995; Wageman & Baker, 1997). Incentives in teams have also been studied in settings where the associated tasks are independent (Beersma et al., 2003) to study settings where the associated tasks are highly interdependent (Allen et al., 2003; Wageman & Baker, 1997). There was, unfortunately, a lack of empirical work on the impact of pay incentives within team settings in the context of South Africa at the time of this study; hence, other than the work of Bussin (2011), this study lacks the depth of reference which would have been desired.

In their experimental study, Wageman and Baker (1997) found that, while incentives were important to performance, its effects were linked to task interdependence which affected cooperation within the team. In effect, there was no evidence of the independent effects of incentives on performance in teams. Wageman and Baker did however find that interdependent incentives have an influence on performance where the tasks are highly interdependent. However, in another laboratory experimental setting, using 57 groups of 3 students each, to examine the differential effects of task and reward interdependence on performance, helping behaviour and effort, Allen et al. (2003) did not find support for the interactive effects of task and reward interdependence on performance which was found in the Wageman & Baker study of 1997.

Drawing on several theories – including individual motivation and institutional theory – Shaw et al., (2002) studied the effects of pay dispersion on workforce performance using survey research techniques. The research found that, workforce performance was related with situations where base-pay dispersion was aligned to individual work and individual incentives. The researchers also found that base-pay compression was associated with high performance in instances where there were no individual incentives and where tasks were interdependent.

In a simulated task experiment using 75 four-person teams, Beersma et al., (2003), investigated the relationships between team performance and the reward structure of the team, specifically to investigate the intervening roles of task dimension, team composition and individual performance levels. Their study found that a competitive (individual) reward structure enhanced the task dimension of speed, while a cooperation (group) reward structure enhanced the task dimension of accuracy.

In a meta-study on the effects of incentives on work-place performance, Condly, Clark, and Stolovitch, (2003) reviewed 600 studies and sampled 45 of these studies as qualifying for final analysis. Overall, their results indicated that there was an average 22% gain in performance as a result of the introduction of incentives in team settings. Some of their other findings include the following 1) team incentives appeared to be associated with higher performance as opposed to individual incentives; 2) money was found to be associated with higher performance when compared to non-monetary incentives; 3) higher performance gains were associated with manual rather than cognitive work; 4) both quantity and quality dimensions of performance are positively correlated with incentives; 5) larger performance improvements are associated with longer term (6 months or more) incentives programmes.

2.5.3 HYBRID INCENTIVES IN TEAMS

Hybrid or interdependent incentives (also called reward interdependence) represent any combination of individual and group based incentives which organisations can employ depending on the types of teams present and the levels and types of interdependence present within the team. These and many other intervening variables such as task structure and reward structures (Wageman & Baker, 1997; Crawford & LePine, 2013), autonomy preferences (Wageman, 1997; Wagner et al., 2012) make the structuring of incentive programs highly complex, and have thus been the subject of much recent research into compensation programs (Barnes et al., 2011; Beersma et al., 2003; Shaw et al., 2002). Issues embodied within equity theory have been found and have been used to guide a lot of research and the practical approaches to the issues surrounding compensation (Barnes et al., 2011). Equity theory (Adams, 1965) places special emphasis on the application of compensation practices which reward specific and individual contributions. On the other hand, when it comes to compensation in teams, a lot of the research approaches have been predicated on social interdependence theory (Deutsch, 1949), which holds that group member behaviour is dictated by the correct structuring of group goals (Barnes et al., 2011; Deutsch, 1945).

Hybrid incentive schemes have been advocated in a lot of research as the most ideal mix to use within the team structure, due to the fact that hybrids provide the best mix of the benefits accruing from individually motivated effort and group-based extrinsic effects and reinforcement (Bussin, 2011; DeMatteo, Eby, & Sundstrom, 1998; Heneman & von Hippel, 1995; Kozlowski & Ilgen, 2006; Welbourne & Gomez Mejia, 1995). Studies have shown however, that hybrid incentives present their own difficulties (Barnes et al., 2011; Heneman & von Hippel, 1995; Karau & Williams, 1993; Mitchell & Silver, 1990; Shaw et al., 2002; Wageman, 1995). Wageman (1995) demonstrated that group incentives work best when the level of rewards and task interdependence is either very high or very low, and that those teams with moderately interdependent rewards and tasks perform the worst. Part of this is explained by the finding that individual incentives within group contexts drive individuals to focus on what they can control, and thus diminish the contribution which the individual could make at a group-level in the form of assisting tasks, coordination tasks and general teamwork (Barnes et al., 2011; Shaw et al., 2002). On the other hand, while group incentives tend to support more cooperative behaviour to enhance tasks dimensions such as accuracy (Beersma et al., 2003), there appears to be an erosion of the speed component of work tasks (Beersma et al., 2003. In addition, group-based incentives result in social loafing (Karau & Williams, 1993). Karau and Williams, (1993) showed in their meta-review of the literature on social-loafing that group incentives are associated with individuals expending far less effort that they would under individually based incentive programs. Although - in their experiment - Wageman and Baker (1997) confirmed results from former studies that, the influence “of the free-rider effect” was small in groups which were working “face-to-face”.

2.5.4 INTERVENING VARIABLES BETWEEN PAY INCENTIVES AND PERFORMANCE

Task structure, reward structure (Wageman & Baker, 1997), goal-setting (Wright, 1989) have been shown to be some of the major intervening variables in the relationship between financial incentives and team performance. Wageman and Baker (1997) developed and tested a model which predicted an increase in performance in groups as a result of the interactive effects of task interdependence and rewards interdependence. Among other findings, the results from their experiment confirmed the interactive effects of task interdependence and rewards interdependence to improve team performance.

In an experiment to test the mediating role of goal setting on the relationship between different levels of financial incentives and performance, Wright (1989) found that goal-setting completely mediated the relationship between financial incentives and performance: financial incentives were unrelated to performance, but financial incentives were related to personal goal levels and commitment to assigned goals. Both personal goal levels and commitment to assigned goals were strongly related to performance.

Various components of team processes, found within the group effectiveness framework (Cohen & Bailey, 1997), have also been studied and shown to be intervening variables between incentives and performance.

2.6 TYPES OF TEAMS

Teams have been described and classified using various heuristic frameworks (Cohen & Bailey, 1997; Katzenbach & Smith, 1993; Sundstrom, DeMeuse & Futrell, 1990). Hackman (1990) defined work teams as intact social systems that perform one or more tasks within organisational settings. Cohen and Bailey (1997) describe four types of teams: work teams, parallel teams, project teams and management teams. A work team is described by Cohen and Bailey (1997, p. 242) as "...continuing work units responsible for producing goods or providing services. Their membership is typically stable, usually full-time, and well defined. Work teams are found in both manufacturing and service settings."

Most of the units within work places (manufacturing and services which are controlled through some form of supervision would be classified under work teams. Historically, these teams were managed through the supervisor, who would issue instructions and ensure that team members maintained production and quality standards. In time, work teams have evolved to include self-managing units. A continuum of the commonly found types of work teams is described by Banker et al., 1996. Their heuristic is based on the degree of autonomy found within each type of work team. The researchers theorise the range of work teams as including traditional work groups, quality circles, high performance work teams, semi-autonomous workgroups, self-managing teams and self-designing teams. According to Banker and colleagues, in traditional work teams, members of the team engage in tasks allocated to them by the supervisor or manager, who has overall control over the allocation of resources, and targets, and who controls the flow of work to team members. Quality circles are formed when members come together generally from different departments to resolve specific quality and other production related issues from time to time. In semi-autonomous and autonomous work groups, the team members are not only responsible for carrying on the taskwork, in addition, the team is responsible for managing the work. In self-designing work teams, the team is autonomous, and its members are also responsible for designing the taskwork and the membership of the team.

Parallel teams - as described by Cohen and Bailey (1997) – are formed when two or more people are brought together from different disciplines in order to solve specific issues which require a multi-disciplinary approach. These teams usually exist in parallel to their normal roles within the organisation. Project teams are teams which are formed with a specific project scope and project duration. The scope and the time that is allocated to the completion of the project is strictly managed. Such interventions generally do not involve repetitive tasks and they generally require specific and multi-disciplinary sets of skills. Management teams are usually constituted by the formal coming together of a number of senior people within the organisation, and they are commonly centred on the hierarchy of the person within the organisation. These people are drawn from the different disciplines and functional areas within the organisation in order to provide direction to the rest of the organisation. Sundstrom et al., (1990) typology of production teams included advice and involvement teams, production and service teams, projects and development teams, action and negotiation teams, management teams, transition teams and start-up teams. The Advice and involvement teams as described by Sundstrom et al., (1990) are employees who come together to "identify opportunities for improvement", but who are restricted in terms scope of contact time and activity. In the Cohen and Bailey (1997) typology, this team corresponds to the Parallel team. Sundstrom et al., (1990) describe Production and Service teams as teams which are formed when employees are working together fulltime with a certain degree of autonomy. These teams would include self-managing teams. Production and service teams have the ability to divide and allocate their tasks, but they are restricted in respect of the output required. The production and service teams from Sundstrom and colleagues correspond to the Work teams as described by Cohen and Bailey (1997). Sundstrom and colleagues describe action and negotiation teams as teams which are composed of highly skilled and specialised individuals who come together for brief performances (such as surgery teams in hospitals; specialised flight crews) and who are expected to deliver a specific outcome. This category of teams does not correspond with any of the categories mentioned by Cohen and Bailey (1997). Sundstrom et al., (1990) also mention the existence of management teams. Although these teams are not fully described by the authors, this category corresponds to the management teams described by Cohen and Bailey (1997). Sundstrom and colleagues also mention Transition and Start-up teams; again these teams are not described in detail by the authors. No mention of Start-up and teams or transition teams is made by Cohen and Bailey (1997).

Hollenbeck, Beersma, and Schouten (2012) provided a dimensional scaling conceptualisation of team types which used three constructs: temporal stability of the team, the skill differentiation of the team and differentiation of teams based on the authority levels vesting within the team. In their conceptualisation of the temporal stability dimension, teams can be classified ranging from one-shot teams on the one extreme, to continuing teams on the other extreme. On the skill dimension, teams can be classified as cross functional teams (possessing high skill differentiation) to behavioural teams (with low skill differentiation). On authority differentiation, teams can be classified as judge-advisor teams (possessing a high-levels of authority) to autonomous and self-managing teams. This conceptualisation allows for the reclassification of teams on scores along these three dimensions.

One of the other more widely used and accepted aspects of teams is the concept that teams should possess boundaries (Cohen & Bailey, 1997; Guzzo & Dickson, 1996; Hackman, 1987; Sundstrom et al., 1990). Two important aspects of the team boundaries are membership definition "..individuals.. who see themselves and who are seen by others as an intact social entity" and the work which teams perform "..individuals.. who share responsibility for outcomes"(Cohen & Bailey, 1997).

2.6.1 TEAM SIZE

Research - particularly research based within laboratory settings - suggested that small group sizes would lead to higher performance in comparison to large group sizes (Gladstein, 1984; Hackman, 1987; Steiner, 1972; Sundstrom et al., 1990). According to Steiner (1972), team size has a curvilinear relationship to group effectiveness, but large groups present difficulty in coordination of effort when compared to smaller groups. Nieva, Fleishman, and Reick (1985) characterised the curvilinear relationship between group size and team effectiveness as in the form of an inverted U-shape. Using factor analysis, Gladstein (1984) examined group size as a component of group structure and found that size was correlated with both group processes and group structure. Latane et al., (1979), in experiments of people clapping hands in groups and individually demonstrated a decrease in the individual contributions of people who were placed in real groups and pseudo- groups. McGrath (1984) asserted that increasing group size leads to lower team cohesion, which in turn affects team performance (Evans & Dion, 1991; Mullen & Copper, 1994). In their meta-study, Mullen, Symons, Hu & Salas (1989) showed that, increases in group size resulted in dissatisfaction among the work team members, while Mullen, Johnson, & Drake (1987) showed that the productivity of the organisation increased as the span of control of the supervisor decreased, independent of the workload on the individual.

Some studies have found that increasing the numbers of people in teams leads to improved performance (Campion, Medsker, & Higgs, 1993; Magjuka & Baldwin, 1991), as fewer groups within organisations allow for less onerous organisational coordination. This latter assertion is in direct contrast to the earlier assertion by Steiner (1972). Deriving from the work of Steiner (1972) and Nieva et al., (1985), Cohen & Bailey (1997) conclude that "the U-shaped relationship between size and effectiveness may not hold for all types of teams in organizational settings..."

In a meta-analytic review of the relationships between team design features and team performance, Stewart (2006) review 93 studies, and concluded that project and management teams show slightly higher performance when they include more members. Using meta-analytic techniques, LePine et al., (2008) reviewed the literature on the relationships between teamwork processes and team effectiveness, with view to test a multi-dimensional model of these relationships. In particular their research was aimed at providing empirical evidence of the theorised moderator roles of task interdependence and team size on the relationship between team processes and team effectiveness. From their meta-analyses, the researchers conclude that task interdependence and team size affects the relationship between teamwork processes and team performance. They find that, in studies where the relationship between teamwork processes and team performance was stronger, that this was accompanied by higher levels of task interdependence and that the sizes of the teams tended to be large also.

2.6.2 CONTEXT INFLUENCE IN TEAMS

Teams exist within the organisational contexts in which they are embedded (Ancona & Caldwell, 1992; Guzzo & Shea, 1992; Kouchaki et al., 2012; Marrone, 2010; Mathieu et al., 2008; Sundstrom et al., 1990). The environments within which teams are found, shape and influence the internal processes and group norms, and these environments thus affect the performance of teams (Ilgen, 1999; Kouchaki et al., 2012).

A predominant research paradigm is for groups to be treated as "closed systems" (Ancona, 1990) which convert inputs into outputs; in part, this paradigm is informed by systems theory. The relationship between groups, the group environments and the impact on group performance has been studied from a wide range of perspectives over the years (Ancona & Caldwell, 1992; Guzzo & Shea, 1992; Marrone, 2010; McGrath, 1984; Sundstrom et al., 1990). The research approaches used to study groups and the contexts of groups has evolved from using the experimental paradigm (Mowday & Sutton, 1993; Marks, DeChurch, Mathieu, Panzer, & Alonso, 2005) to studying groups within live contexts using longitudinal designs (Cohen & Bailey, 1997; Stewart, 2006; Wageman, 1995).

Deborah Gladstein (Gladstein, 1984) was one of the first researchers to examine the influence of the context on group performance. In the study, Gladstein tested a theoretical model of task group effectiveness, which included group context as one of the variables. Gladstein's study involved 100 sales teams in the communications industry. The context variables theorised by Gladstein to affect team effectiveness included supervisory behaviour, the availability of training to team members, market growth and rewards. Market growth was found to be positively related to sales revenue; rewards were positively associated with leadership activities, work norms, role clarity and task control, while training was positively related to self-reported effectiveness. Gladstein was thus able to empirically demonstrate the role of the team context in the group effectiveness construct. In a 1990 study to examine mechanisms which teams use to cope as they interact with their contexts (an inside-out / external perspective), Deborah Gladstein Ancona (Ancona, 1990), found that teams employ three types of strategies: informing, parading and probing. From the research, Ancona concluded that the best performance was linked to teams which employed probing strategies within their environments, as these teams engage more with their environment to find out what is going on. The research also concluded that, the activities which teams perform in order to engage with their environments are better predictors of team performance when compared to internal processes, for teams which depend on the "outside environment" for their survival.

Kouchaki et al., (2012) presented a review of how studies have approached the characterisation of the relationship between groups and their environments. Their review focused on classifying the extant literature, and they found three prevailing approaches to studies on groups and their environments: 1) Studies in which the environment provides resources to the group (Campion et al., 1996; Cummings, 2004; Tushman & Katz, 1980, p. 2) studies in which the environment provides the impetus for change within the group (Edmondson, 2002; Gersick, 1988; Waller, 1999) and 3) studies where an outward (target) approach from the group is used, and the group deliberately influences its environment (Ancona, 1990; Denison, Hart & Kahn, 1996; Marks et al., 2005).

Over the years, the influence of context on group performance has been empirically demonstrated (Ancona, 1990; Gladstein, 1984; Mathieu et al., 2008); it has also been shown that, based on the level of dependence of the group on its environment for survival, the strategies which a group employs to manage the interface between the group and its environment could be an important predictor of its performance. Put differently, the extent to which a group engages in the management of its boundaries is correlated to the performance of the group.

2.6.3 BOUNDARY MANAGEMENT IN TEAMS

Ancona and Caldwell (1992) studied the activities which teams engage-in with their external environments. The research perspective they used was an outward look into the organisation from the standpoint of teams which were embedded in working environments. Their research was conducted on new product teams and team managers to test hypotheses about the teams' communication activities with their organizations. The research by Ancona and Caldwell found that teams communicate vertically and horizontally within their organizations. The research also found that the teams developed specific strategies in order to cope with their environments, and that the effectiveness with which the teams engaged in these engagement strategies determined the performance of each team. Vertical communication was used by teams as a means to engage and influence senior management, while horizontal communication was used 1) to coordinate activities with other organisational stakeholders, 2) to obtain feedback from the organisation 3) for scanning activities for ways in which to improve tasks and to obtain technical information from the environment 4) to scan the market conditions of the environment of teams. The strategies which teams used differed: some teams chose to specialise in particular sets of communication and external engagement activities; some teams engaged in multiple forms of engagement activities in order to deal, with their environments; other teams isolated themselves from their external environments. The study also showed that, over time, it was necessary for teams to employ different strategies in order to deal with their environments, and the study also showed that, team performance was determined by the extent to which teams engaged in cycles of external activity followed by a focus on internal team processes. In a review of studies on team boundary spanning, Marrone (2010) reviewed past research on team boundary spanning in order to provide suggestions of future research directions on the topic. Using a multilevel approach for the review, her study concluded that the contribution of boundary management to team performance outcomes was significant and pervasive across many types of teams, including action teams, production teams and project teams. In addition, team boundary spanning led to higher-level outcomes such as "network performance, and successful implementation of organization-wide change initiatives, innovation and adaptation".

2.6.4 TEAM PROCESSES, TASK-WORK, EMERGENT STATES AND TEMPORAL INFLUENCE

The input-process-output model (IPO) Steiner (1972), McGrath (1984), Hackman (1987) was the basic layout on how inputs result in desired outcomes, whether using machines only, people only or a combination of both machines and people. In the years following the acceptance of the IPO framework, a lot of the research techniques employed a positivist approach, where-in there was precision and control within the linear process suggested by the framework. This positivist epistemology has subsequently been replaced by and a general acceptance that groups are far more dynamic that suggested within the original IPO framework. The basic framework of the IPO model has thus undergone several modifications and enhancements in the teams' literature over the years (Kozlowski et al., 1999; McGrath et al., 2000; Marks et al., 2001) as more focus was placed on improving the understanding of the processes which lead to the outcomes.

One of the major criticisms of the IPO model was its apparent implication of a linear process from inputs to outputs (Moreland, 1996; Marks et al., 2001; Ilgen et al., 2005). The criticism of the IPO model stemmed from the fact that it lacked the necessary emphasis on the roles of some of the intervening variables, feedback loops and a consideration for the fact that the process may not be linear (Ilgen et al., 2005).

Team processes have been defined as "interactions such as communication and conflict that occur among group members and external others" (Cohen & Bailey, 1997). Cohen and Bailey (1997) also distinguish between internal team processes, which are processes directed at and focussed on dealing with the tasks at hand and dealing with other team members, while external process are aimed at the environment within which the team resides and which the team has to manage. Marks et al., (2001) define team processes as “members’’ interdependent acts that convert inputs to outcomes through cognitive, verbal, and behavioural activities directed toward organizing task-work to achieve collective goals”. Figure 3 depicts the different transition phase and action phase processes, as outlined by Marks and colleagues. Marks et al., (2001) also distinguished between team processes at different phases of engagement with a task. Building on the theory of time, interaction and performance (TIP) developed by McGrath (1991), Marks and colleagues conceptualised team processes as comprising three “higher order” process dimensions – transition phase processes, action phase processes and interpersonal processes. These three dimensions of processes were further made-up of ten “lower order” processes which mapped on to the higher order processes.

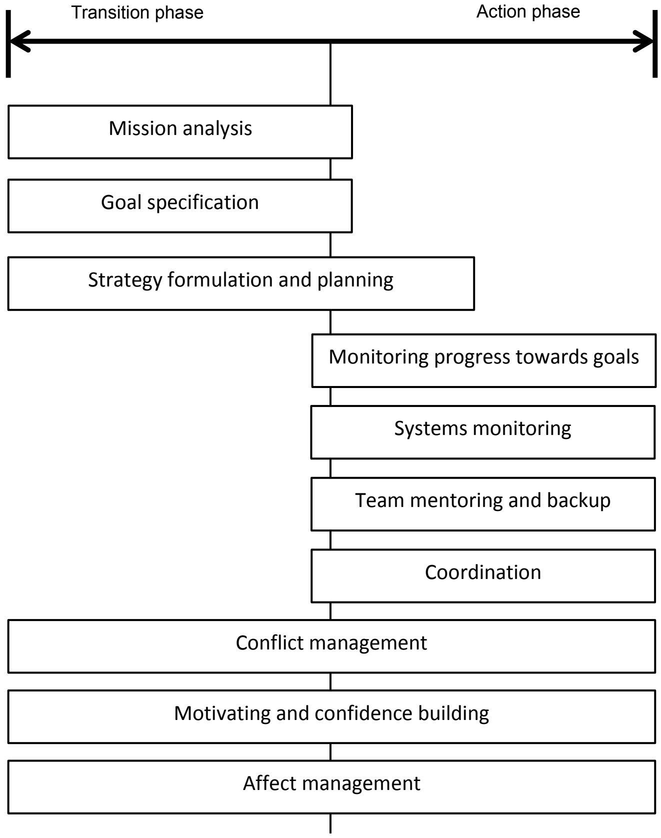

Figure 3: Manifestation of processes in transition and action phases

Source: Marks et al., (2001)

Team processes involve how the individual and team-members use and interact with their immediate work environments in using allocated resources (e.g. tellers using cash counting equipment in banks; how supervisors allocate the number of cash counting machines to team members). Processes “thus mediate the translation of inputs to outcomes” (Kozlowski & Ilgen, 2006). The construct of “team processes” needs to be further broken down and distinguished from “taskwork” and it also needs to be distinguished from the interrelated concept of “emergent states” as coined by Marks et al., (2001).

Taskwork describes how the actual work is performed by the individuals within a team, and task-work relies on the competence of the team members and the methods which they use to perform a task. In the example of tellers counting cash given above, taskwork would be the steps involved and the process of a teller actually counting the cash. Marks et al., (2001) also distinguish between taskwork and what they term “teamwork”, which they argue involves how team members are dealing with other members of the team.

Marks et al., (2001) argued and conceptually differentiated team processes and what they termed “emergent states” by arguing that, while team processes involved actual interactions of people among themselves and with their tasks, emergent states described “cognitive, motivational, and affective states of teams, as opposed to their member interaction”. Emergent states would therefore be represented by the “attitudes, values, cognitions and motivations” of individual and team members, which are constructs which are “typically dynamic in nature” and which are affected by the context of the team. Their perspective was based on the premise that emergent states are not the same as interaction processes, and that, accordingly, it is conceptually incorrect to treat them as such: “Emergent states do not represent team interaction or team actions that lead toward outcomes. Rather, they are products of team experiences (including team processes) and become new inputs to subsequent pro-cesses and outcomes” (Marks et al., 2001).

Marks et al., (2001) further developed the concept of team processes and argued that team processes involve several phases of development and that these phases could involve a number of different processes which may happen individually or simultaneously with others. The researchers also presented the team process model as a combination of linear and non-linear activities and feedback loops which develops and plays out over a period time. This dynamic model of team processes and the separation of the processes from emergent states set up a foundation for further research into the different models involved in team processes and emergent states.

The conceptualisation of team processes and team emergent states is predicated upon time having an influence, because all team activities happen within the context of the time dimension (Locke & Latham, 1990; McGrath, 1991; Marks et al., 1991), and these activities often involve multiple interdependent activities in order to deliver a single task. McGrath's Theory of time, interaction and performance (TIP theory) (McGrath, 1991) is based upon this dynamic nature of taskwork in teams. Studies of teams and groups have increasingly incorporated the time dimension as more researchers tried to understand the dynamic nature of group performance and context interactions (Harrison et al., 2003; Marks et al., 2001), and in particular in those groups which are embedded within organisations (McGrath, 1991; Kozlowski, Gully, Nason & Smith; Wageman, 1995). Work teams within organisations can exist for considerable periods of time, with stable and dynamic memberships; this gives the team members a history together and the expectation of an existence going forward. Researchers and practitioners have thus realised the criticality of the time dimension in group development and a more complete understanding of team effectiveness.

Group development was initially understood through a well-established framework developed by Tuckman and Jensen (1977) as a series of steps through which groups had to sequentially go through: forming, storming, norming, performing and adjourning (see also section 2.8). There were two common research streams: one dealing with the groups' dynamics and the other dealt with group problem solving (Gersick, 1988). Group dynamics research was concerned with how group members coped with issues which were critical to their ability to perform as group members "such as dependency, control, and intimacy". Group problem solving dealt with issues concerning the development of decision making (Gersick, 1988).

In a study of eight "naturally occurring teams", Gersick (1988) found that teams followed patterns of what she termed "punctuated equilibrium". Punctuated equilibrium were periods where teams would go through stages on accelerated action followed by a slowing down of effort which was linked to time related deadlines (see also section 2.8).

2.6.5 GOAL SETTING, FEEDBACK AND PERFORMANCE

The theoretical foundations of the role of goal setting in improving performance are long established in the literature. Various meta-analyses of the multitude of studies have been performed over the years, and there is consistency and repeatability of the results in both laboratory and field studies (Latham & Locke, 2007; Locke & Latham, 1990; 2012), and these summaries have been captured in the books by Locke & Latham.

Locke and Latham (2012) summarise two critical issues which have emerged from the literature reviews and meta-analyses: 1) there is a linear positive relationship between then degree of goal difficulty and performance. 2) In comparison to situations where the goals are not set and situations where people are encouraged to do their best, more specifically defined goals tend to enhance performance improvements.

The linear relationship between the degree of goal difficulty and performance was established for all situations, except for the instances where ability became a limitation (Locke & Latham, 1990; 2012). Ability was thus found to moderate the linear relationship between goal difficulty and performance (Locke & Latham, 2012; Mento, Steele, and Karren, 1987; Tubbs, 1986; Wood, Mento, and Locke, 1987). Other variables found to moderate the relationship between goal difficulty and performance included task complexity, goal commitment and feedback (Locke & Latham, 1990; 2012).

Goal difficulty was found to correlate linearly to performance through three mechanisms (Locke & Latham, 2012) which are related to motivation: 1) goal difficulty affects the prioritisation of efforts (Terborg, 1976) and the skill set (Latham & Saari, 1982) which is used to attain the goal; 2) goal difficulty influences the effort (Latham & Locke, 1975) which the person wishes to expend in order attain the goal, and 3) goal difficulty influences the persistence with which the goal is pursued by the individual (Bavelas & Lee, 1978; Huber, 1985). In addition, it was found that despite the fact that a person may prioritise, the fact that a person may place more effort and the fact that a person may persist in order to achieve a difficult goal, complex tasks require specific knowledge of how to go about the task in order for the goal to be achieved (Latham & Locke, 2012). This specific knowledge is not the same as ability – which is a pre-requisite – but is more “cognitive in nature” (Locke

& Latham, 2012). All the four variables listed are the variables which mediate the relationships between goal difficulty and performance.

Ability, feedback, task complexity and goal commitment were found to moderate the relationship between goal difficulty and performance. According to goal theory (Latham & Locke, 2007), ability is a pre-requisite in that it allows the individual with the matched ability to make a decision to attain a specific performance goal (Locke & Latham, 2012). Performance feedback was found to be the other important moderator of the relationship between goal difficulty and performance, because feedback "allows people to decide if more effort or a different strategy is needed to attain their goal. When performance feedback is withheld, goal setting is ineffective for increasing performance". (Locke & Latham, 2012). Goal theory also states that the moderator role of feedback on the relationships between goal-difficulty with performance is, in addition, mediated by goal setting. In this instance, feedback must result in setting of goals or adjustment of the current goals, in order for performance to improve. In the instance where feedback is not given or where feedback is ignored, performance does not improve.

Feedback within groups involves the sharing of information within the group on the actual state of group objectives (Algera, 1990). For example, in a work team environment, a supervisor could be tasked to provide feedback to the group members on the actual versus target performance outcomes for the group. This sharing of information among all members of the team is a critical component of group feedback: "..group goals without group feedback have no effect and group feedback without group goals automatically result in self-set group goals" (Van Der Vegt et al., 2001, p. 53). The literature on feedback suggests that immediate feedback on performance, results in the highest levels of improvement for individuals (Dihoff, Brosvic & Epstein, 2003).

Goal commitment – manifested as the person actually making a concerted effort – was also found to moderate the relationship between goal difficulty and performance (Donovan & Radosevich, 1998; Latham & Locke, 2007; Locke & Latham, 1990; 2012). Acceptance of the goal – for both self-set goals and assigned goals - is encompassed under the goal commitment construct here. In previous research, the support given by supervisors was found to lead to high goals being set by workers (Latham & Saari, 1979). Goal setting was also found to be easier for simple, uncomplicated tasks when compared to complex tasks (Wood et al., 1987). According to goal theory (Latham & Locke, 2007) other moderators of the task difficulty-performance relationship include resources (Peters et al., 1982), personality (Adler & Weiss, 1988; Latham & Locke, 2007) and affect (Locke & Latham, 1990; Latham & Locke, 2007).

2.6.6 CONFLICT WITHIN TEAMS

Teams are composed of people who come together to perform tasks in order to achieve defined goals. When people come together to form work teams, perceived (De Dreu & Gelfand, 2008) and real differences between members emerge as a result a wide number of issues, including backgrounds, perspectives, attitudes, aptitudes etc. (De Dreu & Weingart, 2003). Whether the differences between the work team members are real differences or perceived differences, this can lead to the development of "tension" between the members of the work team (De Dreu & Weingart, 2003; de Wit, Greer & Jehn, 2012). Several researchers (Cosier & Rose, 1997; Dreu & Weingart, 2003; Jehn, 1997) have argued and shown (Cosier & Rose, 1997; Jehn, 1997) that the tension that develops in teams leads to intra-team conflict. The researchers have also shown that this intra-team conflict results from the fact that there are relationships and task issues which members of teams need to constantly manage. Conflict has been shown empirically (Gladstein, 1984; Saavedra, Earley, & Van Dyne, 1993) to interfere with team performance, through the development of "tension, antagonism" (De Dreu & Weingart, 2003) and by distracting the "team members from performing the task" (De Dreu & Weingart, 2003) at hand.

There are three commonly recognised forms of intra-team conflict in the teams' literature: task conflict, relationship conflict and process conflict (De Dreu & Weingart, 2003; de Wit et al., 2012; Jehn, 1997). Task conflict relates to what defines the completion of the task; task conflict includes conflicts about "the distribution of resources, procedures and policies, and judgments and interpretation of facts" (De Dreu & Weingart, 2003), and the "content and outcomes of the task being performed" (de Wit et al., 2012). Relationship conflict can arise out of differences in political view-points, and a wide range of personal attributes, norms, values and preferences (De Dreu & Weingart, 2003; de Wit et al., 2012). Process conflict relates the process and coordination that is required to complete the task, such as the "logistics" required to enable the completion of the task and the "delegation of tasks and responsibilities" (Jehn & Bendersky, 2003).

De Dreu & Weingart (2003) undertook a meta-study on the relationships between task conflict, relationship conflict, and team performance and member satisfaction. Their meta-study confirmed the theorised negative relationships between relationship conflict and both team performance and teams satisfaction. Their meta-study also confirmed theorised negative relationships between task conflict and team performance, although the study showed that this negative relationship was more pronounced in teams dealing in complex tasks than in those teams performing production-type routine tasks. Task conflict was shown to be weakly negatively related to team performance in the instances where task conflict is weakly positively correlated to relationship conflict. Research and assumptions prior to the 2003 meta-study by De Dreu and Weingart had suggested that task conflict can, in certain circumstances, enhance team effectiveness, even though relationship conflict damages team effectiveness. Contrary to this, the De Dreu & Weingart meta-study found evidence of a strong and negative correlation between task conflict, team performance and team satisfaction.

In a more recent meta-study carried out by de Wit et al., (2012), the researchers undertook the task of synthesising the paradoxes apparently inherent in intragroup conflict and team performance. De Wit et al., (2012) included 116 empirical studies in their meta-analysis of intragroup conflict. They also added process conflict to the intra-group conflict analysis mix – something which had not been previously explored in the De Dreu and Weingart meta-study of 2003. In addition, de Wit et al., (2012) also explored the meta-roles of some moderator variables in the relationship between intra-group conflict and team outcomes – a development resulting from recent research studies into more complex relationships between intragroup conflict and team outcomes. Their meta-study found that there is a negative correlation between both relationship conflict and process conflict to group outcomes, and that these relationships were of a stable nature. Their meta-study did not find a strong negative correlation between task conflict and group outcomes - in contrast to the De Dreu and Weingart (2003) meta-study. Instead, their findings described more complex relationship patterns between task conflict and group performance, owing largely to the introduction of moderator variables in their analysis: task conflict was found to be more positively related to group outcomes in instances where task conflict was weakly correlated to relationship conflict. This moderated relationship was found to predominate in studies which involved top management teams and in studies where performance was operationalised in financial measures or where performance was operationalised as the quality of the decision rather than where performance was operationalised as an aggregated measure.

2.6.7 TEAMS AND PERFORMANCE

A large amount of work has been published in a variety of journals and books on various aspects of performance in teams and small groups over the years (Bettenhausen, 1991; Cohen & Bailey, 1997; Guzzo & Dickson, 1996; Hackman, 1987; Johnson & Johnson, 2005; Kozlowski & Bell, 2003; Marrone, 2010; Mathieu et al., 2008; Sundstrom et al. 1990; Wageman, 1995; Stewart, 2006, 2010). The result of this vast body of work has led to the publication of a number of meta-studies and reviews, some of which have appeared in more citations than others. This research uses the terms "team" and "group" interchangeably.

Performance in teams follows the basic input-process-output (IPO) model (McGrath, 1964) where output can be treated as performance (Mathieu, 2008). Outputs are final assessment points in the IPO model; the measurement of outputs can thus vary, depending on the task that is being performed.

There are two approaches which are prevalent in the studies of performance in teams which are in the extant literature. There is an internal perspective, where focus is placed upon the processes within the team itself and how these processes affect performance. The internal perspective tends to place emphasis on the individuals within the team, and the effects of these interactions on performance. Various theories underpin this approach to the research on teams, including Expectancy and Motivation theories. The external perspective tends to treat the team as a closed system, and the unit of analysis and focus in this type of research is on the interactions of the team with its external environment (Ancona, 1990; McGrath, 1997).

Bettenhausen (1991) reviewed in excess of two hundred and fifty (250) articles, published between January 1986 and October 1989. In the review article, he began the separation and differentiation of general group studies and studies relating to teams which are based within the organisational context. Bettenhausen emphasises the importance of understanding groups, because – as he argues – "increasingly, work is being performed in groups" (Bettenhausen, 1991, p. 371), and that workgroups form an important culmination of the understanding of group dynamics. He also argues that group studies which are performed within working environments should ideally incorporate designs which explore an understanding of both the effects of the tasks and the effects of the group context as a means to understand the complexity surrounding the functioning and effectiveness of small groups within the context of organisations. The main purpose of the review by Bettenhausen was to highlight the importance of work teams, and the different streams of work which existed at the time, which contributed to a further understanding of work teams. Work groups – Bettenhausen argues – involve a high degree of tension between individual and group needs, and, an understanding of this tension, is fundamental to getting effectiveness out of work teams. The principal theory underlying this claim by Bettenhausen is embodied in the Social Identity Theory developed by Henri Tajfel and John Turner (Tajfel & Turner, 1985). SIT states that people are most likely to compare in-groups as better than out-groups, as a means to find positive social identity (Ashforth & Mael, 1989; Turner & Oakes, 1986).

As studies placed more emphasis on research in groups/teams based within organisational contexts, meta-studies and books emerged within this boundary as well Cohen & Bailey (1997), Kozlowski & Bell, (2003); Mathieu et al., (2008), Stewart, (2006).

In their meta-analytic review of team studies, Cohen and Bailey (1997) define teams as follows: "A team is a collection of individuals who are interdependent in their tasks, who share responsibility for outcomes, who see themselves and who are seen by others as an intact social entity embedded in one or more larger social systems (for example, business unit or the corporation), and who manage their relationships across organisational boundaries." (Cohen & Bailey, 1997, p. 241). This definition of teams is found in the work of other influential contributors to the teams discourse (c.f. Guzzo & Dickson, 1996; Hackman, 1987; Sundstrom et al., 1990), and it is thus widely accepted.

Kozlowski and Bell (2003) offer a similar description of teams as: "Collectives who exist to perform organizationally relevant tasks, share one or more common goals, interact socially, exhibit task interdependencies, maintain and manage boundaries, and are embedded in an organizational context that sets boundaries, constrains the team, and influences exchanges with other units in the broader entity". (Kozlowski & Bell, 2003). The importance of being an identifiable collective in teams is also highlighted in a different study by Van Der Vegt and Bunderson (2005). In this study, the researchers show how collective team identification enhances team learning and performance across multi-disciplines.

One of the major reasons for the extensive use of teams in organisations is to enhance learning as a means to achieve continuous improvements in performance (Wildman, Thayer, Rosen, Salas, Mathieu & Rayne, 2012). "The perception of common goals in conjunction with the joint motivation to achieve them is the source of interdependence among group members" (Johnson & Johnson, 2005). From the literature, it is clear that teams require identification and goal alignment as key features; it is also fairly clear that the use of work-teams as a work-structure is prevalent, and that this type of work-structure has had a fair amount of success in improving performance, both in practice and in research settings.

2.7 CONTRACTORS AND REGULAR EMPLOYMENT

The literature on employment contract types uses various terminologies to describe non-permanent workers. Casual employment (Campbell, 2004; Junor, 2004), fixed-term, temporary and non-permanent employment (Connelly & Gallagher, 2004), contingent employment (De Cuyper, de Jong, De Witte, Isaksson, Rigotti & Schalk, 2008) are all terms which have been used in the literature to define temporary employment. There are at least three dimensions on which temporary employment differs from regular or standard employment relationships (Campbell, 2004; De Cuyper, et al., 2008; Gallagher & Sverke, 2005; Olsen & Kalleberg, 2004; Polivka & Nardone, 1989): the permanency of tenure, benefits associated with the employment contract type and the directness of supervision by the employer. Regular employment contracts are generally characterised by continuity in the employment relationships, while this is not generally the case for temporary employment contracts. Employment for regular employees also tends to be associated with statutory-benefit entitlements, such as medical aid contributions by the employer, provident or retirement fund benefit contributions from the employers, unemployment benefits and other benefits, which are absent from temporary employment contracts. Regular employment contracts generally require the person to work under the direct supervision of the company which employs them; in contrast, temporary employees could also work at third party premises, and not under the direct supervision of the main employer.

Drawing from the literature on organizational citizenship behaviour (OCB), psychological contract and affective behaviour has led many researchers to postulate significant performance differences between contract workers and regular workers. Organisation citizenship behaviour (Organ, 1988) consists of sets of behaviours which are not specified as part of the job description of employees, but which, when practiced, facilitate the work in work teams. Examples of such behaviours include assisting co-workers with their work, helping others, and many more (Van Dyne & Ang, 1998). Van Dyne and Ang (1998) studied the organizational citizenship behaviour of contract workers in Singapore. Their research found that, contrary to expectations, when contract workers exhibited positive attitudes about their relationship with their employer, they exhibited higher OCB scores in comparison to regular workers. In their study of work teams in a paper mill, Podsakoff, Ahearne and MacKenzie (1997) found empirical evidence that helping behaviours had a significant influence on both performance quantity and quality within the teams.

2.8 TIME, TEAM PROCESSES AND PERFORMANCE

Traditional theoretical paradigms and subsequent research into group development in small group settings, paid emphasis to predicted trajectories which groups were theorised to sequentially go through, as they tackle tasks (Gersick, 1988; McGrath, 1991). These group development stages were largely grounded on the work of Tuckman (1965) on the developmental stages of small groups, which hypothesised that small groups sequentially go through stages of “forming”, “storming”, “norming” and “performing” (Tuckman, 1965). Tuckman and Jensen (1977) later modified the original hypotheses by Tuckman, to include an additional final stage which they termed “adjourning” the small group development model.

Group development itself could be separated into activities which groups engaged-in in order for individuals to be able to function together within their groups; these were called inter-personal processes. Groups also engaged in task oriented processes (Gersick, 1988; Tuckman, 1965; Tuckman & Jensen, 1977). Following a lifespan study of eight naturally occurring teams, Gersick (1988) discovered that team development did not necessarily follow this predicted series of team development, as teams engaged in task accomplishment. Her research found instead that teams went through phases of task-work followed by periods of inertia, during which teams had an opportunity to re-evaluate how they were functioning. This period was generally followed by corrective actions effected during the task activity periods. These phases were termed "punctuated equilibrium" (Gersick, 1988, p. 9).

Using several propositions, based on large volumes of prior research on groups, McGrath (1991) advanced a theory of time, interaction and performance (TIP) in groups, which primarily focussed on temporal influences on group interaction and performance. Essentially, TIP theory highlighted the need to deliberately incorporate time as a dimension to monitor, when looking at group processes, since group processes were affected by issues such as the changing membership of real-life teams through time, the impact of time constraints on group behaviours, changes in the environmental contexts of groups, and many other time-variable factors. In their experimental study of team member familiarity using students over a 3-week period, Harrison et al., (2003) demonstrated that team member familiarity was a an important predictor of team performance. Their study suggested that time was an important predictor of team performance, within teams with stable membership.

The theoretical and methodological importance of being explicit about the role of time variables when studying team or organisationally based processes, has been argued and demonstrated by various researchers (Ancona, Goodman, Lawrence, & Tushman, 2001; Ancona, Okhuysen & Perlow, 2001; Ballard, Tchan & Waller, 2008; Neal & Griffin, 2006; Pitariu & Ployhart, 2010; Ployhart & Vandenberg, 2010; Sonnentag, 2012). Sonnentag (2012) illustrated how time in organisational research can be shown to mean 1) the studying of time-related constructs such deadlines; 2) time can be shown to capture time-sensitive processes such as ordered patterns of activities; 3) time can be used to capture causality by using time-lags and 4) time can be used to capture the general contexts in which phenomena are being studied.

2.9 TEAM EFFECTIVENESS

Team effectiveness (Cohen & Bailey, 1997; Marks et al., 2001; Kozlowski & Ilgen, 2006) is a construct which comprises the variables and processes which explain how inputs are converted into outputs within teams. Broadly, the team effectiveness construct takes into account 1) the environmental setting where the team is embedded, 2) the tasks which the team has to perform, 3) the processes which the team employs and development stages over time through which a team has to go through in order to convert inputs into desired outputs, 4) performance outcomes, the team manifest behaviours of the team members and survival of the team in an intact form over time. Figure 4 depicts the components of team effectiveness as described.

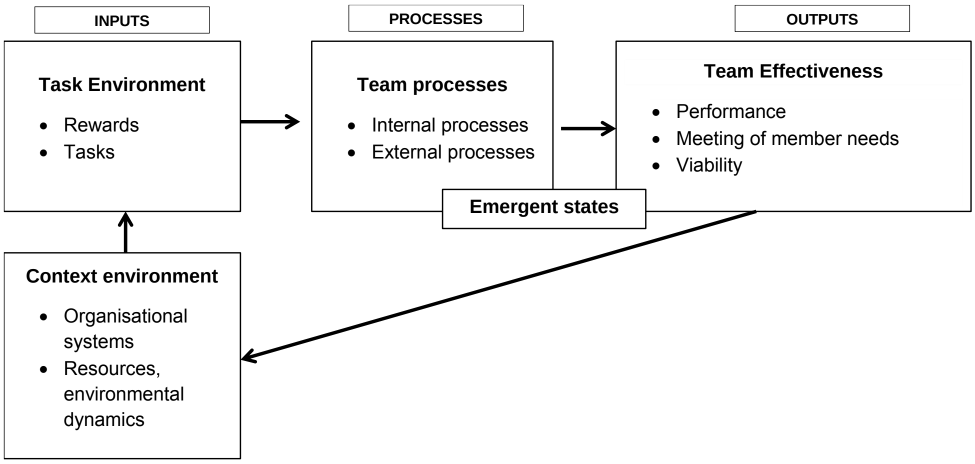

Figure 4: Team effectiveness framework

(Modified from Cohen & Bailey, (1997); Kozlowski & Ilgen, (2006); Marks et al., (2001).

The team effectiveness construct was derived from the basic input-processes-output (IPO) organisation of work processes originally put forward by McGrath (McGrath, 1984), as a means to study groups, with special emphasis on getting a better understanding team processes and the relationship between different variables within the IPO framework. The framework has been widely used and developed further as group studies get more complex. Inputs comprise the team member's composition factors, and inputs include the resources which teams use to accomplish their tasks. Team processes are composed of the activities which the team members engage-in as they accomplish their tasks, while outputs include measured criteria for performance, meeting the needs of the team and the viability of the team.

Cohen and Bailey (1997) further developed the team effectiveness heuristic, by identifying components of internal and external processes, such as conflict and communication among others. Their main deviation from original team processes model by McGrath was the introduction of a concept they called group psychosocial traits, manifested as group norms and mental states. Marks et al., (2001) introduced a model of recurring phases of team processes. The authors presented a model where team processes could be classified into three broad categories: transition processes, which were described as processes which take place in the team during periods in which the team was in-between tasks; action processes, described as processes which occur during the period of task accomplishment, and inter-personal processes, which occur during both the transition and action phases of team processes. According to the model, different tasks require varying levels of action and transition processes; however, the content of processes within all the process phases remains largely similar. Drawing on the works of Fleishman and Zaccaro (1992), Levine and Moreland (1990), O'Leary-Kelly, Martocchio, and Frink (1994), Brannick, Prince, Prince, and Salas (1992) and other researchers, Marks and colleagues specified mission analysis (he identification of the key tasks and the evaluation of how use resources to achieve the tasks), goal specification and strategy formulation (choosing a course of action to follow) as components of transition processes. Monitoring progress towards goals, monitoring systems, team back-up behaviours and coordination were listed as action processes. Conflict management, motivation and affect were listed as component of interpersonal processes.

While a large body of literature exists in support of the effectiveness of teams in improving performance outcomes, there appear to be mixed results on the extent of the successes of teams in organisations. Allen and Hecht (2004) argue that the enthusiasm of organisations and researchers regarding the extent to which teams are effective in organisations may have been over-played. They argue that the gains from the use of teams are modest at best. Allen and Hecht (2004) argue that teams provide individuals with psychological benefits - social-emotional and competence-related benefits – and that it is these psychological benefits to individuals that are responsible for higher performance, rather than the "team" work structure per se.

2.10 CONCLUSION

The literature reveals wide support for the role of work teams in performance improvement within various settings, including organisational settings (Bettenhausen, 1991; Guzzo & Dickson, 1996; Levine & Moreland, 1990; Stewart, 2006, 2010). There exists empirical support for the roles of both interdependent tasks and rewards as important intervening variables in the relationships between work teams and performance (Johnson & Johnson, 2005; Wageman, 1995; Wageman & Baker, 1997). Theoretical support for the foundations of these inter-relationships is to be found within goal interdependence theory as shown.

A trade-off between the two major task dimensions of speed and accuracy, has been shown in various studies and meta-studies (Beersma et al., 2003; Elliot et al., 2001). However, the meta-studies by Jenkins et al., (1998) and Condly et al., (2003), which reviewed team-based task performance in the presence of incentives, did not show the trade-off between the speed and accuracy of task accomplishment.

Empirical research has also demonstrated the indirect, but positive impact of pay incentives on work team performance, through their impact on goal setting (Latham & Locke, 2007; Locke & Latham, 1990, 2012; Wright, 1989). The indirect effects of pay incentives on performance have been conceptually and empirically shown to be mediated by intrinsic and extrinsic motivation (Jenkins et al., 1998; Barnes et al., 2011; Wagner et al., 2012).

Cohen and Bailey, (1997); Kozlowski and Ilgen, (2006); Marks, et al., (2001); McGrath, (1984); Sundstrom et al., (1990) have developed various, but consistent heuristics of team processes, which have been conceptualised to mediate the relationship between the task environment of the work team and the effectiveness of the work team, where effectiveness manifests in performance output, modified behaviours and team viability

Both high and low levels of task and reward interdependence were shown by Wageman, (Wageman, 1995) to be correlated to high performance in work teams, while both moderately interdependent tasks and moderately interdependent rewards were shown be associated with low performance in work teams (Wageman, 1995). Critically, Wageman's study qualified the findings on the impact of interdependent tasks and rewards on team performance by conceding to the high possibility of other potential performance effects of different combination patterns between hybrid tasks and rewards, and team performance.

The following chapter deals with hypotheses based on the literature review, taking into account the effects of individual rewards, group-derived rewards and task interdependence, measured at both individual and at the level of the work team.

CHAPTER 3: RESEARCH HYPOTHESES

3.1 INTRODUCTION

This research had two key objectives. The first objective of the research was to test the effects of pay incentives on individual performance within moderately task interdependent work teams, using variance logic. The second objective of the research was to attempt to explain the sources of differential performances between similar work teams, and to track any additional emerging explanations for the observed performance patterns.

Figure 5 is a diagrammatic summary ensuing from the integration of the extant literature on incentives, team processes and team-based performance, covered in chapter 2. There are three components to the summary: Firstly, individual pay incentives affect performance directly and indirectly (with individual motivation as an intervening variable); this component of the model is based on the individual motivation theories, such as expectancy theory (Vroom, 1963), extrinsic motivation theories, such as the re-enforcement theory (Lawler, 1971, 1973) and interactive factor theories, such the social and information processing theories called cognitive evaluation theory (Deci, 1971, 1972a, 1972b; Deci & Ryan, 1985) and goal setting theory (Locke et al., 1988). For more on the various individual motivation theories, see section 2.5. The second component of the literature summary in Figure 5 deals with team processes (Cohen & Bailey, 1997; Marks et al., 2001; Kozlowski & Ilgen, 2006) focussing on internal team processes (see section 2.8). Target setting, coaching, monitoring and feedback are shown in the literature as some of the components which teams have to manage. The summary also illustrates that, depending on how each team – through the team supervisor - uniquely handles intra-team processes (such as through the better coordination of the stages of team development such as “forming, storming, norming and performing” – Tuckman, 1965; Tuckman & Jensen, 1977 - the better management of phases of punctuated equilibrium - Gersick, 1988 - better management of intra-team conflict – Cosier & Rose, 1997; De Dreu & Weingart, 2003; de Wit et al., 2012; Gladstein, 1984; Saavedra et al., 1993 – and better team boundary management – Ancona, 1990; Gladstein, 1984), this can lead to performance improvement over time (see sections 2.8 and 2.9). Finally, the diagrammatic summary in Figure 5 illustrates the inter-relationship between the task performance variances – speed and accuracy;

specifically the diagram shows that speed and accuracy are covariates (Beersma et al., 2003; Condly et al., 2003; Elliot et al., 2001; Jenkins et al., 1998). In section 2.5 we saw that the individual incentives were expected to lead to a negative trade-off between the speed and accuracy of task accomplishment (i.e. the two were negative covariates); we also saw that the meta-study by Jenkins et al., (1998) and the subsequent meta-study by Condly et al., (2003) suggested that speed and accuracy were in fact positive covariates in the presence of incentives, within team settings.

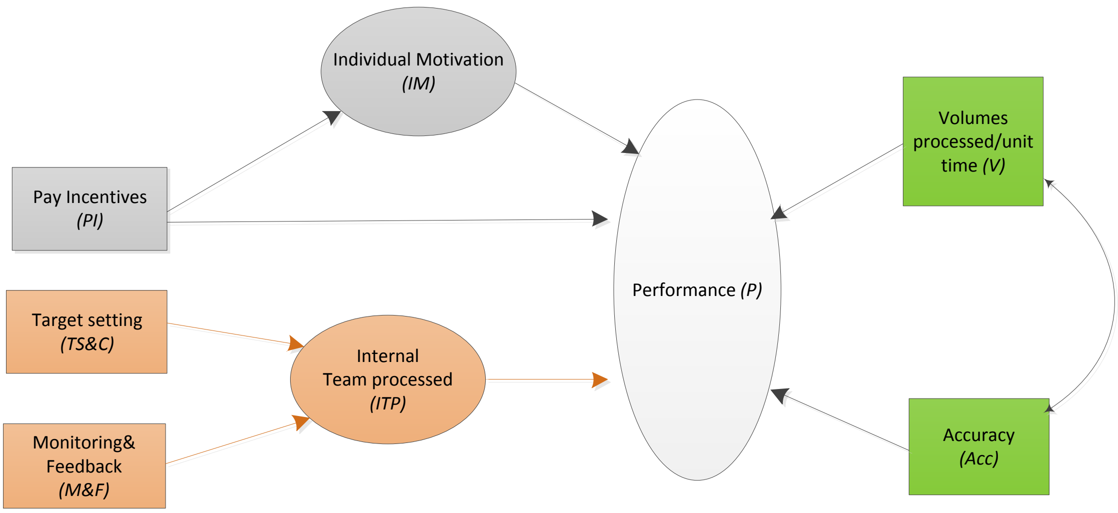

Figure 5: Performance model derived from literature

Individual performance data used in the study was collected daily and analysed in monthly buckets. Data related to the number (volumes), the value and the accuracy of deposits processed, and data related to attendance was collected using a deposit processing system; behavioural ratings, capturing aspects of professionalism of individuals, were captured electronically for each individual at each participating centre. Performance data, collected over 34 months for each category of individuals from 18 bulk cash processing centres was used in the study. Data on the volumes of deposits processed was immediately available for the teller to see on the deposit processing modules of the computer systems which they were using. Professionalism ratings were discussed with tellers as they went through the daily processing tasks. Attendance data was known by tellers, as this was under their control. Accuracy data was only available at the end of each processing day, when the final reconciliation of deposits received, processed and deposits held by each teller were summarised.

The performance levels of each teller on the volumes, value and accuracy of deposits were combined with ratings on behavioural scores for each teller, to come up with a weighted composite monthly performance score, which reflected the final outcome performance for each teller, per month. Attendance was operationalised through measuring the number of days a person was absent from work; each day of absenteeism from work resulted in a scaled deduction of the final monthly rating score of the teller. Sixty percent (60%) of the final monthly outcome measure for each supervisor was based on the monthly final scores of each of the tellers within their team; the balance of the supervisor’s score was made up of a combination of behavioural ratings, capturing each supervisor’s professionalism, together with attendance data. The productivity-linked pay incentives were additional to regular monthly salaries which were paid out to all participants. Pay incentives were paid out monthly to regular tellers, depending on the level of their individual final monthly rating scores, for the previous month’s performance. Similarly, the supervisor’s hybrid pay incentives were paid out monthly for retrospective performance, based on a weighted combination of their own personal ratings (40%) and 60% of the final monthly rating scores of all tellers within their team.

There were two types of tellers involved in the study: tellers who were employed on regular employment contracts (regular tellers) and tellers who were employed through employment agencies, and who were on fixed-term renewable contracts (contract tellers). The ratio of regular to contract tellers for cash each centre was maintained at around 70:30. The composition of regular and contract tellers within each team varied with most teams comprising four regular tellers and two contract tellers. There were no distinctions in the tasks performed by either group of tellers; the only distinction was based on the type of contract held by the teller at the time.

There were two interventions carried out in this study. The first intervention (IV_1) was the introduction of pay incentives for regular tellers while contract tellers were not eligible for pay incentives. The second intervention (IV_2) was the allocation of both types of tellers into teams, each of which was headed by a dedicated team supervisor. The period between IV_1 and IV_2 ranged between eight to ten months for all the participating centres.

Based on the reviewed literature on the effects of pay incentives on performance within work teams, hypotheses were developed on the volumes, accuracy and overall performance patterns expected in the different phases pre-post IV_1 and pre-post IV_2.

3.2 RESEARCH QUESTIONS, EXPECTED CHANGES AND HYPOTHESES

The three research questions (see also section 1.6) being investigated in the study are linked to the research hypotheses, and the changes as shown next sections.

3.2.1 RESEARCH QUESTION 1

Research Question 1 (RQ1) was, "Over time, what are the effects of introducing pay incentives on individual performance?" is investigated using hypothesis 1 (***H_1***), "The average processing time per deposit will decrease three and six months post IV_1, when compared to pre-IV_1. The expected decrease will be greater for regular tellers, in comparison to contract tellers.

Expected changes to volumes of deposits processed

From the literature on work team tasks, it has been shown that, while most task work includes components of speed or pace and the accuracy or precision with which the task is accomplished (Beersma et al., 2003, Condly et al., 2003; Elliot et al., 2001, Jenkins et al., 1998), the tendency in work teams is for accuracy to be sacrificed in favour of speed. Derived from Figure 5, Figure 6 illustrates the relationships between pay incentives and performance variables which were expected to change.

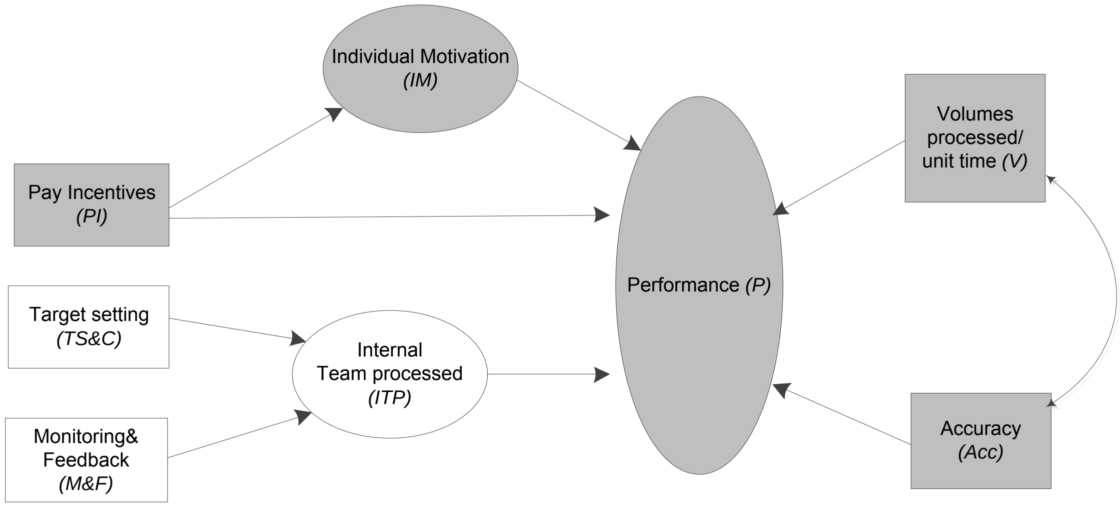

Figure 6: Integration: Effects of pay incentives on speed, accuracy and performance

Drawing on Skinner's reinforcement theory (Skinner, 1953) and the other extrinsic motivation theories, and based on the more recent empirical the works of Beersma et al., (2003) and Jenkins et al., (1998), the introduction of pay incentives was expected to result in the gradual increase in the number of deposits processed per unit time per teller for regular tellers over a period of time. This hypothesis was based on the expectation that the regular tellers would begin to see and feel the impact of processing more numbers of deposits within their allocated time periods on their performance scores, which would directly impact the value of incentives paid out to them, monthly. Because of the monthly time-lag between performance and the receipt of pay incentives, more significant changes in speed were expected to begin two months post IV_1, in line with reinforcement theory (Komaki et al., 1996) Another way to picture the impact of individual pay incentives on the volumes processed per unit time would be a graph where the processing time taken per deposit was going down. Although the increase in volumes of deposits processed per unit time was not initially expected to be significantly different from the base scenario, in time the change was expected to be practically significant. The impact of the allocation of permanent supervisors to teller teams was expected to result in further improvements in the number of units of deposits processed per unit time for both regular and contract tellers, as supervisors pushed all tellers to work harder (the incentive of supervisors was based on a proportion of the performance of all tellers within their team).

Figure 7 illustrates the patterns of expected changes in volumes of deposits processed per unit time (speed of processing) for regular tellers (shown as the bold lines) and for contract tellers (shown as the narrow line). A gradual increase in the units of deposits processed per unit time per regular teller was expected post-IV_1, in comparison to pre-IV_1. The volumes of deposits processed per unit time between regular and contract tellers is expected to differ significantly post IV_1, in that regular tellers, motivated by receiving pay incentives, would process more deposits per unit time in comparison to contract tellers, who did not receive pay incentives.

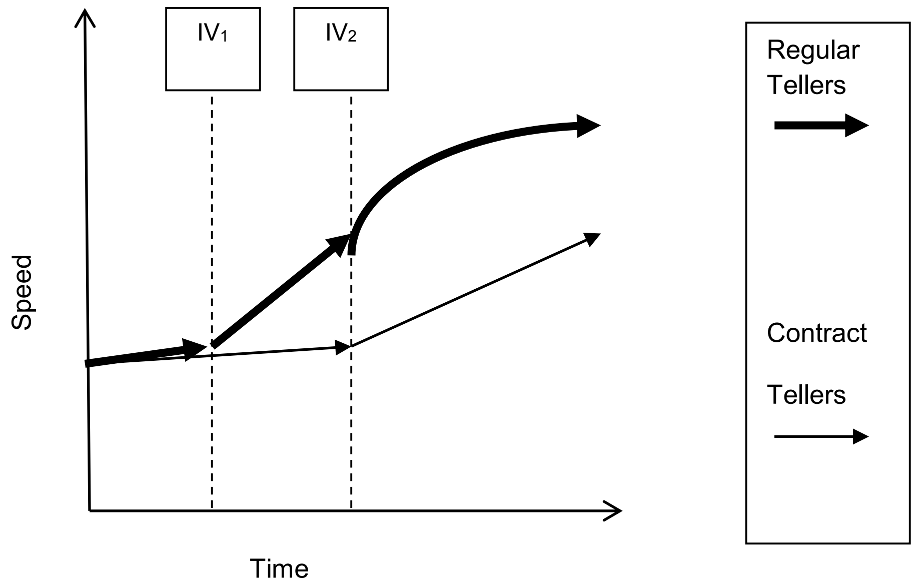

Figure 7: Pattern of expected changes in volumes

Hypothesis 1:

H

$\boldsymbol{H_1}$**:** The average processing time per deposit will decrease three and six months post IV_1, when compared to pre-IV_1. The expected decrease will be greater for regular tellers, in comparison to contract tellers.

From the study by Elliot et al., (2001), the accuracy of taskwork was expected to be sacrificed by individuals who received pay incentives prior to IV_2, where the volumes of deposits processed per unit time were weighted equally with the accuracy with which deposits were processed. The literature suggests that, where it is lacking, accuracy is a difficult task dimension to improve-upon in the short term (Jenkins et al., 1998). Drawing upon Expectancy theory (see section 2.5) as a foundational theory, the valency component of this theory led to the postulation that tellers were unlikely to rely on accuracy to improve their performance ratings in cases where this skill was not acutely developed. Instead, it was expected that the permanent tellers would place more effort to increase the volumes of deposits which they processed per unit time (speed of processing per deposit), in compensation for lack of accuracy, in order to attempt to earn pay incentives. In addition, since accuracy was measured at the end of each day - in the form of balancing the total deposits received, deposits processed and the deposits on hand – the rating measure for accuracy was a lagging statistic. Hence, it was not expected that tellers would be able to immediately use this indicator to assess how well they were performing as they went through the day.

It was also expected that some regular tellers would unconsciously sacrifice the accuracy of deposit processing for speed of deposit processing in the short term (i.e. immediately after the introduction of IV_1). This pattern was not expected to last beyond the first two months post IV_1, after which, tellers would be forced to pay attention to their accuracy statistics. In the medium term (2 to 3 months post-IV_1), it was expected that accuracy patterns would gradually improve, as regular tellers were forced to focus on their accuracy statistics by management, and, as tellers began to understand the weighted impact of their accuracy scores on their final monthly overall performance scores, and as tellers reached their limits of the volumes of deposits processed per unit time. It was also expected that some aspects of the professionalism measure (e.g. neatness of work area) would indirectly influence the accuracy outputs of some of the regular tellers; improvements in the neatness of the teller work-space was expected to result in the teller making fewer deposit processing errors. Overall, the accuracy statistics of contract tellers was not expected to change after the introduction of IV_1, as there was no apparent immediate financial motivation do to do so. Figure 8 shows the patterns of changes to the accuracy dimension of performance over the time of the study. In line with the meta-reviews by Condly et al., (2003), and Jenkins et al., (1998), the accuracy of deposit processing was expected to improve over time, following IV_2.

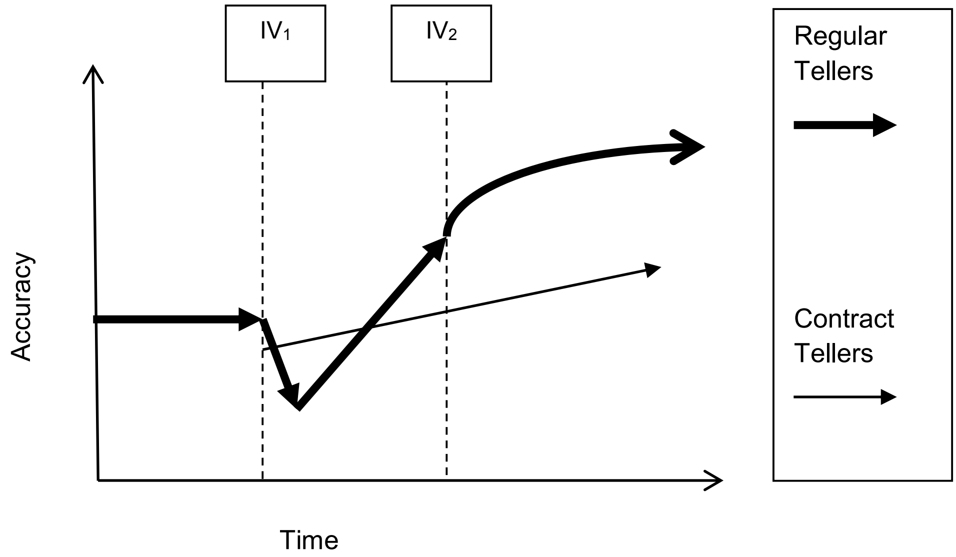

Figure 8: Pattern of expected change in accuracy of deposit processing per teller

3.2.2 RESEARCH QUESTION 2

Research Question 2 (RQ2) was, "What are the effects of introducing hybrid pay incentives for supervisors, on team member performance over time?" RQ2 was investigated using Hypotheses 2a, b, c & d which were based on the general proposition of improvements pre-post IV_2 in the number of deposits processed, deposit volumes processed, volumes ratings of deposit processed and the accuracy of the deposit processing.

Expected changes to overall team-member performance

The allocation of tellers to supervisors, and the formalisation of teams was expected to provide structure and boundaries for teams. Each team, now formally recognised by all inside and outside and under the leadership of a dedicated supervisor, was expected to function slightly differently from the previous setting where tellers were not allocated to teams nor to supervisors. It was expected that the supervisor would do all he/she can, to maximise how the individual tellers within their team perform, since it was in supervisor's interests to earn maximum pay incentives, and 60% of the supervisor's final scores are derived directly from the overall monthly performance score of each of the tellers within his/her team (see section 4.5.2). Using the introduction of IV_2 as time zero (t_0) and each month after that as time-plus-one (t_1, t_2, t_3 etc.), it was expected that teams would differ in their trajectories of monthly average final performance ratings, depending on the team processes (see section 2.8) employed within each team by both tellers and their supervisors. Derived from Figure 5, Figure 9 illustrates the relationships in team processes and performance variables which are discussed below.

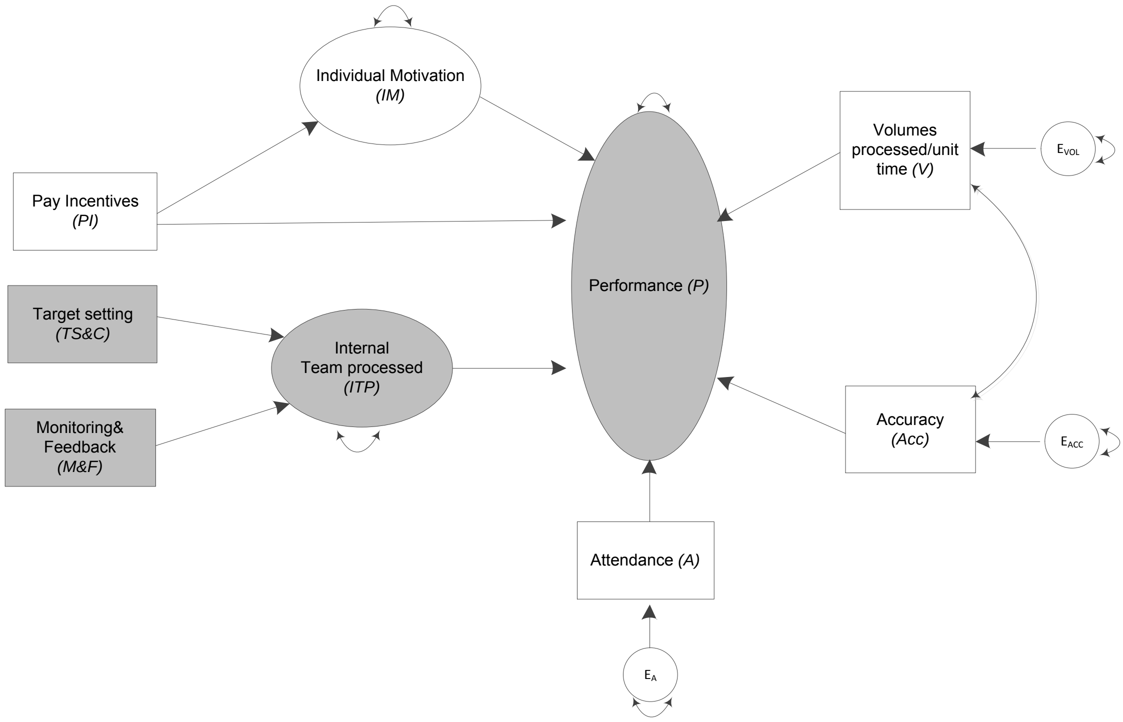

Figure 9: Integration of effects of team processes on performance

IV_2 was expected to result in immediate increases in average monthly volumes of deposits processed by both regular and contract tellers within their teams, as supervisors increased the focus on their dedicated tellers, and supervisors actively drove tellers to process more deposits per unit time. The success and sustainability of the changes to average volumes of deposits processed per unit time was expected to vary significantly between members of different teams, as a result of differing team processes within teams, as directed by the team supervisor. Accuracy was not expected to be significantly affected by the introduction of IV_2. Professionalism measures were expected to change significantly post IV_2, for at least three reasons: 1) it was expected that allocation of tellers to dedicated supervisors would focus both tellers and supervisors on issues related to professionalism, as operationalised (see section 4.3.10.3); 2) because of the immediate feedback which accompanies breaches in professionalism (such as feedback from the supervisor to the tellers on neatness), tellers were expected to focus more on this aspect; 3) because the final overall monthly score of each teller had an impact on the overall weighted final score of the supervisor, the supervisor was expected to pay much more attention to assist his/her tellers to achieve high final professionalism ratings. Attendance patterns for both supervisors and tellers were expected to improve post-IV_2 for at least two reasons both of which are to intrinsic and extrinsic motivation theories (see section 2.5): 1) Non-attendance by any teller within the team indirectly affected the final monthly score of the supervisor, through the final score of the teller; 2) Peer pressure by team members was expected to result in tellers feeling the pressure not to let team members down.

Team processes, such as intra-team coordination, target setting and feedback were expected to account for most of the explainable components of variance in average monthly performances between individuals from different teams over the time of the study. Figure 10 illustrates the expected pattern of the combined effects of IV_1 and IV_2 on overall performance scores, post IV_2 for all teams.

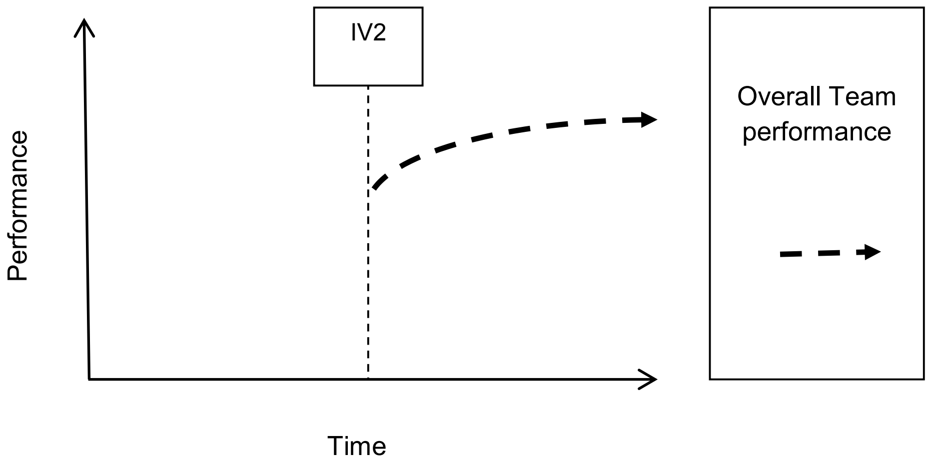

Figure 10: Pattern of expected change in overall team performance

From the literature, the following sub-components of hypothesis 2 are advanced:

***H_2*a:** The average performances of team members in the study, measured in terms of average number of deposits processed per unit time, will show an improvement, from six months before the introduction of IV_2 to 12 months post-IV_2

***H*₂b**: The average performances of team members in the study, measured in terms of volumes processed, will show an improvement, from six months before the introduction of IV_2 to 12 months post-IV_2

***H*₂c**: The average performances of team members in the study, measured in terms of volumes rating, will show an improvement, from six months before the introduction of IV_2 to 12 months post-IV_2

***H*₂d**: The average performances of team members in the study, measured in terms of accuracy rating, will show an improvement, from six months before the introduction of IV_2 to 12 months post-IV_2Predictive model

3.2.3 RESEARCH QUESTION 3

RQ3 was, "What themes emerge to explain persistent performance variance between work teams over time?"

In chapter 2, team processes were shown in the works of (Cohen & Bailey, 1997; Marks et al., 2001) to mediate the relationship between the team task-environment and outputs; this is the foundation of the team effectiveness model. This research focusses on the effects individual and hybrid pay incentives on long-term performance within the work-team structure. The research also focusses on the variances in internal team processes in work teams with moderately interdependent tasks and a combination of individual team-member and hybrid supervisor rewards. Drawing from the literature, the research 1) predicts that certain internal team processes are more significant than others in explaining overall average performance differences over time, in the work teams studied; 2) develops a predictive model to explain some of the mechanisms for sustained performance differences in work teams, with moderately interdependent tasks and hybrid supervisor rewards. Figure 11 depicts the predicted Structural Regression (SR) model for work-team performance, using Structural Equation Modeling (SEM) notation.

The structural model shows that the constructs - internal team processes (ITP) and external team processes (ETP) – result in the endogenous construct called team performance (TP). The two factors - Internal team processes (ITP or η_1) and external team processes (ETP or η_2) - are formed from the multiple constructs called Communication (C), Incentives (I), Target-setting (TS), Monitoring, coaching and feedback (MCF), thus making these factors latent composite factors (Kline, 2011) in the model. The structural model shows that internal and external team processes are correlated, and they lead to team performance; these two factors are thus referred-to as MIMIC factors (Kline, 2011, p. 282) because they are composed of multiple causes and they result in multiple indicators. In addition, since the structural model

The measurement model shows that communication (C or x_1), incentives (I or x_2), target-setting (TS or x_3), monitoring, coaching and feedback (MCF or x_4), are formative indicators for Internal team processes (ITP or η_1) and external team processes (ETP or η_2). The effect/formative indicators are shown as freely varying but they do not co-vary with other indicators. Accuracy (AC or y_1), and volumes processed per unit time (V or y_2) are shown as effect indicators for team performance (TP or η_3). Similarly, these effect indicators are allowed to have variances and they are allowed to co-vary, in line with theory. Each one of these effect indicators also have error terms, which are not shown in the diagram.

The challenges of using formative indicators in structural modeling have been, and continue to be, the subject of research by methodologists (Bollen, 2007; Howell, Breivik & Wilcox, 2007; Kline, 2011; Little, 2013). In structural modeling, formative constructs are assumed to cause the underlying factor. The theory behind formative measurement is that each one of the indicators is considered a partial cause of the factor; thus, each resulting factor is considered an index constructed from the combination of indicators (Hair, Black, Babin & Anderson, 2010). Where formative indicators are used, model identification requires that each of the resulting factors, in turn, result in at least two outcome reflective items or endogenous constructs (Hair et. al., 2010; Kline, 2011; MacCallum & Browne, 1993).

Below are the various regression equations depicted in the model, where

x_1 : Communication (IC)

x_2 : Incentives (PI)

x_3 : Target setting (TS)

x_4 : Monitoring, coaching & feedback (MCF)

η_1 : Internal team processes (ITP)

η_2 : External team processes (ETP)

η_3 : Team performance (TP)

y_1 : Accuracy (AC)

y_2 : Volumes processed per unit time or speed (V)

$\zeta_{1\text{-}3}$: Residuals terms for $\eta_{1\text{-}3}$

γ_{ij} : Loading of i^{th} factor on the j^{th} indicator

λ_{ij} : Loading of i^{th} indicator on the j^{th} factor

$\mathcal{E}_{1\text{-}2}$: Error terms for $y_{1\text{-}2}$

The structural implication of the literature-implied model represented by Figure 11 is that, the direct and indirect effects of internal team processes together with the direct and indirect effects of external team processes (see section 2.6.4) result in team performance. Team performance (TP) = Internal team processes (ITP or η_1) + external team processes (ETP or η_2). The relationship is represented in equation 1:

Equation 1: $\eta_3 = \eta_1 + \eta_2 + \zeta_3$

The first part of the measurement model involves the two composite latent factors - Internal team processes (ITP or η_1) and external team processes (ETP or η_2) – and the four formative indicators - Communication (IC or x_1), Incentives (PI or x_2), Target setting (TS or x_3) and Monitoring, coaching and feedback (MCF or x_4). This part of the model is represented through a matrix, which is equivalent to the following equations:

Equation 2: $\eta_1 = \gamma_{11}x_1 + \gamma_{12}x_2 + \gamma_{13}x_3 + \gamma_{14}x_4 + \zeta_1$

$\eta_2 = \gamma_{21}x_1 + \gamma_{22}x_2 + \gamma_{23}x_3 + \gamma_{24}x_4 + \zeta_2$

The second part of the measurement model involves the two effect indicators - Accuracy (AC or y_1), and volumes processed per unit time (V or y_2) - and the latent factor - team performance (TP or η_3). This part of the model is represented through a matrix, which is equivalent to the following equations:

Equation 3: $y_1 = \upsilon_1 + \eta_3 + \mathcal{E}_1$

$y_2 = \upsilon_2 + \lambda_{23}\eta_3 + \mathcal{E}_2$

where, υ_y is the vector of intercepts of indicators y_1 and y_2.

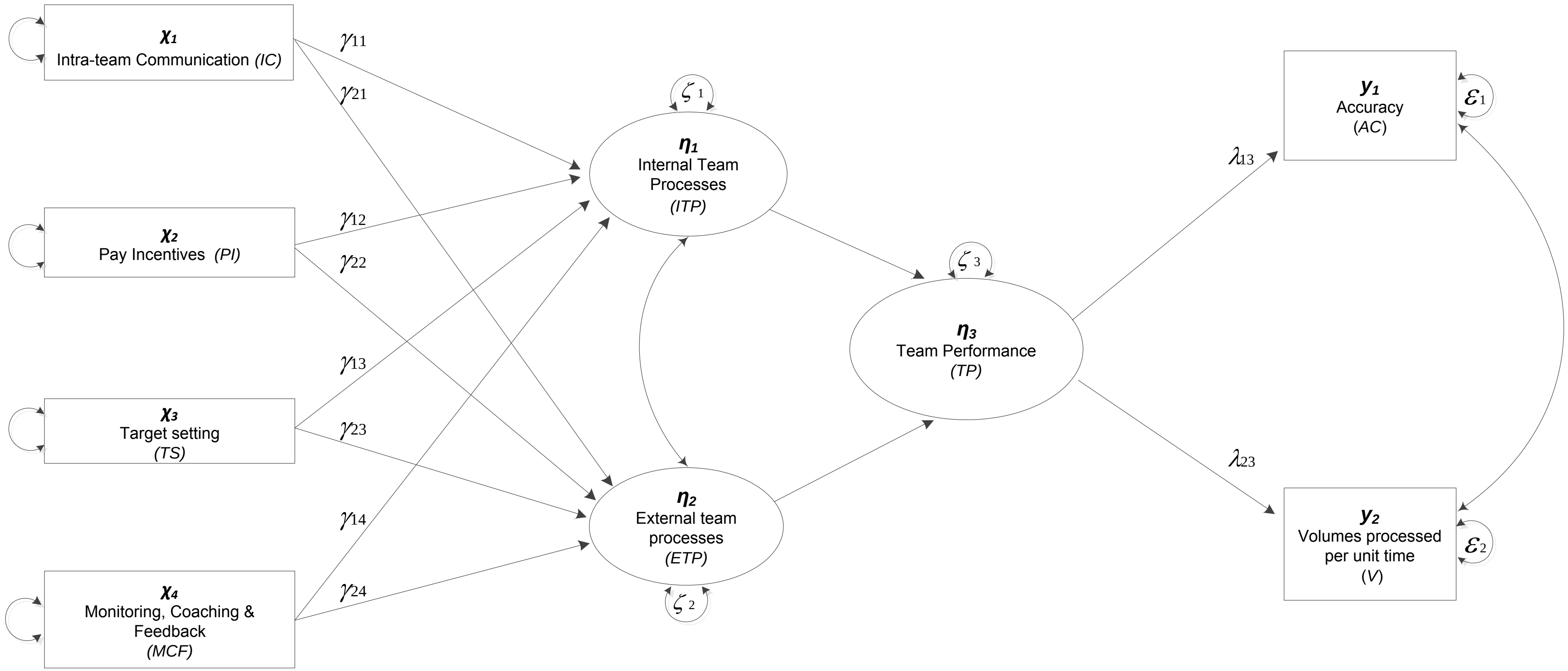

Figure 11: Literature-implied model for work-team performance

CHAPTER 4: RESEARCH METHODS

4.1 RESEARCH DESIGN

Mathieu and his fellow researchers (Mathieu et al., 2008) have highlighted the difficulty of research design, data collection and measurement in a live working environment in the meta-analytic review of team studies from 1997 to 2007. In this review, the authors emphasise the difficulties associated with doing team research within organisational settings as follows: “So, our challenge for future researchers is to embrace the complexity of current team arrangements. Rather than viewing these complex features of organizational teams as confounds or design problems to overcome, we submit that they are important variances to assess, model, and understand. They may, in fact, be the most important sources of influence to understand. This may well necessitate a new research paradigm, one that incorporates both quantitative and qualitative methodologies and one that is time sensitive and able to capture the inherent multifaceted nature of teamwork.” The researchers continue to say, “Strategies in this regard may include qualitative research, time-sampling or diary-style investigations, and clever archival approaches” (Mathieu et al., 2008, p. 462).

The manner in which change as a process can be explained includes first, explaining the change process as a variation in the conceptualised explanatory variables – factors and manifest variables - thought to be involved. This manner of explaining the change process is linked to the logic used in variance theory (Langley, 1999; Van de Ven, 2007), and concepts thought to be involved in the change process are packaged and operationalised in distinct categories (Van de Ven, 2007) – such as goal-setting, feedback etc., - along numerical scales (Van de Ven, 2007). The other way in which change as a process may be explained, is by describing the changes through time, using narratives (Gersick, 1994; Langley, 1999; Van de Ven, 1992). Using narratives associated with both “incidents” and “events” this process approach requires the incorporation of one or more “process theories” (Van de Ven, 2007) which explain the temporal order in which events result in the changes found (Abbott, 1988; Pentland, 1999).

The research design employed in this study was longitudinal. The study involved the tracking of changes in variables associated with performance, for existing tellers and teller-supervisors, who were located at bulk-cash-processing centres, at various geographic locations for a firm operating in South Africa. The firm had individuals who, at the decision of the company, and as a result of their employment contract types, received pay incentives for target performance and individuals who did not receive any pay incentives for target performance. Although individuals were assigned to teams in the latter part of the study, there was no random assignment of individuals either into teams or treatment groups. There were three distinct periods in the course of the study: the period prior to any intervention, the period post the first intervention (pay incentives for regular tellers), and the period post the second intervention (team allocation). While the interventions continued to be administered to the existing people in the work environment, the duration of the study period was limited to a period 34 months, during which data was collected daily, while pay for performance was administered monthly, for retrospective monthly performance. For these reasons, the study belongs in the family of quasi-experimental research designs (Babbie & Mouton, 2006; Huysamen, 2001; Van de Ven, 2007), and specifically belongs in the control-group time series design category, because it incorporates both elements of non-equivalent control group designs and the interrupted time-series design (Huysamen, 2001). In line with recommendations for studies with a longitudinal design (Ployhart & Vandenberg, 2010), various aspects of performance data were collected and analysed on a monthly basis (a repeated measures design), and changes in performances tracked.

The control-group time series design includes a “treatment” group (tellers receiving pay incentives) and a “control” group (tellers not receiving pay incentives); this improves the internal validity of the findings in the study. The interrupted time series design, improves the internal validity of the study in that it allows for more than one measurement occasion on the dependent variable, which has the effect of reducing the impact of historical events, spontaneous development, and metric invariance (Huysamen, 2011; van de Ven, 2007). The repeated measures design (a within-subjects design) removes the within-group variance by subjecting and measuring each individual on all the occasions of treatment and measurement, which in turn reduces error variance (Huysamen, 2001; Shadish, Cook, & Campbell, 2002). This has the effect of improving the internal validity in the study. The study design involves pre-intervention and post-intervention measurements; this design greatly reduces the potential for threats to the internal validity of the study, which may arise through pre-existing group differences, history, spontaneous development (Huysamen, 2011) and both metric and construct invariance (Geiser, 2013; Timmons, 2011). The study design allows for people and teams in a number of cash processing centres, and in geographically sparse locations to participate over a 34-month timeframe. This design enables inferences to be made on the general population of individuals and work teams within such settings, thus allowing for the maximisation of the population validity of its findings. However, because the study is limited to one organisation, the ecological validity of the findings are limited.

This study was interested in understanding change: whether or not the introduction of hybrid performance incentives and the demarcation of people into semi-permanent, task-interdependent work teams, had an impact on individual and team-level performance over time. The longitudinal design used in this study enabled the examination of time-variant (e.g. volumes processed) and time-invariant (e.g. employment contract type) variables which impacted the performance construct, as operationalised. In the literature there are a number of recommendations which are made for consideration when designing longitudinal research. Some of these are dealt with below.

Singer and Willett (2003), and Ployhart and Vandenberg (2010) suggest that longitudinal studies need to contain three or more waves of data collection, in order for the design to make sense. The reasons they put forward are that cross sectional data, even if randomly sampled from cohorts which are at different stages of the change process, does not describe systematic change adequately, and suffers from sampling bias and confounds from potentially underlying features within the cohorts themselves. Two-wave data is prone to confounds between measurement error and true change (Rogosa, Brandt, & Zimowski, 1982; Singer & Willett, 2003). Singer and Willett (2003) also recommend choosing a metric for time which is compatible with the underlying theory. In this study, data was collected over a 34-month timeframe, where performance measures collected (some of which were collected daily) were then summed up in a weighted score, as indicative of performance during the prior month.

Factorial invariance (Kline, 2011; Ployhart & Vandenberg, 2010; Timmons, 2010) - also called measurement equivalence and metric invariance (Timmons, 2010) – is that the same construct is being measured across time, and across different groups when using a multiple group design. Ensuring longitudinal invariance is also a critical consideration in the design of longitudinal studies (Kline, 2011;

Ployhart & Vandenberg, 2010; Timmons, 2010). Invariance refers to the stability of meaning and measurement of a construct or variable over time (Kline, 2011; Ployhart & Vandenberg, 2010). Longitudinal measurement invariance measures the consistency of a factor and the factor indicators across time (Geiser, 2010; Kline, 2011; Meredith, 1993; Meredith & Tisak, 1990). Several researchers who specialise in various forms of longitudinal research (Bollen & Curran, 2006; Ployhart & Vandenberg, 2010; Singer & Willett, 2003), recommend that, in addition to ensuring that the variable under measure has meaningful content, the variable should also be statistically consistently measureable over time. Invariance can take-on many forms, including metric or measurement invariance (Bollen & Curran, 2006; Kline, 2011) and construct or factor invariance (Geiser, 2010). As part of the design in this study, factorial invariance was examined, using Latent States and Traits (LST) modeling (Geiser, 2010). LST modeling is a variability model (Geiser, 2010) which separates "stable from occasion-specific components of variance" (Geiser, 2010, p. 85).

The study also sought to explore some of the mechanisms which could explain sustained performance variance among comparable teams. Some of the research questions required the exploration of factors and processes which could explain some of the performance variance between teams, through the analysis of performance of individuals within teams; the study relied heavily on the in-depth interviews as a means to propose process issues associated with sustained performance.

The main study can be separated into two parts. The first part was an assessment of individual performance trends using quantitative techniques on historical performance and attendance data for the measurement dimensions in the matrix. This data was used for to pick up pre-existing performance and attendance trends of the tellers. Next, data was collected on all the different components of a composite "performance" matrix, for all tellers and all teams during rest of study, up until the end of the period of study (i.e., 34 months of performance-related data, captured daily but assessed monthly). A portion of the overall 'performance" matrix was deposit processing data, which measured the speed of processing cash deposits and the accuracy with which deposits were counted. This data was collected directly from the cash processing systems. The other portion of the performance matrix was data related to behaviours by tellers. This data, which was in the form of ratings, was recorded daily and manually by tellers, supervisors and departmental heads. The data was retrieved from centre records and it was used monthly as part of a composite overall performance score (refer to section 4.3.10.5). In addition to this, the research also tracked changes in the performance of both individuals and teams, as teams were introduced in the working environment. This part of the study design allowed for the testing of existing theories (e.g. theories on the effects of pay incentives on performance) underpinning interdependent work-team performance.

The second part of the study design facilitated the collection and analysis of qualitative information, on themes which were emerging in relation to individual and team performances, as time passed. This component of the study was achieved through the use of purposive sampling. Qualitative data was collected from individuals and teams for their views on context-specific issues, performance trends, the impact of the two interventions on people, and the impact of teams on performance for the duration of the study. Semi-structured interviews were used for this; the interviews were followed by the analysis of the information collected, and themes were produced. The design of the questionnaire used for interviews in this second part of the study, built on the findings of the first part of the study, in a lagged design. Hence, even though the study had two components, these components ran in parallel.

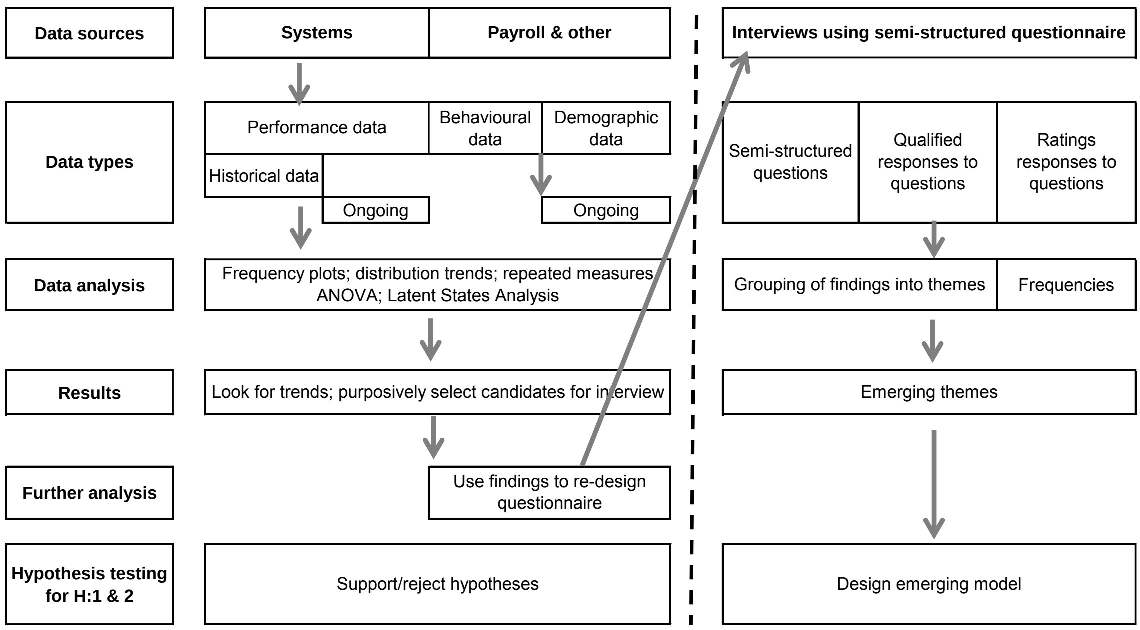

Figure 12: Flow diagram for research design for parts 1 and 2

Figure 12 graphically illustrates the sequences followed when conducting the research; the illustration depicts the sources of the data used, the types of data, the analysis performed, the results derived, and any further analyses. The graphic also shows the links between the different parts of the research.

4.2 RESEARCH METHODOLOGY

The methodological paradigms commonly used for research in the social sciences include the qualitative paradigm, quantitative paradigm (Babbie & Mouton, 2006; Huysamen, 2001), and the participatory action paradigm (Babbie & Mouton, 2006). These research paradigms are related to phenomenological, positivist and critical meta-theories found within social science (Babbie & Mouton, 2006; Huysamen, 2001).

The design of this study intended, first, to explore the predicted effects - a positivist approach (Babbie & Mouton, 2006) - of pay incentives (an intervention) on individual performance. The epistemologies used were thus a combination of deduction and inductive reasoning. This first purpose of the main study, and its accompanying hypotheses, employed deductive logic, underscored by existing theory; the section largely used quantitative analytical techniques to test various hypothesised relationships on performance variance, pre- and post the first intervention.

The second purpose and design of the study explored (in addition to performance variance) processes, which could explain sustained performance variance in comparable, moderately-interdependent teams, over time. This phase of the research used inductive logic, based on in-depth semi-structured interviews. Deduction was used, mainly as a supporting epistemology in providing rigour to some of the variance estimation statistical techniques used to estimate measurement invariance.

In their review article, Kouchaki et al., (2012) argue the importance of understanding the context and environments of groups on performance. The importance of understanding the impact of the contexts has also been highlighted in the works of Guzzo and Shea, (1992); Marrone, (2010); Mathieu et al., (2008); Sundstrom et al. (1990) and Van de Ven, (2007). For this reason, the case study method was used to interact with teams within their respective areas of work. An ethnographic approach, combining both descriptive qualitative and descriptive quantitative methods was used. Ethnography is described as the "making, reporting and evaluation of" reports from "direct observation of behavior in a particular society"

(Babbie & Mouton, 2006, p. 279). The reason for combining the different techniques was designed to search for any emerging and, more importantly, any sustained patterns of actions, behaviours and processes between purposively selected teams; combining different techniques also allowed for a level of triangulation of information sources and test procedures.

The semi-structured interviews, which were combined with surveys followed a multiple case study approach (Gerring, 2008; Yin, 2003), where “cases” were teams, embedded within their functional and geographic locations. In some cases, where the variable of interest was at the individual level (such as the instances where the in-depth views of the individual , individuals were treated as “cases”, even though they were merely respondents.

This study used combinations of quantitative and qualitative methods for tracking and analysing the performance of individuals and teams over time, emanating from the nature of the research questions. The reason for using mixed Quantitative / qualitative techniques (Tashakkori & Teddlie, 2003) was because the research questions referred both to variance and process issues (Van de Ven, 2007) as a means to understand performance in teams, where incentives and tasks were interdependent. The variance components of the research questions provided breadth and an element of generalizability, while the process-related components of the research provided a deeper understanding of the team-processes associated with performance variance between teams. The mixed method approach used in this research provided both complementarity and completeness (Tashakkori & Teddlie, 2008) in the interpretation of changes in performance for individual-level and team-level cohorts whose incentives and tasks were moderately interdependent over time.

Individual and team performance data were tracked over the duration of the study (cut-off at 34 months). In-depth interviews, combined with quantitative surveys were used to capture the views of purposively sampled participants. Due to limitation of the cross-sectional nature of the surveys, cognisance was taken that the research could have missed important dynamics in the team development, as noted by Mathieu et al., (2008).

4.3 RESEARCH SETTING

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The function of the components of the cash centres in this study was the facilitation of the processing and banking of bulk retail cash and cheque deposits. The processing centres dealt with here were responsible for receiving, verification and timeous facilitation of banking for bulk retail cash and cheque deposits, on behalf of some commercial banks, catering to commercial bank clients who have specialised bulk banking needs.

Each centre had deposits receiving people and systems, deposits counting people and equipment and the necessary supervisory processes aligned to these operations. The receiving and counting of retail deposits was done in specially designated areas of the cash centre, which were specifically designed or modified for this purpose. The normal work-week of the cash centres was from Monday morning until Saturday midday; some flexibility around starting and ending times was done at the discretion of the centre management.

Deposit receivers – called “runners” - and deposit counting tellers were initially managed by a group supervisors, in a ratio of approximately one supervisor to six tellers, where any supervisor could assist any teller during the process of receiving and processing retail deposits, As a means to retain tellers through them earning more “take-home” pay while getting more productivity of the retail processing operations, two interventions were introduced into these settings: 1) a pay incentive scheme was introduced for permanently employed tellers, followed by 2) the allocation of tellers and supervisors into teams and the introduction of hybrid incentives for the supervisors. Each team was composed of tellers and a supervisor. The sizes of each team varied somewhat, with a standard team composed of six tellers and one supervisor for the team.

Systems and equipment used by each of the cash centres were standardised and controlled centrally by the company, and purchases of new or replacement of existing machines was centrally controlled. All cash centres were fitted with a multitude of cameras and security related systems. The purpose of the security cameras was two-fold: 1) to provide the cash centre security control rooms with a total view of the cash centre and the retail processing floor, for security purposes; 2) to provide visibility and to record all activity within the cash centre for every minute of the day. The purposes of the latter provision of the security cameras was, to be able to retrospectively trace and view every deposit transaction which was received and processed within the cash centre. This part of the camera system was also linked electronically to each teller computer terminal , which was used to run a combined deposit management, inventory management and vault management system (VMS), so that each transaction was simultaneously processed, and logged onto the VMS. The camera and recording systems were able to file the video footage covering the processing of the each deposit onto the same deposit data file. The calibration of all deposit processing and security equipment was managed centrally through nationally applicable contracts and service level agreements with the concerned suppliers. This ensured that the calibration, maintenance and replacements of faulty equipment happened without impinging on the ability of the any one of the centres to complete retail cash processing tasks.

Prior to the introduction of the intervention programs, all tellers and supervisors within the company went through an improved re-training followed immediately by a graded examination on teller tasks and responsibilities for tellers, and supervisory skills, tasks and responsibilities for supervisors. The teller program was called Teller training and the supervisors program was called the Supervisory Development Program (SDP). This training intervention was designed to ensure that a base level of tasks and responsibilities was achieved throughout the organisation.

4.3.1 EMPLOYMENT CONTRACT TYPES

Tellers had one of two types of employment contracts: permanent employment contracts and renewable fixed-term contracts. The tellers who were employed permanently were employed directly by the company, and all the contractual obligations associated with this contract- type were administered and borne by the company directly. Tellers on fixed-term renewable contracts were employed by different third-party contract agencies, which were ultimately responsible for administering the contractual obligations related to the employee. The company was responsible for the daily management of all tellers, including the orientation of new employees, training and management of all hygiene issues related to the tellers. The management of the cash centre was ultimately responsible to ensure that the daily operations of centres, in respect of retail deposit processing, operated smoothly. As a policy of the company, a ratio of 70% of the retail department staff within a cash centre, were to be permanently employed people, and the remaining 30% of the staff, were to be retained on fixed-term renewable contracts. Tellers on renewable short-term contracts were converted to permanently employed people, whenever vacancies occurred within the permanent staff compliment. The general selection criteria used for the conversion from fixed to permanent contracts was based on the teller's prior performance mainly.

4.3.2 CATEGORISATION OF TELLERS AND SUPERVISORS IN THE STUDY

In this study, retail deposit processing tellers were categorised in three (3) ways. The first classification of the tellers was by the type of machine which the teller used to count and verify deposits. Tellers were allocated to deposit processing machines, depending on the requirements of the centre. Using this classification, there were three main categories of tellers in the study 1) tellers using desk-top banknote counting and verification machines (e.g. 2650 machines); 2) tellers using bulk banknote counting and verification machines (e.g. Numeron-type machines); 3) tellers using specialised coin counting equipment only (e.g. Pelicans). The second way in which tellers were classified in this study was by the type of employment contract which the teller had with the company. This classification method resulted in two (2) groups of tellers: 1) permanently employed tellers (regular tellers) and 2) tellers who were on fixed-term renewable contracts (contract tellers). The third way in which the study categorised tellers and supervisors was related to the performance of the teller/supervisor on the incentive and productivity scheme that was introduced as an intervention. Through this classification, there were category A+ tellers/supervisors (rated 4 on the rating scheme) who were tellers/supervisors with the highest performance on the components of the scheme. A+ (or ranking 4) tellers/supervisors were followed by A tellers /supervisors (or ranking 3); B tellers/supervisors (ranking 2) and C tellers/supervisors (ranking 1). More details of this ranking system will be covered later.

4.3.3 RUNNERS

"Runners" were responsible to physically move deposit containers to the tellers. Supervisors would either call on the runner to send deposit containers to a specified teller, or the runner would, with experience, know where each deposit was destined to go. Runners also helped to clear the verified deposits from the tellers to the storage vaults. At peak processing times – after the receiving chute cut-off time – the number of deposit containers waiting to be counted would peak dramatically, as most cash-in-transit (CIT) deliveries would have occurred just prior to the cut-off time. At this time, runners were extremely busy trying to distribute work to tellers as quickly as possible.

4.3.4 RECEIVING OF RETAILER DEPOSITS AT CASH CENTRES

Various CIT companies collected and delivered retailer deposits at the cash centres. Deposits were transported in containers, tamper proof bags and envelopes. All the devices used for transporting deposits were clearly labelled to facilitate the deposit transactions. On arrival at the cash centre, the deposit containers were received via specially designed chutes. The deposit containers were then logged onto the VMS, recording among other things, the time of receipt, the details pertaining to the owner of the deposit and the condition of the deposit container on receipt. Having completed this, the deposit containers were ready for distribution by the runners to the counting tellers.

4.3.5 PROVISION OF DEPOSIT VALUE & DEPOSIT CUT-OFF TIMES

The ultimate aims of the deposit processing function at the retail cash centres was either 1) to verify the value of deposits made by bulk banking retail clients on behalf of a commercial bank, and to facilitate the processing of details related to the transactions and their documentation in such a way that it could be reflected in an account of the banking client by the commercial bank; 2) to effect third party payments through the allocation the verified deposits into the account stipulated by the retail client.

During this period, all verified deposits had to be accompanied by stamped teller entries confirming the deposit verification. These entries – called W.A.S.T.E. (an acronym for Written and Stamped Teller Entries) – which were in paper format, had to be processed by the bank reflected by the deposit slip from the client. Hence, these entries had to physically move to these specialised deposit entry areas (nicknamed "Blue rooms" or "Day-one centres" etc. depending on the bank) which were either located within the commercial banks premises or in separate areas within the cash centre, but always under the control and supervision of the bank. In both instances, WASTE had to be received at these centres by a strictly enforced cut-off time. Commercial bank cut-off times for receipt of WASTE ranged from 16:30 to 17:30 for inter-bank settlements to be effected, depending on the bank. In order to meet the deadlines of the commercial banks for giving value to deposits, cash centres enforced their own deadlines on the receipt of deposits at their depots from CIT providers; this cut-off time was 15:30. All deposits received before these times were then processed so as to make the cut-off times of the "Blue rooms".

4.3.6 DEPOSIT TYPES AND PROFILES

Retail deposits made at cash processing centres could be in the form of banknotes, coins and cheques. Combinations of deposit-types made at cash centres took the form of banknotes-only deposits, banknotes mixed with coin deposits, deposits containing only coins, and finally, any combination of the coin, notes and cheques. The number of cheques included in deposits was generally very small. Retailer's deposits also differed on the size/value of the deposit; the deposit envelopes could contain a wide range of the number of banknotes, coins and cheques. Some retailers preferred that their tills should "bank" smaller deposits more often – each of these smaller deposits were called "drops". This was designed to reduce the risks associated with keeping large amounts of cash in tills, and also to minimise the risks of balancing errors at the retail till-points. Other retailers - particularly those retailers who were using secure safes within their premises, tended to make large-value deposits.

Small "multi-drop" deposits coming into the cash centres was very unpopular with the tellers, because it involved the opening of, and the processing of each of the drops separately – i.e. as single deposits. This often slowed the process down tremendously, and resulted in multiple episodes where tellers had to perform cash re-counts. Large deposits were preferred by tellers, as these deposits generally contained large numbers of bank notes which, after arranging properly, could easily be processed through the high-speed note counters. Deposits containing coins were the least preferred of all deposits, since these deposits invariably contained mixed coin denominations. Mixed coin denominations within a deposit required a manual count and the separation of each coin denomination before the teller could perform the deposit verification final balancing step.

4.3.7 CASH COUNTING EQUIPMENT

The types of cash counting equipment used within the retail processing centres included equipment which could be used on top of the desk - often referred to as "desk-top counters" within the industry. The De La Rue® manufactured 2650® (2650) desktop counter and the Gesicke & Devrient® (G&D) manufactured Numeron® machine were the main types of desktop counters used within the centres, and this study is limited to these two types of banknote processing systems.

4.3.8 TELLER TASKS

The role of the teller in the bulk cash centres was to accurately verify all deposits received and to complete all the necessary entries pertaining to the deposit (i.e. to complete the deposit transaction so that it had complete traceability) to enable the commercial bank to give value to their retail clients on their bank accounts.

4.3.8.1 RECEIVING OF DEPOSITS BY TELLERS

Deposits were received from runners by tellers. Deposits were normally presented to the teller in the form of deposit boxes, deposit envelopes or deposit bags. Tellers then proceeded to verify deposits (cash and cheques) against a deposit slip which normally accompanied the deposit, through the use of counting machines.

4.3.8.2 PROCESSING OF DEPOSITS BY TELLERS

"Deposit processing" was a broad concept encompassing 1) the receiving of deposits by the teller, 2) checking the correctness of the depositor's details against a database, 3) checking the contents of the deposit – the number of smaller, single or multiple deposit envelopes contained within the overall deposit; 4) stamping of the deposit slip, after checking the correctness of the account holders' details; 5) stripping of the W.A.S.T.E. 6) the verification of the actual deposit contents versus what was declared on the customer deposit slip; 7) the reconciliation of all deposits received by the teller with their end-of-day balances.

Tellers captured the verified value of the deposit to the client via a deposit capture module of the VMS. Tellers then stored counted deposits in a standardised format which was ready for transfer to a bulk note sorting machine, which was usually located within another department of the same or a different cash processing centre. At the end of the shift for the teller, the teller then reconciled 1) all the deposits which were allocated to them to via the VMS, 2) to all the deposits verified by them through counting 3) to all incidents of deposit surpluses and shortages found during verification 4) to all cash and cheque deposits carried or transferred to other departments by the teller.

"Incidents" were identified as instances where the teller found differences between 1) the declared deposit amounts on the deposit slip and the actual cash or cheque value verified on counting by the teller, 2) and incidents where a deposit was not accompanied by a deposit slip were identified by the teller on VMS. In the instance where an "incident" occurred, the teller embarked on the following processes: 1) the teller had to identify the incident on VMS, 2) the teller had to re-count the whole deposit from the beginning a second time. If the recounted deposit matched the declared value on the deposit slip, then the teller could proceed to conclude the deposit according to the procedure stated earlier. If the recounted deposit still showed differences between the declared value and verified value, then the teller had to call the nearest supervisor to assist with the deposit. The supervisor would then log onto VMS as a supervisor, and they would then go on to personally verify the deposit by following the same steps as outlined for tellers. If the difference still remained, then the difference between the declared and verifies values would be captured on VMS, and the value given to the bank account would reflect the verified value of the deposit. Dealing with incidents was a very time consuming exercise for tellers.

4.3.9 SUPERVISOR TASKS

The role of the retail tellers' supervisor was to use allocated resources in order to ensure that all received deposits were accurately and timeously processed within the day of receipt. The way in which teller supervisors did this was by supporting runners and tellers during the deposit receiving and counting processes, and by coordinating the smooth functioning of the retail deposit counting section of the cash centres. The final goal for the teller supervisor, was to ensure that all deposits received from bulk banking commercial bank clients were processed and facilitated to enable for the bank to give the value of the deposit on the retail banking client bank account within 24 hours of the day in which the deposits was made by the client.

One of the more critical operational roles of the supervisor on the processing floor came at peak processing times. Peak processing times occurred in various ways. The first peak processing time occurred daily, between about 15:00 – when most CIT companies rushed to deliver deposit containers in order not to miss the 15:30 cut-off time stipulated by the cash centres for the receipt of deposit containers. For the supervisors and tellers, the period from 15:00 until about 16:30 was a daily pressure point, which needed to be navigated and coordinated skilfully by all, in order to ensure that all deposits received were processed for transfer to the "blue rooms", for the final stage of "banking" (see section on deposit value and deposit cut-off times above).

The next peak processing period occurred on Mondays and Tuesdays of every week. Collections of deposits from retailers were done every day of the week, including on Saturdays and Sundays. Deposit collections made were generally delivered at the cash centres on the same day on which the collection occurred, except for deposits collected from retailers from about midday on Saturdays, and all collections made from retailers on Sundays. In most instances, these collections also happened to be some of the larger collections of the week. Saturday and Sunday deposits were delivered at the cash centres by most CIT companies on the following Monday afternoon, together with CIT companies' normal Monday collection. A few CIT companies delivered their "weekend collections" at the cash centres as the first thing on Monday morning. Some CIT companies would not collect all the normal Monday retailer deposits on the Monday – these would only be collected on their Tuesday run. As a result, the volume of work to be processed by the cash centres on Mondays and Tuesdays was generally two or three times the normal weekday daily volumes.

The next peak period coincided with periods following holidays. Although these instances were fewer in numbers, these peaks also placed a tremendous amount of pressure on the retail processing floor. Abnormal but devastating peak processing times often followed periods of industrial action, which affected workers within the road transportation sector. During these periods, very few deposits were collected from retailers, since most CIT companies servicing the retail sector belonged to the one or other trade union which was linked to the road transportation sector. In some instances, some deposits were delivered by the retailers themselves at the cash centres; but these deliveries often occurred late at night or by arrangement with the cash centre management.

In all instances, the supervisor's' primary role was to coordinate the work of tellers so as to ensure that the deposit verification process was completed in time for all deposits to "make banking". In certain instances, supervisors allocated work to tellers, through giving instructions to the runners on where to take deposit boxes or envelopes received. At cut-off time, supervisors were critical in allocating and ensuring that work was processed speedily by tellers, in order to make deposit cut-off time to banks.

Supervisors allocated resources to tellers to perform their deposit verification processes. The resources allocated by supervisors to tellers included the desks, cubicles, chairs, deposit storage bins and lockers in which the teller performed deposit verification processes. The supervisor was also responsible for providing the equipment which the teller used for deposit verification and ensuring that each teller received equipment which was in good working order. The supervisor was also responsible for ensuring that the tellers had all necessary the stationery which would be used to complete the deposit verification process. Stationery used by tellers included stamps (used to stamp the received and verified deposit slips), rubber bands (used for tying cash and cheque deposits for storage) and miscellaneous other stationery items used by the teller during deposit processing.

As already mentioned in the section under teller tasks, supervisors were responsible for intervening in cases of "incidents" and assisting tellers to complete their deposit verification tasks.

4.3.9.1 THE CHANGING ROLE OF SUPERVISORS IN TEAMS

Before the introduction of the interventions, supervisors were almost solely responsible for assisting tellers in dealing with “incidents”. This meant that the tellers had to personally ensure that they had all the tools they needed for deposit processing themselves, or otherwise the tellers had to approach the retail head of department (who oversee all supervisors on the retail floor) for assistance. The head of department (HOD) was also responsible for managing all tellers, runners and supervisors within their department. This system of management of the floor was fraught with delays and was deemed in-efficient.

The supervisor re-training program (SDP) came with added responsibilities on the part of the supervisor. With the final intention of allocating tellers and supervisors into teams, the SDP emphasised the concept of teams and the management of teamwork. The supervisor’s role had changed from merely supporting tellers through incident management, to the management of team resources and the provision of much broader support to the tellers, and taking direct responsibility for ensuring task accomplishment. The supervisory role effectively replaced the role of the HOD on the floor, but its focus had also changed to placing more emphasis to providing support to the team members. The supervisors’ role also included balancing the work load among the teller within the team, through ensuring that leave was scheduled properly, and that the allocation and re-allocating of work was equitable.

4.3.10 OPERATIONALISATION OF VARIABLES

This section of the report describes the methods employed in order to operationalize the various data types within the study. The section covers the operationalisation of both quantitative and qualitative data used in the study. The constructs used here are aligned to the issues explored in the qualitative section of the study

4.3.10.1 VOLUMES

The measurement of deposit volumes (and speed) of processing was designed on the basis of existing information which was readily available on VMS. The profiles of the deposits which were going into each of the cash centres were also known, and the amounts of cash handled by each teller per shift, per day and per month were also available. The speeds of banknote processing of the available machines were re-checked to ensure that there was room for improvement on the part of the user. On the basis of this, a normal distribution curve profile was designed using all the data, for each of the existing broad classifications of deposit profiles in the centres. Ranges for low, average, high and very high performances were selected. A 15% "stretch" adjustment was made on the distribution – which had the effect of shifting the whole curve to the right. The ranges for low, average, high and very high volumes performances were re-selected and applied as the new standards.

The speed of processing deposits was measured using an assessment of the cash processed by each teller per month. There were two variables measured here: the volumes of cash processed by each teller (using the Rand values) and the time taken in seconds, to process each deposit. Table 1 shows different measures of deposit processing volumes and speed used to rate tellers, as part of the overall performance rating in the study.

Table 1: Measures for volumes

MEASURE	MEANING
Average ring-in[1] time means	The mean values of the time, in seconds, taken by each teller to ring-in a deposit
Average verified[2] time per deposit[3]	The mean value of the time, in seconds, taken by each teller to verify a deposit
Average verified time per envelope[4]	The mean value of the time taken, in seconds, by each teller to verify an envelope
Average straight[5] time per deposit	The mean value of the time taken, in seconds, by each teller to open, count and balance a deposit in a single process
Average straight time per envelope	The mean value of the time taken, in seconds, by each teller to open, count and balance an envelope in a single process
Average value of straight deposits	The average value, in Rands, of the deposit counted and balanced in a single process, by each teller

1: Ring-in: this was the time taken for tellers to process a deposit slip, without necessarily verifying the value of the deposit against the deposit slip. Ring-in time worked on the principle that the deposit was "said-to-contain" a declared value, and the deposit was treated on that basis, until a final count was done, at which point the exact value of the deposit was used and corrections made.

2: Verified: this was the process of verifying the contents of the deposit container, normally performed through counting using various types of desk-top counters.

3: Deposits: containers containing one or more deposits envelopes or bags inside. The deposit was normally accompanied by a deposit slip which contained the banking details of the person on entity making the deposit.

4: Envelopes: envelopes were normally smaller deposits which were contained inside a larger deposit container or bag.

5: Straight processed: this was the process where a deposit was rung-in and verified by a single teller, in a single session. This was the most stable and consistent measure of the time taken to process a deposit by a teller.

4.3.10.2 ACCURACY

The measurement of accuracy was initially designed on the basis that tellers should have no cash shortages, other than those differences which emanate as part of the actual deposit. In reality, it was found that there were a large number of small differences which tellers dealt with on a daily basis; on the basis of this, the measurement tool was adjusted to cater t for these differences. Since deposits also had surpluses, the net absolute difference of the teller was used as a measure of how well tellers managed their own differences. Table 2 presents a description of the accuracy measures used in the study.

Table 2: Measures for accuracy

MEASURE	MEANING
Accuracy rating mean	The mean accuracy rating of each teller
Differences as % total value processed	The value of differences measured as a % of the total deposit value processed by the teller in the month

4.3.10.3 PROFESSIONALISM

Professionalism was derived on the basis that tellers in the cash centre needed to take responsibility for their own actions, even though they were never in direct contact with banking clients. Part of the logic of this was based on the fact that some clients demanded to view the footage of deposits which had been indicated to have had incidents, and unprofessional tellers made the job of showing the client how their deposit was handled very suspicious. The professionalism of the teller was a rating of neatness of the teller workspace, and the adherence to laid-down processing procedures by the teller. The professionalism rating for supervisors was a score based on similar attributes as teller professionalism, given to supervisors by their head of departments. Table 3 presents a description of the professionalism measures used in the study.

Table 3: Measure for professionalism

MEASURE	MEANING
Professionalism rating means	The mean value for professionalism rating of each teller

4.3.10.4 ATTENDANCE

Teller attendance / absenteeism was included as a negative - i.e. it effectively deducted from the total overall score of the teller at the end of the month, prior to processing the incentive pay-outs. It was decided to use absenteeism as a negative in order to discourage tellers from taking un-scheduled “day-offs”, which placed tremendous pressure on the tellers who were members of the team, and sometimes even those tellers who were not members of the teller’s team. Table 4 presents a description of the attendance measure used in the study.

Table 4: Measure for attendance

MEASURE	MEANING
Attendance rating mean	The mean attendance rating of each teller

4.3.10.5 OVERALL PERFORMANCE

Overall performance score was weighted composite of the two productivity indicators – volumes and accuracy of deposit processing – and the two behavioural indicators – professionalism and attendance (see section 4.5.1.4). 60% of the final rating scores for supervisors were derived from the performance of the tellers which were allocated to the specific supervisor for the specific calendar month, the final supervisor rating was used as a proxy for overall team performance. Table 5 presents a description of the final performance measure used in the study.

Table 5: Measure for final performance scores

MEASURE	MEANING
Final score rating mean	The mean final score rating for each teller

4.3.10.6 EMPLOYMENT CONTRACT TYPE

Tellers were classified as permanent or regular tellers – if they were employed directly by the company on permanent contracts of employment – alternatively, tellers were classified as contract tellers – where the company through an employment agent contracted their employment, as renewable fixed-term contractors.

4.4 PILOT STUDY

The literature recommends that a pilot study be undertaken in order to refine methodological issues before a main study is undertaken (Huysamen, 2001). This approach is prudent, and in the case of the current research, this approach was deemed critical, due to the nature of the research questions contained in the study. The pilot study sought to examine the practicality and efficacy of using performance outcome measures and to examine the extent and practical significance (effect size) of any differences on such measures, both at individual and team levels, following the interventions. Such quantitative changes over time, as well as differences across teams, needed to be established as a precursor to pursuing the main study aims, viz., to understand the change process over time, which will require investment in a longitudinal design using qualitative methodology.

The pilot study had the following objectives: 1) To check on the efficacy and practicality of using the proposed measurement procedures for collecting data on the speed and accuracy variables in the design of the main study quantitative component; 2) to examine the practical significance (effect size) of any differences in compounded performance outcomes of individual tellers on the input variables of work speed and counting accuracy following introduction of the teller productivity scheme; 3) to examine the practical significance (effect size) of any differences across teams on average work speed, average counting accuracy, and the averages on the behavioural variables of professionalism and attendance in teams, following the allocation of the tellers to supervisors (i.e. the formation of teams). This was deemed necessary in order to determine whether the proposed qualitative study is warranted with a view to understanding any such difference; 4) to use semi-structured interviews to capture emerging themes for use in developing a structured questionnaire for use in the quantitative component of the main study. The design of the semi-structured questionnaire was based on the recommendations made by Van De Ven (2007) for developing process studies. The results from the pilot study are in Chapter 5.

4.5 INTERVENTIONS

There were two interventions that were made as part of the research. The first intervention (IV_1) was the introduction of a cash reward performance incentive, over and above the basic payment salary. This incentive was extended only to regular tellers who were performing above a certain level of a combination of performance and behavioural measures. The second intervention (IV_2) was the allocation of all tellers into specific teams. Each one of the tellers was allocated into a team headed by a single teller supervisor. IV_2 was introduced approximately ten months after the introduction of IV_1.

The interventions were underpinned by a performance measurement system, which covered different variables known from experience, to underpin high performance within the retail teller environment. These variables were put together, debated and agreed-to by members of the senior operations management team of the company, after a series brain-storming sessions and workshops that had taken place within the company.

The incentive reward structure was based on a composite score of productivity which was used as a basis for evaluating performance at both the individual level and at the level of the team. This approach to assessing team performance has been employed before in the literature (c.f. Kozlowski & Klein, 2000). The weighting of each of the components of the reward system was structured based on a combination individual and team effort. The outcome measures on each of the dimensions were dependent on two factors 1) clearly defined performance measures for each of the task dimensions of the composite scorecard, and 2) subjective ratings for behavioural components of the scorecard from other members of the team.

The performance measurement system designed by the company had four components:1) volumes of deposits processed, accompanied by the speed of deposit processing, 2) the accuracy with which the deposits were processed, 3) the professionalism which was exhibited by the tellers during the process of deposit verification, and 4) the predictable presence of tellers at processing work stations. Taken together, the company decided that all of these variables had to be further broken down into operationally workable components, and that these performance components had to aggregate to a single indicator of overall performance, after the weighting of each one.

4.5.1 INTERVENTION 1 (IV_1) – INTRODUCTION OF PAY INCENTIVES

The first intervention (IV_1) was the introduction of pay incentives. Pay incentives were introduced for regular tellers employed within the company. No pay incentives were offered to tellers employed through employment agencies on renewable fixed term contracts. The reasons for introducing the pay incentives for permanently employed tellers were two-fold: 1) to provide a self-funding way to compensate hard-working and dedicated workers to the company, 2) to provide a retention mechanism for tellers, by increasing the "take-home" component of the tellers' pay packages, while reducing the turnover of tellers who were on the permanent work contract. The structure of the pay incentives was designed to encourage regular tellers to try and achieve the highest levels of performance (A+ status or category 4).

The pay incentive program was trialled for three months in one large cash centre, before being rolled out to all other cash centres. During the trial period, no actual incentives were paid out to the tellers, although an indication of the potential earnings per teller was communicated to the management teams of all the centres.

Following the introduction of IV_1, performance data (for volumes processed, accuracy of processing, professionalism and attendance) was collected daily and collated monthly. Purposive sampling was used for centres and individuals to be targeted for interview (refer to section 4.9.1); purposive sampling was conducted in a lagged fashion, steered by the findings of performance trends from centres and individuals. Data was collected for both permanent and contract tellers over a period of ten months. The detailed processes followed for data collection are covered in sections 4.7 to 4.1 of this report. Performance data collected pre and post IV_1, was used to test hypothesis 1 (the hypothesised influence of pay incentives on short term performance – see sections 3.2). Repeated measures ANOVA was the primary technique used to test hypotheses1 and 2 (see chapter 5 and section 5.7).

4.5.1.1 TASK INTERDEPENDENCY BETWEEN TELLERS

The counting of retail deposits by the teller was largely a task that involved the teller only. The key aspect of task interdependence between tellers was manifested more glaringly during the peak periods (see section on supervisor tasks and task accomplishment). In peak periods, all the tellers had to perform at their highest levels of effort for speed and accuracy, due to high volumes of work which needed to be processed within a limited time window. Equally, tellers had to ensure that their levels of professionalism were not compromised. Absenteeism of any of the tellers placed tremendous strain on the remaining tellers to complete deposit processing each day. Tellers also provided ad hoc advice on processing techniques to other tellers. In addition, some tellers working in close proximity tended to watch their colleagues and to copy the techniques that their colleagues used when processing particularly difficult deposits (see section on deposit profiles).

4.5.1.2 REWARDS INTERDEPENDENCE

In IV_1, the incentive pay program for tellers was largely dependent on the tellers' own effort.

4.5.1.3 INCENTIVE PROGRAM MANAGEMENT

The participants in the study were aware on the measurement system in place, as part of the incentive scheme. The assessment and functioning of the incentive program was fully explained to all existing participants, and a test run was done within one production centre for three months prior to its implementation into other production areas. Selected people were identified as “super-users” of the scheme each centre, so that they could individually support and explain the mechanics of the scheme to new employees during the new employees’ periods of induction into the company (induction is a process of orientation of new members into the company, and it is generally built into the training program for newly recruited tellers). The super-users were also there in order to support existing employees in explaining the mechanics of the scheme. In general, super-users of the incentive program were existing training personnel, based at each production centre who are responsible for conducting new and refresher training for tellers and other staff members at the centres.

4.5.1.4 INCENTIVE STRUCTURE FOR TELLERS

For tellers, ninety percent (90%) of the outcome measures were based on individual performance along two dimensions 1) volumes of cash counted – forty five percent (45%) and 2) the accuracy of the counting – forty five percent (45%). Ten percent (10%) of the teller outcomes were based on a rating by the supervisor. This rating was based on the perceived professionalism of the teller by their allocated supervisor. The professionalism rating included items such as the tidiness of the work space of the teller, punctuality for work, neatness, adherence to procedures and to the laid down dress code. In addition, a negative rating for the teller was used by the supervisor whenever the teller was absent from work, outside the company allocated annual leave period. This negative rating had an effect on the composite (overall) score for the teller.

Table 6: Variable names & weighting used for final performance score

DIMENSIONS	WEIGHTING
Speed of processing (number of deposits processed) per unit time	45%
Accuracy of verification process	45%
Professionalism	10%
Attendance	Negative rating

Table 6 shows weighted matrix for all performance measures used for the final rating score. Teller ratings and teller incentives are given in Table 7

Table 7: Teller rating & pay incentive structure

RATING	PERFORMANCE LEVEL	ADDITIONAL MONTHLY PAYMENT**
A+	4	R1,700-00
A	3	R700-00
B	2	R300-00
C	1	Nil

**This payment was over and above the normal teller salary, and had been calculated as "take-home" pay, after all statutory obligations

4.5.2 INTERVENTION 2 (IV_2) – FORMATION OF TEAMS

The second intervention (IV_2) was the introduction of retail processing teams, composed of six tellers and one supervisor. The purpose of IV_2 was to trial a more effective work structure to operate the retail deposit processing floor, where work tasks were moderately interdependent between the tellers and their supervisors, through the empowerment of both the tellers and their supervisors. IV_2 was introduced eight to ten months after IV_1, depending on the start date at each centre. The introduction of IV_2 coincided with the introduction of hybrid pay incentives for the teller supervisors (see sections 4.5.2.7 and 4.5.2.9).

Teams were put together by allocating tellers to each supervisor; this was based on the practical experience of the operations managers of the centres, with the intent to achieve an equitable distribution of tellers in teams, using the historical performance of each teller as a basis. Tellers were first grouped on pre-existing performances into category-A tellers, category-B tellers and category-C tellers. Category A tellers were tellers associated with high overall performance. Category B tellers were associated with average performance, while category-C tellers were tellers who had low historical performance, based on the value of cash counted and verified per teller per month (for more on the classification, please see section 4.3.2). Within a cash centre, tellers were then assigned to a supervisor in such a way as to even-out the number of each class of teller per supervisor.

Performance data was collected as for IV_1. Purposive sampling was used to select centres, individuals and teams to be interviewed. As in IV_1, the purposive sampling was conducted in a lagged fashion, steered by the findings of performance trends from centres, individuals and teams. The purposive selection of centres, individuals and teams was designed to ensure that as much variability (in performance) was included in the samples; this design is also recommended by Van de Ven (2007) and Gerring (2007) for process study and case study research. Data was collected for both permanent and contract tellers over a period of 18 months, post IV_2. The detailed processes followed for data collection are covered in section 4.7 of this report. Performance data collected pre and post IV_2, was used to test hypothesis 3 (the hypothesised changes in overall performance, following the allocation of people into teams and the introduction of pay hybrid pay incentives for teller supervisors - see section 3.2.3).

Repeated measures ANOVA and latent states (LS) modeling (see section 4.8.2.3) were used to test hypothesis 2 (refer also to chapter 5 and section 5.7).

4.5.2.1 ALLOCATION TO A TEAM & DEDICATED SUPERVISOR (TEAM CONTEXT)

The teams' immediate contexts were investigated, by asking the tellers and supervisors questions related to any changes which the team members had experienced or gone through, following their allocation to specific teams and - for tellers – being allocated a dedicated supervisor, and - for supervisors – being assigned to dedicate their attention and look after specific group of individuals, whom they may or may not have interacted with before.

The questions posed required responses from both tellers and supervisors on whether the introduction of the teams and dedicated supervisors had resulted in any changes in volumes of processed deposits, the accuracy with which deposits were being processed; the questions also sought to get an understanding of the impact of teams and dedicated supervisors on behaviours associated with professionalism and attendance.

Interviewees were first asked one open-ended question related to issues they were aware of which could affect the relationships between team members. A similar approach as that used for the questions on incentives was used, whereby, a list of issues would be identified, followed by more in-depth probing on the identified issues. Thereafter, questions specific to the introduction of the dedicated supervisor and the allocation to the team were asked. The format of these questions required the interviewees to rate their responses, and then to try and qualify them where possible. The tellers and supervisors being interviewed were asked to rate by choosing one of the following responses: "Much the Same" (reflecting that the allocation to a team or the allocation to a dedicated supervisor had not had any influence on the person being interviewed, in respect of the performance dimension), "Worse" (reflecting that the allocation to a team or the allocation to a dedicated supervisor had resulted in a negative impact on the person being interviewed, in respect of the performance dimension), and, "Much Better" (reflecting that the allocation to a team or the allocation to a dedicated supervisor had a positive impact on the person being interviewed, in respect of the performance dimension).

4.5.2.2 TEAM CONTEXT

The retail deposit processing floor formed part of the cash centre, and belonged to the “retail” processing department, which was one of five departments of the cash centre. The layouts of the retail processing floors enabled the flow of work for distribution from the receiving chutes, to the different teller cubicles. In most instances, the processing cubicles were laid out in such a way that each supervisor would be able to visually see each of his/her tellers as they did their work in their cubicles, and these tellers would be located next to each other.

The retail department was led by a head of department, into whom, reported a senior cash processing supervisor, who had various teller supervisors reporting into them. As mentioned before, each supervisor was responsible for an average of six tellers. In most retail processing departments at the cash centre, there were at least two teams, with some of the bigger centres having over ten teams.

Teams followed different processes for coordinating their task work, depending on the rapport within each team. For instance, some teams chose to hold regular meetings while teams did not feel that this was entirely necessary. Some teams chose to regularly and publicly display their individual team member’s shift, daily or weekly targets and achievements, while other teams used other ways of communicating performances within the team. Some teams would arrange to meet socially together as a team, while others did not embark on any social interaction outside the work place.

4.5.2.3 TASK INTERDEPENDENCE

The joint responsibilities of the tellers and supervisors was to ensure that all deposits received were processed timeously and accurately in order to enable the retail banking clients to receive the associated deposit values in their bank accounts. The members of each team had different tasks, and each of the tasks varied from being purely individual tasks to moderately interdependent (hybrid) tasks. Within the retail deposit processing teams, there were virtually no pure group tasks; all tasks tended to be either individual or a hybrid of individual and group – a moderate form of interdependence.

The degree of task interdependence was operationalised as an assessment of ratings of self-reports, which were collected during the interview sessions that were carried out as part of the study. The investigation of task interdependence was addressed by asking participants to rate how they perceived the levels of interdependence of other peoples tasks on their own tasks. All participants were encouraged to qualify their ratings with comments, examples and explanations wherever possible. Tellers were asked to rate how they perceived the levels of task interdependence between the tasks of other tellers and their own tasks. Tellers were then asked to rate their perceived levels of dependence on their supervisors in order to complete their own tasks. Supervisors were asked to rate how they perceived their own levels of dependence on how individual tellers within their own group did. In addition, supervisors were also asked to rate their perceived levels of task interdependence on their teams as a whole. The rating scale which all participants used was low (reflecting that the levels of task interdependence was perceived to be low and rare by the participant), high (reflecting that the levels of task interdependence was perceived to be critical and continuous by the participant), and moderate (reflecting that task interdependence was perceived to be continuous but not critical).

Table 8: Task interdependence matrix between tellers and supervisors

KEY DEPENDENT	TELLER 1	TELLER 2	SUPERVISOR
TELLER 1		1. Assistance during peak times 2. Attendance as scheduled 3. Ad hoc advice	1. Provision of ergonomic workspace 2. Provision of deposit processing equipment 3. Assistance with incidents 4. Balancing of work-load
TELLER 2	As in Teller 1 to Teller 2		As in Teller 1 to Supervisor
SUPERVISOR	As in Supervisor to Teller 1	1. Getting through allocated workload 2. Turning up for work, as scheduled	

Table 8 summarises some of the key task interdependencies between tellers and between tellers and their supervisors in the team setting. The rows in the table depict the person who is the key dependent: for example, teller 1 (row 2) is dependent on teller 2 (column 3) for 1) assistance during peak times, 2) attendance as scheduled and 3) ad hoc advice

4.5.2.4 TASK INTERDEPENDENCY BETWEEN RUNNERS AND TELLERS

Although the runners were responsible for distributing received retail deposit, and for clearing processed deposits from tellers, a large part of this coordination effort rested with the supervisors. Consequently, the runners did not have great deal of impact on teller activities (and vice-versa), although it is conceivable that friendships between these two parties could have affected the distribution of work, in some instances.

4.5.2.5 TASK INTERDEPENDENCY BETWEEN RUNNERS AND SUPERVISORS

Where necessary, runners took instructions from supervisors on where to allocate received deposit and on which teller cubicles to clear processed deposits from.

4.5.2.6 TELLER DEPENDENCY ON SUPERVISOR

As mentioned earlier under the section on supervisor tasks, tellers depended on their supervisors to provide them working spaces which were ergonomically suitable to their tasks. Although the supervisors' role in this was merely to facilitate the allocation of a cubicle to the teller, it was the role of the supervisor to make the space, user-friendly for the teller, as the teller spent long hours doing repetitive deposit verification procedures. The supervisor also ensured that the teller received deposit-processing equipment which was in good working order: the equipment had to have the capability to process the banknotes at the speed it was designed to do; the machine had to have the capability to identify banknote denominations when calibrated; it had to be capable of identifying counterfeit banknotes; and in some instance, the machine had to have the capability to identify poor quality banknotes for removal from re-circulation.

4.5.2.7 SUPERVISOR DEPENDENCY ON TELLERS

As seen earlier in the section on supervisor tasks, the most important task which a supervisor had to do on the retail deposit processing floor was to ensure that received deposits were processed accurately and timeously and transferred to the "blue rooms" before their cut-off times. The responsibility for planning and the responsibility of coordinating the deposit processing activities, on the portion of the retail processing space for which the supervisor was responsible, was a task that was achieved by the supervisor alone. The supervisor was thus depended on tellers who were scheduled to be on the floor, to turn up for their work shifts, and for tellers to work at a pace that would achieve the tasks of preparing W.A.S.T.E. (refer to the section on provision of deposit value). Without these two ingredients, the supervisor was at risk of not making W.A.S.T.E. cut-off times.

4.5.2.8 REWARDS INTERDEPENDENCE

Under IV_2, the incentive pay program for the supervisor was derived from a combination of teller performance (60%), and the supervisor's own efforts (40%).

4.5.2.9 INCENTIVE STRUCTURE FOR TELLER SUPERVISORS

For teller supervisors, the performance incentive structure was structured so that sixty percent (60%) of the weighting of the final performance score for the supervisors was derived from the added overall performance scores of each of the tellers who formed part of the supervisor's team. Twenty five (25%) of the weighting of the final performance score for the supervisors was derived from a rating score done by the retail head of the department (HOD), and fifteen (15%) of the incentive was a combined rating score by the tellers forming the supervisor's team. Table 9 shows the earnings breakdown for supervisors within a team.

Table 9: Weighting of supervisor pay incentives

Derivation of the Component of the Supervisor's Final Score	Weighting
Overall performance for each of all tellers in supervisor's team	60%
Rating of Supervisor performance by Head of Department	25%
Average Rating from each of the tellers in the supervisor's team	15%

4.6 DEVELOPMENT OF CONCEPTUAL MODEL

The proposed conceptual model was developed iteratively, through combining the findings on individual and team performances post IV_1 and IV_2, and the incorporation of findings from the interviews conducted on purposively sampled individuals and teams (see section 4.1). The building blocks of the proposed performance model consisted of first, gaining an understanding the effects of pay incentives on performance variables for each individual, using repeated measures ANOVA and individual interview data over a period of 10 months. Secondly, the effects on performance variables, resulting from the allocation of individual tellers to dedicated supervisors and specific permanent teams, were tested on data collected from individuals over a period of 18 months. Repeated measures ANOVA and structural equation modeling techniques were used to test these findings; the findings were used to answer hypothesis 3. Thirdly, interview data obtained from in-depth interviews of purposively selected individuals and teams, were used to propose a predictive model for performance in interdependent work teams over time.

4.7 DATA COLLECTION AND ANALYSES

The outcome variable of interest in this study was performance, operationalised as a composite rating of 4 scores on volumes processed, accuracy of processing, professionalism and attendance. The objectives of data analyses in the study were to assess the magnitude, statistical and practical significances of changes in performances for individuals and groups over time, following the introduction of two interventions. The other interest of the study was to compare the performances of different groups (performances in teams, and performances per employment contract type), over time, and to use this information, with qualitatively derived information, to propose a model of team effectiveness for moderately interdependent work teams, who received hybrid pay incentives.

Data was collected and analysed over a 34 month period of the study; this period included data prior to the introduction of any of the interventions. Tellers and supervisors with consistent records and data were used for further analysis. Rating means were used in order to perform statistical analyses for all the different input and output variables. The start dates of the interventions - IV_1 and IV_2 - were slightly different for each centre. For the purpose of analysis, the data was organised in such a way that the two interventions were synchronised between all different case studies. From the raw data collected, the total number of tellers available for data analysis was 660. This total number of tellers represented a combination of tellers who used the 2650-type desktop banknote counting machines, and the Numeron-type desktop banknote counting machines. For the sake of consistency, it was decided to limit the analysis to tellers using the 2650-type desktop note counters, which resulted in 74,8% of the original data being retained.

Tellers who had attendance records of at least 90% were selected for further analysis, which yielded 16,699 records at monthly level or “teller months” for 2,226 tellers, when data were converted to single row per teller per month. Only tellers with complete records of employee status (i.e. whether the teller was classified as a permanent teller or contract teller) were retained. This sample of tellers also represents the potential sample of tellers who could be lined up for further clarification interviews if they continued their employment with the organisation. Tellers were classified on whether they were contract or permanent during the period of analysis. We then cross matched which of the tellers with consistent data (at least three data points within a six month period) were under a supervisor with consistent data. The process above was used in deciding which tellers and teams to interview for further analysis of emerging themes.

Qualitative data was collected through in-depth interviews, researcher observation and limited surveys, during the interview sessions. The detailed methodology followed for the qualitative study is covered in detail in 4.9 of the report.

4.8 QUANTITATIVE DATA PREPARATION AND ANALYTICAL TECHNIQUES USED

In order to establish a baseline, archival performance data (speed and accuracy) for both regular and contract tellers from January 2008 until April 2008 was analysed per cash centre. There were approximately, six hundred (600) tellers, four hundred and twenty (420) of whom were regular tellers and one hundred and eighty (180) of whom were contract tellers.

For the main study, data from January 2008 to October 2010 was collected and used. There were approximately a hundred (100) supervisors, and therefore approximately the same number of teams. Measurements on the performance dimensions of volumes processed, accuracy and the behavioural dimensions of attendance and professionalism were captured daily for each teller and for both regular and contract tellers. The measurements were then aggregated into a composite monthly performance score. Similarly, heads of departments at each cash centre rated and recorded the supervisors' professionalism scores daily. Basic analytical techniques used included the total sample number, minimum and maximums for each category of variables, means, medians, means of medians, trends analyses of both time-related variables and ratings pre- and post-interventions.

As already mentioned, all data pertinent to the transaction that was being processed was captured within the VMS and servers at each centre as the transaction was being processed. During the early period of the study, the captured data was then summarised daily, stored within the centre systems and also transmitted daily to a central server. The data was then available for analysis at the centres on a daily basis; analysis of the data was performed centrally on a monthly basis in order to coincide with the payment cycles of the company.

Performance data (speed and volumes) was collected, collated centrally, analysed and displayed visually on all cash centre processing floors one hour after processing (i.e. all volumes related data by each teller which reflected the teller performance in the hour before). The displayed data showed the following components of performance related to speed and volumes of cash processed: 1) the names and surnames of “high” and “low” performing tellers within each centre; 2) high and low performing teams within each centre, displayed as the names of surnames of the team supervisors; 3) the overall centre performance relative to all other centres of the company. High performances were displayed in green and the low performances were displayed in red.

All individual performance data for tellers, on speed and accuracy is on record in the cash processing system the VMS since 2006/2007. The data was converted into a format which could be readily analysed. Data from January 2008 was used to analyse the performance of each individual on the dimension of speed and to some extent, on the accuracy dimension as well. For tellers, attendance and demographic data was also available for the same period, while only attendance and demographic data was available for analysis for supervisors for the period preceding the introduction of the interventions under study.

Teller and supervisor measurements were captured monthly at all cash centres. Following this period, each of the tellers (permanent as well as contract tellers) was allocated to a team, each of which had its own permanent supervisor. All performance and behavioural measurements for tellers and supervisors were recorded daily and aggregated into a monthly score sheet from which the incentives payments are made, depending on the overall classification of the teller or supervisor in the matrix.

Data collection for individual performance occurred daily on all the four variables under study. The data analysis and payment of incentives was done monthly. Due to the monthly payment stratification of the analyses and formal payment systems, data collection is largely structured in monthly buckets.

Systems in the bulk retail cash centres of the company collect data on individual teller performance for the speed of processing cash for combined cash and cheque deposits. These systems also show the accuracy of the cash count, through the end-of-day balancing of cash received and cash verified functionality. The data that was collected at the cash centres also included records of attendance. The cash centre systems had a built-in functionality which enabled the appraisal of the "professionalism" of each teller by the supervisor. This "professionalism", which is described later in more detail, is a rating score of the behaviour of the teller while performing the cash count and verification. It is a subjective measure.

The VMS system which was used in the company to collect performance data records data on at least the following dimensions: 1) teller name and teller number; 2) VMS workstation, 3) number of banknotes processed, 4) the value of banknotes and cheques processed, 5) the time taken to process each deposit, 6) the client deposit details - name, account number. This data was then used to appraise the performance of individual tellers. Team performance was measured as an aggregation of the combined individual performances of tellers, but excluded the performance of the supervisor since the supervisor's production incentive was based on a component of the combined scores of the tellers. Teller performance was based on the level of performance on each of four components measured: speed, accuracy, professionalism and attendance.

4.8.1 QUANTITATIVE DATA: PREPARATION OF DATA

The data preparation steps involved the collection and organisation of the original quantitative performance-related data in terms of the construct variables which were used to operationalize performance in the study; these were volumes related data, data related to the accuracy of the deposits processing, professionalism-related data, attendance records and overall performance data. Table 10 summarises the data treatment procedures used in the study.

According to Singer & Willett (2003, p. 281), "To fit a latent growth model CSA, your data must be organised at the person level, in a multivariate format". As recommended, a person-level data set was produced for this study, since the aims of the study were to examine changes in performance variables over time in individuals and in groups. The resulting person level data sets was largely complete. A person-level data set required the matching of monthly data per person; for this, accurate names and personnel numbers were necessary for all records.

In preparation for the longitudinal multivariate design employed within the study, the final dataset was both balanced and time-structured (Singer & Willett, 2003).

According to Singer & Willett, in a balanced data set, all individuals are assessed on a similar number of time-occasions, and time-structured data-sets are characterised by an identical “set of occasions” at which measurements are taken (Singer & Willett, 2003, p.138). The final dataset was then organised and analysed in 6-month buckets, representing the period pre interventions, post intervention 1 or pre intervention 2 and post intervention 2. The variables used in the study were composed of 5 factors: accuracy, volumes processed, attendance, professionalism and overall performance. Each of the factors were composed of various indicator variables, and this summary is presented in the Table 10: Summary of treatment of quantitative data. The meaning of these constructs is covered in more detail in the section after this one. Each one of the variables was analysed and rated monthly to arrive at a composite final monthly rating.

4.8.1.1 MISSING DATA: CAUSES AND TREATMENT

A large component of the errors found in the original data narratives resulted from procedural errors such as the inconsistent spelling of the names and surnames of the study participants. Another frequently found procedural error was the inconsistency in format for the capturing of the of names of people and customers on the deposit processing system in some of the centres (e.g. some people had their first names, followed by surnames, while in other cases, the surname would be captured first followed by the first name). The causes, extent and treatment of the missing data is dealt-with in the following section of the study.

The database had a few missing entries as a result of data not being captured. Maternity leave periods and various other forms of absence from work of the individuals also resulted in instances of missing data. It was also thought that instances of missing data may have resulted from occasions of system downtime. The employment status of some individuals changed during the course of the study: some individuals whose employment status were classified as “contract tellers” (refer to 4.3.2) at the commencement of the study had their employment contracts converted to “regular tellers”

The literature on multivariate studies recommends the examination of the randomness of missing data, as a means to ensure that any treatment applied to compensate for the missing data is appropriate (Cohen, Cohen, West & Aiken, 2003; Hair et al., 2010). On the basis of the distribution patterns of the missing data points on each variable, the randomness of the missing data processes can then be determined.

In this study, the missing data process was determined to be Missing Completely at Random (MCAR). The assumption within MCAR is that observed values of the variables are truly representative of the population from which they are sampled (Hair et al., 2010). Mean substitution was used as an imputation technique for the missing data. Mean substitution is a commonly used method for dealing with missing data in multivariate analysis (Hair et al., 2010) where the missing data process is found to be MCAR. The logic of imputation using mean substitution is the use of the mean value of all observed values for the variable, under the treatment conditions, and that the mean value best represents the population from which the sample is drawn. The downside of imputation using the mean value is that it can distort the true underlying distribution of values of the variable under the treatment condition, by “dragging” the value to the mean. In addition, mean substitution imputation can affect the estimated true variances within the population (Hair et al., 2010).

4.8.1.2 DEALING WITH OUTLIERS

In multivariate analysis, outliers are defined as those values which lie 1.0 to 1.5 quartiles outside the distribution of all values in the data set; data values outside these ranges are commonly referred to as extreme values (Hair et al., 2010). Multivariate ANOVA is very sensitive to outliers (Hair et al., 2010), which in this study, meant that the outliers had to be dealt-with before the ANOVAs could be run. The Grubbs test is a test used to detect outliers in normal distributions; the test takes each one of the extreme values (minimum and maximum) within the data set, and computes the probability that these values belong within the population; the result of this computation can then be read against the Grubbs’ critical value table. For datasets with samples greater than 25, the probability result is an approximation. The weakness of the Grubbs test is that it cannot be applied to datasets whose distribution is not normal. This test was used to check for outlier values on the datasets in this study, and it is represented in the following equations:

Equation 4: $T_{max} = [x_n - X_{mean}] / s$

Equation 5: $T_{min} = [X_{mean} - x_n] / s$

where, x_n = represents the suspected single outlier

X_{mean} = sample mean

s = sample standard deviation

4.8.1.3 DATA NORMALITY

Visual checks were done on data plots to examine the distributions of the data, as part of testing the normality assumptions within the data. In addition, normal probability plots (included as part of the appendices in this study) were performed on the datasets for each of the variables used in the study. Normal probability plots are plots of the cumulative distribution of a normally distributed data set (resulting in a diagonal straight line), plotted against the actual scores from data sets, as a means to compare the two distribution patterns (Hair et al., 2010). The predicted line and line derived from the data will largely overlap, if the data is normally distributed. In multivariate study designs, the added assumption is that all variables are multivariate normal (which simply means that, after the combined effects of the all variables, the data retain a normal distribution). Non-normal distributions can take on other characteristics, such as positive or negative skewness and various forms of kurtosis. In practice, data normality does not prohibit the use of the data; in these instances, the error terms or residual scores need to be normally distributed and homoscedastic.

4.8.1.4 OTHER TESTS UNDERLYING MULTIVARIATE ASSUMPTIONS

As a final step in the organisation of data for the study, various tests for multivariate analysis were performed. Hair et al., (2010) recommend - as part of the data examination step in multivariate analyses - that data should be tested to ensure that basic statistical assumptions are not violated, particularly because multivariate analyses could hide important clues to violations of the basic assumptions which underlie these statistical tests. Including the checks for data normality, checks for data homoscedasticity, linearity and the absence of correlated errors, are some of the other basic tests recommended by Hair et al., (2010) within the multivariate framework. The repeated measures analysis of variance technique also requires an examination of sphericity and independence of observations.

4.8.1.5 HOMOSCEDASTICITY

Homoscedasticity refers to the “assumption that dependent variable(s) exhibit equal levels of variance across the range of predictor variable(s)” (Hair et al., 2010, p. 74). Testing for homoscedasticity (also called homogeneity of variances) therefore can be used in multivariate data analyses to check the variance structures of dependent variables on the independent variables. One of the critical assumptions in ANOVA is the assumption of the homogeneity of variances. Homoscedasticity is important to establish, particularly in multivariate studies, because the consistency of variance distribution across the predictor variables on the dependent variable, needs to be confirmed, especially when measuring the same variables over time and between groups, as is done in repeated measures ANOVA. The opposite of homoscedasticity is heteroscedasticity, and often results from an underlying non-normal distribution of at least one of the variables. As repeated measures ANOVA was one of the primary techniques used in this study, Levene test for means was used to test for homoscedasticity for each of the variables between the treatment groups and control groups in this study, because most of the datasets were largely found to have normal distributions. Although the Bartlett test was also considered, it was discarded for the Levene test, as some of the raw data required transformations before further analysis could be done. The Levene test for means was thus preferred for the use with some of the transformed datasets; the test can also be used for medians, trimmed means and residuals - when the modified Levene test is used (Cohen et al., 2003). The null hypothesis in Levene test is stated conceptually as,

H_0: $\sigma_1^2 = \sigma_2^2 = ... = \sigma_k^2$

while the alternate hypothesis in the test is defined as

H_a: $\sigma_i^2 \neq \sigma_j^2$ for at least one pair (i, j).

where,

σ_k^2 = variance of variables (*i, j, or k*)

The Levene test uses either the *t*-test (for 2 variables) statistic or the *F*-statistic (where more than 2 variables are involved). The *F*-statistic is represented as

$F = MS_{effects}/MS_{error}$

where

$MS_{effects}$ = Mean square for the effects and

MS_{error} = Mean square for the error

4.8.1.6 SPHERICITY

Sphericity (also referred-to as circularity), is a concept which is applicable to repeated measures ANOVA and is closely related to the concept of homoscedasticity. Sphericity refers to the equality of variances in the difference scores between groups (Field, 2013) or treatment levels in a repeated measures design. It is estimated by calculating the differences in the scores between groups or treatment levels, and then calculating the variances for each set/pair of difference scores. It is a requirement of sphericity that these variances be roughly equal.

The test of sphericity is the Mauchly test, which tests the null hypothesis that there is no difference in the variances (σ^2) between each pair of treatment levels. The *a priori* significance level (α) level is set at 0.05.

4.8.1.7 EQUALITY OF VARIANCE-COVARIANCE MATRICES

A closely related assumption to homoscedasticity is the concept of the equivalence of covariance matrices across groups. In multivariate analysis of variance, there is an assumption of equivalence of covariance structures for different groups (Hair et al., 2010). The variance-covariance matrices in the groups are therefore checked for consistency, as part of the confirmation process. Where significant differences are found between the groups, this usually means that the alpha (α) values are misleading, and adjustments are made to the sensitivity of the test, by using higher or lower confidence limits, rather than the standard 0.05.

4.8.1.8 LINEARITY AND MULTICOLLINEARITY

Linearity underlies the correlational associations between variables used in all multivariate techniques (Hair et al., 2010), including multiple regression, factor analysis and structural equation modeling. Relationships between variables are not restricted to the linear component only; other variables, in addition, may possess non-linear components. Residuals - in regression analyses - provide a good indication of the amount of unexplained variance in the relationship between two variables. An understanding of the extent of the linearity if the relationships between variables is therefore important, if the true strength of the relationship between variables is to be understood and predicted.

Scatterplots provide good visual assessments to the linearity/or non-linearity of the relationship between two variables. Regression analyses can also be performed, followed by an assessment of the distribution patterns of resulting residuals.

Data transformations, such as using squareroot, logarithmic scales etc., can then be used as corrective measures where non-linear relationships are found; transformation of the variables often results in better linearity, which allows improved estimation of the relationships between the variables.

An additional requirement of multivariate ANOVA is that the dependent variables should not possess high multicollinearity (Hair et al., 2010). Collinearity is defined as a situation where the relationship between two variables has a correlation co-efficient of 1. Multicollinearity of dependent variables results when the dependent variables have this high correlation coefficient, and it usually indicates that there is a redundant variable (because the same thing is being measured) and has the effect of reducing the statistical power of the multivariate ANOVA (Hair et al., 2010).

4.8.1.9 ABSENCE OF CORRELATED ERRORS

Dependence techniques (where Y depends on x + z) produce error terms, which provide some clues on the strength of the predicted relationships between variables. These dependence techniques require that the error terms be uncorrelated, if they are to reflect measures at different levels (Hair et al., 2010). Correlated error terms indicate a common underlying factor which needs deeper exploration. Data collection procedures sometimes cause uniformity of error terms in similar groups (Hair et al., 2010); when these groups are then analysed together (as in ANOVA), the final estimated relationships between the groups may be biased, and may not reflect the true nature of the relationships between the variables in the groups. This problem is similar to the endogeneity problem (Antonakis, Bendahan, Jacquart & Lalive, 2010) where a third variable (z) could explain the nature of the relationship between two variables (x and Y). In such instances, the missing factor requires identification and correction. In the present study, there was no issue of error correlation.

4.8.1.10 INDEPENDENCE OF OBSERVATIONS

Independence of observations is a built-in assumption in ANOVA techniques (Hair et al., 2010). Because the design of this study was quasi-experimental (no random assignment of individuals working in real-work environments), and because the study employed repeated measures to collect data among two groups of individuals, complete independence of the observations could not be guaranteed (see sections 4.8.2.1 on repeated measures ANOVA and 4.8.2.2 on linear SEM).

4.8.1.11 OTHER

The Tukey HSD (honestly significant difference) method is a post-hoc test used to test for group differences, while controlling the rate of making the α error (Cohen et. al., 2003; Hair et al., 2010).

4.8.1.12 DATA TRANSFORMATIONS

The main purpose of data transformations in this study was to achieve normality (see section 4.8.1.3) and linearity (see section 4.8.1.8). In order to enable better analysis of the measures for variables, some transformations were performed on some of the data. Data transformation was required for the accuracy variables and for volume variables. The squareroot of the accuracy scores were used, after which Grubbs transformations (see section 4.8.1.2) were performed to cater for outliers. Only Grubbs transformations were performed on volume variables to cater for outliers.

4.8.2 ANALYTICAL TECHNIQUES USED FOR QUANTITATIVE DATA

The variables used were in metric format. Several steps were taken as part of the multivariate analysis of the quantitative data; these are summarised in Table 10

The steps included the preparation of the data to enable analysis, performing trends analyses on some data sets, the application of statistical analytical techniques and the associated use of significance testing. The main purpose of statistical testing during the pilot study was to check for the practical significance (effect size) of the postulated changes in the performance variables over time. Changes in volumes and changes in accuracy were major components of the estimated performance outcomes. For this reason, the *t*-test for dependent samples was the technique used to compare volumes and accuracy ratings between two periods (see section 5.2.3) during the pilot study.

There were various statistical tests used during the main study. The techniques included the extensive use of mixed model two-way repeated measures analysis of variance (ANOVA), and the use of structural equation modeling (SEM) techniques, in a confirmatory approach, as part of hypotheses testing and as part of the development of a conceptual model for work-team performance over time. The rationale for the use of both repeated measures ANOVA and SEM techniques is dealt with in more detail in sections which will follow.

Table 10: Summary of treatment of quantitative data

	Issue	Relevance	Implications	Diagnoses, tests & corrections performed	Used in this study (Y/N)	Reference(s) cited	Relevant section(s) in study
1	Missing values	• Accounting for processes of missing values (MAR or MCAR)	• Could cause bias in the data	• Imputation using mean substitution	• Y	• Hair, Anderson, Tatham & Black (1998) • Cohen, Cohen , West & Aiken, (2003)	4.8.1.1
2	Data is multivariate normal	• Assumption in multivariate analyses		• Normal probability plots	• Y	• Hair et al., (1998)	4.8.1.3
3	Outliers	• Affect the mean structure of distributions • ANOVA sensitive to outliers	• Could be detrimental or useful, depending on the causes of the outlier	• Grubbs test and manual corrections	• Y	• Hair et al., (1998)	4.8.1.2
4	Homoscedasticity	• ANOVA analyses	• Assumption in ANOVA tests	• Levene test	• Y	• Hair et al., (1998)	
5	Variance-covariance matrix equivalence	• Multivariate ANOVA analyses	• Assumption in multivariate ANOVA tests	• Changes recommended to default sensitivity of test (0.05)	• N (not deemed necessary)	• Hair et al., (1998)	4.8.1.6

6	Linearity and multicollinearity	• Multivariate ANOVA analyses	• Linear correlational analyses require linearity	• Scatterplots • Analysis of residuals • Data transformations	• Y	• Hair et al., (1998)	4.8.1.8
7	Correlated errors	• Dependence relationships • ANOVA	• True underlying explanatory factors could be missed	• Find true underlying factors for relationships	• N (not correlated error terms found)	• Hair et at., (1998) • Antonakis, Bendahan, Jacquart & Lalive (2010)	4.8.1.9
8	Sphericity	• Repeated measures ANOVA		• Mauchly's test	• N	• Hair et at., (1998)	4.8.1.6
9	Independence of observations	• Multivariate ANOVA analyses		•	•	• Hair et at., (1998)	4.8.1.10
10	Data transformations	• To achieve linearity	• Linear correlational models rely on linearity of the underlying data to achieve estimations	• Squareroot • Divided some values by 2000 • Grubbs scrubbing	• Y	• Hair et at., (1998)	4.8.1.12
11	Power & statistical inference	• Inference	Statistical significance, power estimations	• Tukey HSD test for means in ANOVA (post-hoc)	• Y	• Cohen et al., (2003)	4.8.1.11

4.8.2.1 REPEATED MEASURES ANOVA

The first purpose of doing a two-way mixed model repeated measures analysis of variance was to understand the fixed effects of the interventions (pay incentives and allocation of people into specified teams) on individuals, as time passed. The second purpose for using the repeated measures ANOVA was to compare the impact of the two groups of people - contract tellers versus permanent/regular tellers - over time, after the introduction of the interventions. The outcome variable of interest in the quantitative analyses was performance, operationalised as a composite of 4 scores. Performance was assessed in monthly buckets, called teller months. Since the same variable was measured on a number of occasions for each subject and each grouping, repeated measures analysis of variance was selected as the primary methodology: "..a major purpose of repeated measure ANOVA is often the investigation of systematic changes in mean *Y* over time" (Cohen et al., 2010, p. 575). In the repeated measures ANOVA analysis, each person was measured on the same variable over several different occasions over time (fixed-effects modeling approach); hence, in this repeated measures ANOVA, the within-subjects factor represents the passage of time (Duncan, Duncan & Strycker, 2006) since the design of the study used a both balanced (Singer & Willett, 2003) and time-structured approach (Singer & Willett, 2003) (see also section 4.8.1 under data preparation). Between-subjects factors – employment status - were also incorporated into the two-way mixed model ANOVA done in this study (see section 5.4).

4.8.2.2 LINEAR STRUCTURAL EQUATION MODELING (SEM)

Linear structural equation modeling is an established analytical technique, with wide applications in the social sciences. The book by Kline (2011) offers a useful introduction to the history and the developments of SEM. The description of the history and various applications of the SEM techniques will not be dealt with in this section. SEM is also known as Covariance Structure Analysis (although this term can be misleading since SEM can be used to analyse mean structures as well), Covariance Structure Modeling and Analysis of Covariance Structures.

SEM combines elements of multiple regression (MR) analysis, path analysis (PA) (Hair et al., 2010; Kline, 2011), both exploratory and confirmatory factor analytic approaches (EFA and CFA). SEM has been used to examine latent factors/states (Geiser, 2010; Kline, 2011), to develop growth models (Bollen & Curran, 2006; Duncan et al., 2006; Kline, 2011; Preacher, Wichman, MacCallum & Briggs, 2008), and various other forms of multi-level models (Kline, 2011; Raudenbush & Bryk, 2002; Raudenbush, Bryk, Cheong, Congdon & du Toit, 2004), using both exploratory and confirmatory approaches. Structural equation models are made up of two components: the structural model and the measurement portion of the model. The critical components when using SEM (in order to explore, to test or to develop models) include the specification of the model, the identification of the model, and the estimation of model parameters including the examination of mean structures. SEM identifies two forms of variables: manifest (observed) variables and latent variables (which represent constructs, factors and other forms of non-observed variables). Manifest variables which are used to measure latent variables are known as indicators.

Because SEM incorporates path analysis, multiple regression and factor analysis, SEM techniques possess the ability to simultaneously measure both manifest and latent variables: this distinguishes SEM techniques from ANOVA and MR techniques; however, SEM techniques require large sample sizes (Kline, 2011). Largely because SEM techniques require large sample sizes, and the fact that SEM incorporates MR, PA and general Factor Analysis (FA), SEM places much less emphasis on statistical tests, which would be followed in isolated regression techniques, such as MR and ANOVA. Kline (2011) outlines four main reasons why there is less emphasis on statistical tests in SEM: 1) The highly significant tests traditionally associated with large sample sizes could simply reflect the effects of the sample – large samples tend to show "significant" results; 2) SEM allows for the testing of the complete model, unlike MR and ANOVA which tend to focus on components of the model; 3) Because the significance effects of latent effects are estimates in SEM, minor adjustments to components of the model could result in changes in "significance" of the estimated parameters; 4) SEM focuses on estimating the effects size (ES), and provides better estimates of ES for manifest variables when compared to MR and ANOVA.

The standard CFA model which is incorporated into most SEM models uses uni-dimensional measurement (each indicator loads onto a single factor, and the error terms are independent of each other), which offers more precision in the estimation of discriminant and convergent validity (indicators of the same factor should have high correlations while indicators of different factors should have low correlation) (Kline, 2011).

A confirmatory factor analysis (CFA) approach in SEM, involves the assumption of non-directional relationships between a postulated underlying factor (η_2) on another postulated underlying factor (η_1) in the structural component of the model (Byrne, 2012; Geiser, 2010). A single bidirectional curved arrow between the factors, η_1 and η_2 represents the correlation between two factors.

The investigation of latent variables, with the incorporation of time-variant and time-invariant manifest variables in the measurement component of the model, is a form of latent growth or latent variable modeling. Uni-directional arrows, representing regression paths, are incorporated into both the manifest and latent paths in this form of SEM; the approach is used to study changes or the absence of changes in variables across time – commonly known as longitudinal factorial invariance (Preacher, 2011).

SEM provides the flexibility to use the repeated measures found in longitudinal study designs, to measure the level of variability of factor-specific traits on different measurement occasions – these models are called variability models. SEM can also be used to measure changes in constructs over time – the models are referred-to as change models (Duncan et al., 2006; Geiser, 2012).

In this study, the performance was postulated as composed of at least two factors: the volumes of deposits processed, and the accuracy with which the deposits were processed (see section 4.3.10). The volumes factor was measured using at least two indicators: total values deposit processed; values of deposits-straight-processed (see section 4.3.10.1) and the time taken to process these types of deposits). The accuracy factor was measured by calculating the ratio (reflected as a percentage) of individual tellers' differences per month, as a proportion of the total value of deposits processed by the teller in the month (see section 4.3.10.2).

4.8.2.3 INVARIANCE ESTIMATION USING LATENT STATE ANALYSIS

As discussed in section 4.1, part of the research design was to establish factorial invariance, prior to further analyses of the quantitative data and prior to conducting more in-depth interviews.

There are currently four recognised levels of factorial invariance (Timmons, 2010): configural invariance, weak factorial invariance, strong factorial invariance and strict factorial invariance. In configural invariance, the pattern of fixed and free parameters is equivalent across groups being compared. In weak factorial invariance, the corresponding factor loadings across the groups are equivalent. In strong factorial invariance, the corresponding indicator means are equivalent across the groups, and in strict factorial invariance, the corresponding indicator residuals are equivalent. The literature does not recommend the use of strict factorial invariance in practice (Timmons, 2010).

Configural invariance means that the pattern of fixed and free parameters is equivalent across groups. One can test for configural invariance using software packages, such as M*plus* (Muthén & Muthén, 1998-2013), which will generate model fit information for the groups combined. If the combined model has good fit, then there is configural invariance (model fit is discussed in detail, later in this section).

Steyer and colleagues (Steyer, Ferring & Schmitt, 1992; Steyer, Schmitt & Eid, 1999) developed variability modeling techniques for latent states and traits. The model for latent states analysis is called the latent state model (LS) and the model for examining both latent states and traits is called the latent state-traits model (LST) (Geiser, 2010; Geiser & Lockhart, 2012; Steyer et al., 1999). Following Steyer and colleagues, the literature distinguishes "between a trait component (a component that characterizes stable person-specific effects), a state residual component (a component that characterizes the effects of the situation and/or person x situation interactions), and a random measurement error component" (Geiser, 2010, p. 82). LS modeling is a less restrictive form of modeling because it does not require prior specification of the correlation structure among the latent variables; this allows the model to freely estimate all possible correlations between the variables. However, in LS modeling only the latent variables (states/factors) and the measurement error variables are estimated (Geiser, 2010), while in LST models, the latent states residuals are decomposed further into trait-related and state-related residuals, allowing for the estimation of variance which is unique to a measurement occasion. The advantage of using LS modeling as a base-model technique lies in its ability to test for construct and measurement invariance in longitudinal studies (Geiser, 2010). The LS model within a longitudinal data analytic framework is represented as:

$$\boldsymbol{Y_{ik}} = \boldsymbol{\alpha_{ik}} + \boldsymbol{\lambda_{ik}} \, (\boldsymbol{state\ k}) + \boldsymbol{\varepsilon_{ik}} \text{ where}$$

i	=	indicator
k	=	measurement occasion
Y	=	observed variable
α	=	intercept term
λ	=	the factor loading
State k	=	latent state variable
ε	=	measurement error/residual variable

The main use of the LS models in longitudinal study designs is to measure and ensure factor and measurement invariance (Geiser, 2010), through the use of covariance structure analysis (cf. Structural Equation Modeling) and the analysis of observed and latent mean structures. The ease of use and flexibility offered by the LS model allows this model to be used as a foundation model/baseline model (Geiser, 2010) onto which more complex and restrictive examinations of data modeling can be done, such as invariance estimation, in LST (which further splits stable, from occasion-specific variance components) and latent growth curve models (LGCM) (Duncan et al., 2006; Bollen & Curran, 2006).

To establish the degree of model fit for the various invariance components, several fit indices can be used, depending on the software used. In M*plus*, the chi-square test of model fit (X^2), Comparative Fit Index (CFI) (Bentler, 1990), Tucker-Lewis Index (TLI) (Tucker & Lewis, 1973) , Information Criteria (Akaike Information Criterion – AIC (Akaike, 1987), Bayesian Information Criterion – BIC (Schwartz, 1978) & Sample Size adjusted BIC - ABIC (Sclove, 1987), Root Mean Square Error of Approximation (RMSEA) (Browne & Cudeck, 1993), Standardised Root Mean Square Residuals (SRMR) and are used.

The chi-square test for model fit is reported in most model-fit estimations. However the test is sensitive to sample size (Byrne, 2012; Little, 2013) as illustrated in the equation: X^2 = (N-1)* *Fmin*, where N is the sample size, and F_{min} is the minimum fit function. The chi-square test is based on the hypothesis that the covariance matrix in the test sample is equal to the restricted covariance matrix in the model (i.e. the chi-squared H_0 is that $\Sigma = \Sigma(\theta)$, where Σ represents the population covariance matrix, and θ is a vector of the model parameters, thus $\Sigma(\theta)$ is the hypothesised covariance structure); this specification of H_0 in the chi-square is recognised by researchers as rather unrealistic (Byrne, 2012; Little, 2013; MacCallum, Browne, & Sugawara, 1996). In addition, according to Bollen and Curran (2006), when using Maximum Likelihood estimation, the null hypothesis being tested is for both mean and covariance structures of the sample and implied model (i.e. H_0: $\mu = \mu(\theta)$ and $\Sigma = \Sigma(\theta)$, where μ represents the means. Therefore, a small chi-square is desired between the model parameters and the sample-derived parameters if the null hypothesis is to be adopted. The chi-square test is useful in comparing nested models (nested models are models which are built from one model to the other by the application of more stringent restrictions on some parameters). The chi-square test also forms an integral part of the computation of other model estimates (Byrne, 2012). As a result of the limitations of the chi-square test statistic, other fit indices are normally used in conjunction to the chi-square statistic, when assessing model fit (Byrne, 2012; Kline, 2012; Little, 2013; Wang & Wang, 2012).

The chi-square test of model fit for the baseline model is a test which compares the hypothesised model to a null (or independence) model, in which there is no covariation amongst any of the indicator variables; in M*plus*, this test also estimates the intercepts of the observed variables (both variances and means are estimated) (Byrne, 2012, p. 67). Typically, the chi-square test of model fit for the baseline model results in values much larger than the hypothesised model, reflecting that the hypothesised model better reflects the relationships in the underlying data.

Incremental fit indices (also called Comparative fit indices) used in M*plus* include the CFI (Bentler, 1990) and TLI (Tucker & Lewis, 1973); these indices are used to compare model parameters within nested models. The CFI index uses normed scaling, where a 1.00 represents a perfect fit between a less restricted baseline model and a hypothesised model. A value .95 is considered a well-fitting model (Bentler, 1990; Byrne, 2010; Hu & Bentler, 1999). The CFI is calculated as

$$\text{CFI} = 1 - [(X_H^2 - df_H)/(X_B^2 - df_B)]$$

where X_H^2 is the chi-square for the hypothesised model, df_H are the degrees of freedom in the hypothesised model, X_B^2 is the chi-square for the baseline model and df_B are the degrees of freedom in the baseline model.

The TLI is a non-normed index, however a TLI value of 1 is typically interpreted as indicating a well-fitting model (Byrne, 2012), while values less than .90 typically indicate a requirement to recalibrate the model (Wang & Wang, 2012, p. 19). The TLI is calculated as

$$\text{TLI} = [(X_B^2/df_B) - (X_H^2/df_H)] - [(X_B^2/df_B) - 1]$$

Parsimony-corrective fit indices (also referred-to as predictive fit indices) (Byrne, 2012) include the AIC, the BIC and ABIC – all of which are used in M*plus*. These indices fall into a category of indices referred-to as Information criteria indices – the main purpose of which is to compare models (Byrne, 2012; Wang & Wang, 2012). These two indices use the loglikehood values for the hypothesised model (reported as the H_0 value) and the baseline model (reported as the H_1 value) to compute model fit indices for at least two non-nested models (in contrast to the CFI and the TLI, which focus on nested models). The smallest overall value of the AIC, BIC and ABIC are interpreted as representing the best fitting predicted model. A general equation for information criterion statistics is

$$-2\ (\text{loglikelihood}) + a(n)m$$

or

$$-2\ \ln(L) + a(n)m,$$

where L is the maximum likelihood of the model, n is the sample size and m represents the number of estimated (free) parameters in the model. The different indices are shown as

$$\text{AIC} = -2\ \ln(L) + 2m$$

$$\text{BIC} = -2\ \ln(L) + \ln(n)m$$

$$\text{ABIC} = -2\ \ln(L) + \ln(n^*)m$$

where $n^* = (n+2)/24$.

BIC and ABIC impose more stringent restrictions on the index as a result of sample size, which makes them better suited for use in models with smaller sample sizes and fewer parameters to be estimated (Wang & Wang, 2012, p. 21).

The absolute indices for estimating model fit used in M*plus* include the RMSEA and the SRMR. These indices do not rely on referencing a tested model to a baseline model; instead the focus of these indices is to compare the tested model to the underlying data. In contrast to incremental fit indices, where the best model is achieved by obtaining higher fit indices, the values of absolute fit indices decrease as the goodness-of–fit in the model improves, reaching lower bounds of zero as the model improves (Browne, MacCallum, Kim, Andersen, & Glaser, 2002; Byrne, 2012; Wang & Wang, 2012). RMSEA estimation assumes a non-central chi-square distribution, which implies a compromise on the true null hypothesis test; the index caters for some level of variance between sample and model specification, and, therefore that the model is not perfect. Thus, RMSEA is considered an “error of approximation” index (Byrne, 2012). RMSEA indices less than .05 indicate a good fit; values ranging from .08 to .10 indicate a mediocre fit; values greater than .10 indicate poor model fit (Byrne, 2012, p. 73). RMSEA estimation is calculated as

$$\text{RMSEA} = \sqrt{\delta_H / df_H}, \text{ where}$$

$$\delta_H = (X_H^2 - df_H)/N$$

δ_H is the delta value (discrepancy fit) which represents the difference between the hypothesised model X_H^2 and the degrees of freedom df_H.

The final index to be discussed is the SRMR, which is a standardised absolute index, reflecting the “average discrepancy between the observed sample and hypothesised correlation matrices” (Byrne, 2012, p. 76). SRMR values below .05 are associated with well-fitting models (Byrne, 2012; Wang & Wang, 2012).

Referencing the works of Sobel and Bohrnstedt (1985), Bentler and Chou (1987), Wheaton (1987) and Saris, Satorra, and van der Veld (2009), Byrne (2012, p. 77) warns that “global fit indices alone cannot possibly envelop all that needs to be known about a model in order to judge the adequacy of its fit for the sample data”, and “thus, assessment of model adequacy must be based on multiple criteria that take into account theoretical, statistical, and practical considerations”.

4.8.3 QUANTITATIVE DATA: DATA TYPES AND SOME DEFINITIONS

Repeated measures analysis of variance (ANOVA), and structural equation modeling (SEM) techniques were used in a confirmatory approach as part of hypotheses testing. The rationale for using repeated measures ANOVA and SEM techniques is dealt-with in more detail in sections 4.8.2.1 and 4.8.2.2. A theory-led and findings-derived SEM model was proposed, but not tested; the model presents conceptualised relationships between variables of team performance over time (see section 6.5). Table 11 presents a brief overview of some definitions and the operationalisation of some of the variables and constructs used in the study.

Table 11: Constructs, indicators used

Construct Name	Indicator(s)	Underlying variables	Transformations
Accuracy	• Percentage (%) differences found in deposit divided by the total Rand value of the deposit	• Differences[1] • Total value[2] • Value of verified deposits[3] • Value of straight processed deposits[4]	• Squareroot of % difference/total value • Grubs transformation of squareroot of % difference/total value
	• Accuracy rating	• Accuracy rating	
Volumes	• Average straight time per deposit processed	• Average straight-time per deposit processed	• Grubs average straight time per deposit processed
	• Average straight time per envelope processed	• Average straight-time per envelope processed	• Grubs transformation of the average straight time per deposit envelope processed
	• Volumes rating	• Volumes rating	
Attendance	• Attendance rating	• Attendance rating	
Professionalism	• Professionalism rating	• Professionalism rating	
Performance	• Final rating	• Final rating	

4.9 QUALITATIVE SECTION OF THE STUDY

This section of the details the selection techniques used on the qualitative components of the study; the section covers sampling, time-sequencing and the interviews performed during the course of the study.

4.9.1 SELECTION AND SAMPLING FOR QUALITATIVE DATA

In the initial rounds of data collection, centres whose tellers and teams were to be interviewed were randomly selected from the total number of participating centres. Table 12 shows the centres which participated in the initial rounds of interviews, and the date of the interviews at each entre.

Table 12: List & dates for centre interviews

	Immediately after IV_2		Approx. 6 months post IV_2			Approx. 12 months post IV_2		
Centre Name	15-Jul-10	25-Aug-10	14-Sep-10	11-Oct-10	12-Oct-10	11-Jan-11	22-Feb-11	23-Feb-11
Polokwane	X							
Pretoria		X						
East London			X					
Pietermaritzburg				X				
Port Shepstone					X			
Johannesburg						X		
Richards Bay							X	
Durban								X

Following the analysis of performance results, another set of follow up interviews were conducted with individuals and teams at the centres. The purpose of these interviews was to two-fold: 1) the first purpose was to clarify findings of unexpected trends in any of the components of the overall performance measures; 2) the second, the interviews were conducted in order to gain more understanding of the performance results found on quantitative analyses. Preliminary results from the study were used to select cases for more in-depth exploration. As a way to select cases, pre-IV_2 and post-IV_2 comparative results for all centres were done comparing dimensions of speed, accuracy and final ratings. Speed results for processing deposit envelopes pre and post-IV_2 were compared for the average time taken to process deposit envelopes. Accuracy results were obtained by comparing the accuracy ratings for each centre, while final ratings were obtained by comparing the overall performance of each centre pre- and post IV_2.

Using the results, centres were then classified according to whether they were thought to represent typical, extreme, deviant findings (Gerring, 2008) and patterns of results from the dimensions of speed, accuracy and overall performance when comparing the pre- and post-results in percentage change. Centres whose results fell into any of the typical, extreme or deviant groupings were shortlisted. Yin (2003) advises that the selection of cases in multiple case study research should be such that selected cases replicate each other by either contrasting their findings in support of theorised predictions or through the replication of similar results. Emphasis for selection was placed on centres which had not previously been selected in the first part of the interviews processes where random selection was used. According to Gerring (2008, p. 92), typical cases represent cases where postulated expected results are encountered within a phenomenon that is being studied, and the conclusions on the "typicality" of the cases is deduced using the "mean, median or mode" of the dimension.

4.9.2 QUALITATIVE DATA ANALYSIS TECHNIQUES USED

Due to the fact that interview data was collected using questionnaires containing structured themes, the classification of responses fell into the categories of themes selected, based on existing literature (the questionnaires used are attached in Appendices) Where items raised fitted between more than one existing categories of themes, or where an item fell outside the pre-defined categories, then the items were captured separately.

4.9.3 COLLECTION OF QUALITATIVE DATA

Individuals and teams from 18 production centres participated in the study and these centres were located in different geographic locations within South Africa. Semi-structured interviews were conducted, for both individuals and teams at the different centres.

Retail cash processing teams in the different cash centres are treated as individual cases. Given that each case has unique contextual settings (for example, different geographical settings, different sizes of each department etc.) it was anticipated that explanatory processes may not be similar in all the case settings. Selective interviews (purposive sampling) were used to collect qualitative explanatory data. Interviews were conducted with selected individuals (tellers and supervisors) and selected teams. Where necessary, focus group interviews were also conducted. The purpose of doing interviews was to try to elicit explanations for observed behaviours and results and to try and obtain clarity and understanding on themes emerging during the quantitative data gathering process. In addition, interviews were used to obtain clarity on any other notable themes emerging during the period of the research. Axial and selective coding, followed by the application of the paradigm model was then applied to the data to capture emerging explanatory themes. The units of observation during the qualitative data gathering phase of the research were both individuals and teams. Thus, each case (i.e. each retail cash centre) has at least one sub-case (i.e. at least one team), which comprises of different individuals. In some instances, the individuals themselves became cases. In line with the literature (Babbie and Mouton, 2006), contextual issues interacting at the individual, team and cash centre levels are a significant part of the qualitative component of the study.

In both the pilot and main study, qualitative data was collected in the form of semi-structured interviews. Two phases of interviews were done during the study. The initial phase of interviews was during the rollout of the productivity incentive scheme and the allocation of tellers and supervisors into teams. The second phase of interviews was carried out following an analysis of the quantitative data. At this point of the study, it was clear that there were very specific trends which the performance data was showing; the data was suggesting that contract tellers were performing better that regular tellers on most of the variables measured. The purpose of the second phase of interviews was directed at finding out the reasons for this unexpected performance trend.

The interview process broadly classified the interview sections into i) Interdependence ii) specific events iii) the context of the teams iv) goal setting, feedback and progress v) teamwork vi) history and vi) changes in meaning and attributes. The above classification was done based on the recommendation of Van de Ven (2007).

Some of the research questions that the study needed to answer were: 1) what effect did the migration of individuals from individual performance measurement and individual incentives to task and reward dependent team structures have on their performance, and 2) what themes consistently emerged (if any) among teams (comparable in terms of task and reward structure), in respect of speed, accuracy, attendance and professionalism? The main purposes were therefore to test existing theories on individual and team performance across time, using the variance logic design (Van de Ven, 2007) employed for control-group time series. Surveys were added in order to further improve understanding of the variance between individuals and between teams. Therefore, as part of the longitudinal design of the study, it was decided that interviews would be carried out at regular intervals as way to track the changes that were expected, both at the individual and at the team-levels. Semi-structured interviews were carried out with individual tellers, supervisors and groups of tellers with their supervisors at cash centres following the introduction of IV_2.

There were two important purposes for these interviews: the first purpose was to obtain feedback on the impact of the interventions, and the second purpose was to clarify causes of performance variances between individuals and teams. The interviews in this phase of the research were done largely to ensure that emerging themes were being captured as time passed, and as the envisaged changes emerged. For this reason, the semi-structured interviews at the centres were carried out in person by the researcher.

The main influence on the sample of centres and individuals to be selected for interview was time. Purposive selection was used throughout these early phases of interviews and surveys. The selection of centres and the samples of individuals to be interviewed were based on criteria related to the production centre, the type of teller to be interviewed, and a decision on whether or not to include a supervisor. The selection of centres was as a product of an assessment of comparative performance trends for the different production centres, together with an assessment of individual and team performances within these centres.

In the phases immediately following the implementation of the second intervention (IV_2) – allocation of tellers and supervisors into teams, and implementation of pay incentives for supervisors – tellers for interview were selected randomly, keeping in mind the 70:30 ratio of regular tellers to contract tellers (refer to section 5.3.9 - Employment contract types). Table 13 illustrates the selection criteria used for candidates for interview at the different centres. The emphasis of the selection process was based on the time elapsed between the intervention and the time when the interview was performed, and the selection criteria was, in addition, based on the performance of the individuals and teams in the period of three months, leading up to the interview. There were at least two reasons for using the previous three month performance trends to make interview selection decisions: 1) It was felt that it would be easier for individuals to recollect the causes of performance variations, if the questions were asked within this lagged time-interval; 2) three periods of monthly performance data provides a better view of performance trends in comparison to 1, 2 or 4 months data, taking into account point 1 above. Research designs in longitudinal research also support the use of at least three data points to establish trends information (Ployhart & Vandenberg, 2010; Singer & Willett, 2003). There was no set time for each centre, team or individual to undergo interviews. In the periods, approximately six (6) to twelve months (12) months after IV_2, teller and supervisor selection was based on the performance trends of the teller and supervisor in the prior three month period. Centre selection was based on the centre's overall performance trend. After the initial twelve (12) to eighteen (18) month period post IV_2, the selection criteria for tellers was based on a deliberate selection of high performing, and low performing tellers, based on the previous three month ratings of overall performance. A similar methodology was used to select supervisors for interview. The purposes of selecting high and low performing individuals and teams was intended to begin to investigate the causes of the manifesting performance differences at these levels.

Table 13: Selection criteria used for interviews

	Period	Basis for Selection: Centre selection	Teller selection	Supervisor selection
1	***Immediately following IV $_1$ and IV $_2$***	Length of time elapsed since introduction of intervention	Random mix of contract types, but emphasis given to permanent tellers	Random selection of supervisors within centre
	Sample size		Between 4 - 6 tellers	At least 1 supervisor
	Length of interview	Approximately 30-45 minutes each		
	Format of questions	Semi-structured interviews, with self-rating measures		
2	***Approximately 6 months after IV $_1$ and IV $_2$***	Length of time elapsed since interventions and overall centre performance trends	Based on performance trends in the previous 3 months - a mix of high, moderate and low performing individuals selected. A mix of contract and permanent tellers	Based on team performance trends in the period 3 months before the interview date
	Sample size		Between 4 - 6 tellers	At least 1 supervisor
	Length of interview	Approximately 30-45 minutes each		
	Format of questions	Semi-structured interviews, with self-rating measures		
3	***Approximately 12 months after IV $_1$ and IV $_2$ and thereafter***	Overall centre performance trends	Based on performance trends in the previous 3 months: a mix of both high and low performing individuals, although emphasis shifted to low performing individuals and teams. A mix of contract and permanent tellers	Based on team performance trends in the period 3 months before the interview date; emphasis on high performing and high consistency teams/supervisors and low performing teams and supervisors
	Sample size		Between 4 - 6 tellers	At least 1 supervisor
	Length of interview	Approximately 30-45 minutes each		
	Format of questions	Semi-structured interviews, with self-rating measures		
4	**Later periods**	Discussed in Phase 2 of the results, based on the findings from draft results		

Interview arrangements were made through the management of each centre with selected candidates. Interviews were always conducted at the individual's centre premises, at an agreed time during the normal working day of the centre and the individual. In a few instances, candidates initially selected for interview were substituted for other candidates with similar profiles, where the originally selected candidates were either on leave or where they could not avail themselves. Interviews generally lasted between thirty (30) and forty-five (45) minutes.

The interview covered the background and demographic information of the individual, including work experience. The next sections of the interview were built around the research questions, and in addition, incorporated items from a framework proposed by Van de Ven (2007). The final questionnaire included items on variables such as 1) task interdependence; 2) events which could help to explain performance differences; 3) context issues which were relevant to performance within the team or to the individual; 4) the impact of goals and goal-setting, feedback and progress on performance; 5) issues around teamwork; 6) pertinent historically contextualising issues and 7) any changes in meaning of constructs over time.

4.9.4 INFLUENCE OF EVENTS & INCENTIVES ON PERFORMANCE

Tellers and supervisors were asked open-ended questions related to any events at their workplace which would have assisted them to get through more work volumes. They were also asked about any events which may have had a negative impact on their ability to get through more work volumes. The interviewees were first asked to identify any such items, after which they were probed to elaborate on any of the identified items. Typically, the questions were asked in the following formats:

Are there any events/changes at work which have helped you to get through more retail processing volumes in a shift?

Are there any events/changes at work which have slowed you down from getting through more retail processing volumes in a shift?

The other critical issue which was being investigated in the study concerned the influence of the incentives on tellers and supervisors. Specifically, the study required responses from both tellers and supervisors on whether the introduction of the incentives had resulted in any changes on performance dimensions related to the volume of processed deposits, and the accuracy with which deposits were being processed. In order to gain an understanding of the perceived impact of the introduction of incentives on specific aspects of performance, tellers and supervisors being interviewed were asked to rate this, by choosing one of the following responses: “Much the Same” (reflecting that the incentives had not had any influence on the person being interviewed, in respect of the performance dimension), “Worse” (reflecting that the incentives had a negative influence on the person being interviewed, in respect of the performance dimension and, “Much Better” (reflecting that the incentives had a positive influence on the person being interviewed, in respect of the performance dimension.

4.9.5 GOAL SETTING, FEEDBACK, PROGRESS MONITORING

The ability of the supervisor to agree and communicate expected target/goals, provide feedback and to track the progress of each of their team members was measured through self-reported ratings from tellers and the supervisors. The rating self-reports formed a component of the interview sessions. Questions related to these items were posed to both selected tellers and supervisors, and each participant was asked to rate their responses as follows: “Low” (reflecting that the levels of either goal-setting/ targets, feedback or progress/lack was perceived to be low by the participant), “High” (reflecting that the levels of either goal-setting/ targets, feedback or progress/lack of progress was perceived to be high by the participant), and “Moderate” (reflecting that the levels of either goal-setting/ targets, feedback or progress/lack of progress was perceived to be erratic and ad-hoc by the participant).

4.9.6 TEAMWORK

Teamwork was investigated as a way to gauge the level of overall satisfaction with the manner in which the interdependencies for the completion of tasks, were being handled between tellers and supervisors. Certain components of the interdependent tasks, which were deemed critical, were specifically mentioned in the questions, in order to isolate and gauge the level of cooperation between tellers and supervisors within the teams. An example of one of the questions asked to tellers is shown below.

To what extent do you believe your supervisor supports you in providing you with counting equipment in good working order?

An example of a question posed to supervisors, on the supply of stationery to tellers is given below

To what extent do you believe that you provide support to your team in obtaining stationery (stamps, rubber bands, and paper)?

The tellers and supervisors interviewed were asked to rate their responses as follows: "Poor" (reflecting that the levels of perceived support received or provided on the task item was well below what the recipient or provider would have expected or expecting themselves to give), "Good" (reflecting that the levels of perceived support received or provided on the task item was above what the recipient or provider would have expected or expecting themselves to give), and "Moderate" (reflecting that the levels of perceived support received or provided on the task item was just meeting the expectations of the recipient or provider).

4.9.7 HISTORICAL AND CONTEXT ISSUES

Open-ended questions were used to obtain views on any other critical historical issues which could impact performance.

4.9.8 CHANGES IN MEANING

Open-ended questions were used to explore any changes in the meaning of concepts over time, as a means to validate the longitudinal validity and configural invariance (Ployhart & Vandenberg, 2010) in the constructs (see section 4.8.2.3 on quantitative techniques to establish invariance).

4.10 UNDERLYING ASSUMPTIONS OF THE STUDY

The first important assumption which was made in the research was that tellers had received enough training to be able to perform as tellers by the time they were allowed to work on the floor as retail cash processing tellers. This assumption was supported by an additional re-training intervention for all tellers which was embarked upon (refer to section on research setting in 4.3). This assumption was critical in that it allowed for the standardisation of the minimum skills required to perform as a retail cash processing teller. The second assumption the research made was that differences in gender and age did not form a significant contribution to performance if minimum levels of teller and supervisor training had been provided to all tellers and supervisors (refer to the section on the research setting in 4.3.9.1). The third assumption which was made in the research was that, team maturity as a confounding variable within the centre, had been controlled-for by introducing formal teams at the same time at each individual cash processing centre. Teams were also introduced at practically the same time in all the different cash centres – eight to ten months post IV_1.

Interdependence among team members (dealt-with in section 4.5.2.1) was to the extent that tellers depended on supervisors for completion of some of their performance functions, on the allocation of resources, the regulation of work volumes and the types of deposits coming through to them by the supervisor. Tellers were also dependent on the supervisors to intervene in instances where there were variances between the declared values in the deposits, and actual verified value of the deposit. Supervisor rewards depended largely - 60% - on teller performance and ratings from tellers. Interdependence then, was present at both the level of the task and the level of rewards, although the degree of the interdependence was moderate.

CHAPTER 5: RESULTS

5.1 GENERAL INTRODUCTION TO RESULTS

The purpose of this chapter is to present both a summary of the pilot study and the results of the main study. The study used mixed method techniques (Quant/qual) (Tashakkori & Teddlie, 2008) as mentioned in section 4.2. The results are presented, beginning with a summary of the pilot study objectives and results. This is followed by results associated with research questions 1 to 3 (RQ1, 2 & 3). The two interventions in the study – IV_1 (the introduction of pay incentives for regular tellers only) and IV_2 (the formation of teams and the introduction of pay incentives for supervisors) – are part of the research design. Hypotheses 1 and 2 ($\boldsymbol{H}_1$, $\boldsymbol{H}_2$) were used to test various premises relating to the research questions, as will be seen later. In instances where hypotheses were not testable, a proposition was used instead.

Table 14 is a summary of the research questions, their associated research hypotheses, and the associated intervention which was used to test the hypotheses. Table 14 shows that RQ 1 is associated with research hypothesis $\boldsymbol{H}_1$; that RQ1 is associated with the early period of the research and the first intervention (pre-post IV_1); that quantitative data was used to answer the research question. Similarly, the table also shows that quantitative and interview data, for the period six months pre-IV_2 to the periods 12 and 18 months post-IV_2, was used to answer RQ2, through research hypothesis $\boldsymbol{H}_2$a, b, c & d. Finally, the table shows that RQ3 was concerned with emerging themes post IV_2, and that these themes were researched and conclusions arrived-at, using both interview and quantitative data sources. The outcomes of the qualitative component of the study were designed and used to answer research question 3 (RQ3), which was *what themes emerge to explain persistent performance variance between work teams over time?*).

Table 14: Summary of research questions, hypotheses & interventions

Research Question	Question	Associated research hypotheses	Associated intervention & period	Type of data
RQ1	Over time, what are the effects of introducing pay incentives on individual performance?	***H_1*:** The average processing time per deposit will decrease three and six months post IV_1, when compared to pre-IV_1. The expected decrease will be greater for regular tellers, in comparison to contract tellers.	Pre-post IV_1 comparisons	Quantitative data
RQ2	What are the effects of introducing hybrid pay incentives for supervisors, on team member performance over time?	***H_2*a:** The average performances of team members in the study, measured in terms of average number of deposits processed per unit time, will show an improvement, from six months before the introduction of IV_2 to 12 months post-IV_2 ***H_2*b**: The average performances of team members in the study, measured in terms of volumes processed, will show an improvement, from six months before the introduction of IV_2 to 12 months post-IV_2 ***H_2*c**: The average performances of team members in the study, measured in terms of volumes rating, will show an improvement, from six months before the introduction of IV_2 to 12 months post-IV_2 ***H_2*d**: The average performances of team members in the study, measured in terms of accuracy rating, will show an improvement, from six months before the introduction of IV_2 to 12 months post-IV_2	6 months pre-IV_2 to 12 & 18 months post IV_2	Quantitative & interview data
RQ3	What themes emerge to explain persistent performance variance between work teams over time?	Emergent themes	Post IV_2	Interview data

5.2 PILOT STUDY

5.2.1 OBJECTIVES OF PILOT STUDY

The main objective of the pilot study was to check the efficacy and practicality of procedures intended for use when collecting quantitative and qualitative performance data in the main study, including the effectiveness of using semi-structured interviews to capture emerging themes in the main study. Other objectives of the pilot were to check for effect sizes (ES) - the magnitude of changes - in performance variables across time for tellers and teams, using a comparison of mean differences in ratings for volumes, accuracy, attendance and professionalism from pre- to post IV_2. When used to compare differences in paired means, effect sizes (ES) measure standardised differences in the group means, where these differences in group means are divided by their pooled standard deviation (Cohen, 1992; Cohen et al., 2003; Field, 2013; Hair et al., 2010). In estimates of ES for means derived from dependent samples, the ES calculation is a ratio of the pooled mean of the difference scores to the pooled standard deviation of the difference scores. The calculation for ES for means from dependent samples is given in equations 6 and 7; equation 6 is used in this study.

Equation 6: $d = \mu / sd$, where

d	:	Cohen's d (effect size)
μ	:	pooled mean of the difference scores
sd	:	pooled standard deviation of the difference scores

Alternatively, Cohen's *d* for dependent samples may be calculated as shown in equation 7

Equation 7: $d = t / \sqrt{N}$ where

d	:	Cohen's *d* (effect size)
t	:	obtained t value for dependent samples
N	:	the number of pairs compared

5.2.2 SAMPLING USED IN THE PILOT STUDY

Three centres were purposively selected for use in the pilot study, based on the convenience of their locations and the number of individuals who could be accessed for the purposes of conducting pilot interviews. Performance data from two of these centres was used for statistical analyses.

5.2.3 ANALYTICAL TECHNIQUES AND VARIABLES USED IN PILOT

The questionnaire which was designed for use during the main study was administered on six different individuals at one of the centres. During the pilot, the draft questions were asked with the purposes of ensuring that he final questions had little ambiguity; minor adjustments were made to some of the questions as the interviews progressed. At the completion of each interview session, the whole interview transcript was read back to each of the participants, to ensure participant agreement with the content of the transcripts.

As mentioned in section 4.8.2, the *t*-test for dependent samples was the statistical technique used to compare pre-post mean differences on measures conducted during the pilot. The main variables tested were the volumes of deposits processed and the accuracy with which the deposits were processed; professionalism, attendance and overall performance were also compared. All the variables were compared using two time periods or buckets: March to May 2009 (pre-IV_2) and June to August 2009 (post IV_2) for eighty-three (N=83) tellers and forty-three (N=43) supervisors.

5.2.4 RESULTS

The collected performance data was analysed using means of rating values for volumes, accuracy, attendance professionalism and total performance for individuals and supervisors, pre and post IV_2 (the introduction of teams and incentives for supervisors).

The detailed dependent-sample t-tests results are contained in the Appendices.

Volumes were significantly higher in the June to August period than in the March to May period with scores for supervisors used as proxy scores for overall team ratings (*t* (43)=7.54, *p*<.001), with mean volumes of 2.93 and 1.93, and *SD's* of 0.63 and 0.95 in these two periods respectively. Table 15 shows the effect size estimates for volumes, accuracy, attendance, professionalism and means score ratings of individuals for the two periods compared (March to May 2009 – pre IV_2 - and June to August 2009 – post IV_2). Table 16 shows the effect size estimates for volumes, accuracy, attendance, professionalism and means score ratings of supervisors for the two periods compared (March to May 2009 – pre IV_2 - and June to August 2009 – post IV_2). All differences, other than professionalism and attendance ratings were found to be in the hypothesised direction of improvement.

Table 15: Effect sizes measured at individual level

Variable	Mean 1	Mean 2	Difference in Means	Standard Deviation	Effect Size	Small, Medium, Large	N
Volumes*	0.913	1.18	0.267	0.68	0.4	Medium	83
Accuracy	0.463	0.524	0.061	0.502	0.1	Small	83
Attendance	0.881	0.773	-0.108	1.22	-0.1	Small	83
Professionalism*	3.939	3.795	-0.144	0.326	-0.4	Medium	83
Mean Score*	0.006	0.331	0.325	1.336	0.2	Small	83

*Differences significant at p<.050

Table 16: Effect sizes measured at supervisor level

Variable	Mean 1	Mean 2	Difference in Means	Standard Deviation	Effect Size	Small, Medium, Large	N
Volumes	1.925	2.934	1.009	0.877	1.2	Large	43
Accuracy	0.853	1.002	0.149	0.403	0.4	Medium	43

Correct to 2 decimal places

5.2.5 DISCUSSION OF PILOT STUDY

Semi-structured interviews were successfully carried out using the questionnaires developed for tellers and supervisors, with minor adjustments and improvements made for the final questionnaires. The interviews carried out during the pilot phase enabled the researcher to improve the questions asked, and the time allocated for each interview session in the first round of interviews conducted in the main study. Improvements were also made to the rating scales used.

The results of the pilot, for differences pre-post IV_2 measured at the individual level, revealed significant ($p<0.05$) differences in volumes, professionalism and the average total performance scores, with small effect size for total average performance scores, and medium effect size for volumes processed and professionalism. Although no statistical significance was found for volumes and accuracy when measured at the supervisor level, mean differences in volumes had a large effect size, while accuracy had a medium effect size. According to Cohen et al., (2003, p. 673), effect sizes can be calculated using the units of the original measures or using standardised units, as a means to measure the magnitude of a relationship. Effect sizes measure the magnitude of the relationship, rather than the statistical significance of the relationship.

5.2.6 CONCLUSIONS FROM THE PILOT STUDY

The measures for collecting both qualitative and performance data on the speed, accuracy, professionalism and attendance variables were found to be effective; it was also concluded that individual quantitative data could be analysed effectively. Although not material in the pilot, attrition of participants (and data points) was anticipated to be an important issue to address in the design of the main study, mainly as a result of staff turn-over. The practical significance (effect sizes) of the findings for speed, accuracy, professionalism and attendance for individuals showed a range from small to moderate effect sizes. The practical significance (effect sizes) of the findings for speed, accuracy, professionalism and attendance for teams showed a range from moderate to large effect sizes. With the exception of differences in professionalism and attendance ratings, all other differences in ratings were in the hypothesised direction of improvement.

5.3 INTRODUCTION TO THE RESULTS FROM THE MAIN STUDY

This section of the report deals with the results from the main study. The sequence followed in the section was to report on the findings associated with research questions 1 to 3 (RQ1, 2 & 3) individually, beginning with RQ1; the reported findings provide information on both the quantitative and qualitative components of the collected data. Only data directly relating to the research hypotheses is reported-on in the body of the report; supplementary data is supplied in the appendices.

5.4 RESULTS FOR RESEARCH QUESTION 1 (RQ1)

5.4.1 INTRODUCTION TO RESULTS FOR RQ1

The first research question (RQ1) was formulated as follows: *Over time, what are the effects of introducing pay incentives on individual performance?*

RQ1 was concerned with the effects of pay incentives on individual performance. As described in section 3.2, the introduction of pay incentives was expected to lead to an increase in the speed of deposit processing by the permanent teller group, in comparison to the contractor group of tellers, when measured at the individual level. The reason for this expectation was that pay incentives were expected to indirectly (see section 2.5.4 on intervening variables between incentives and performance) induce the permanent teller group to work harder, as a means to earn the pay incentives. It was also expected that the permanent group of tellers would sacrifice accuracy for speed in the immediate period following the introduction of the pay incentives (see section 2.4.1 on the relationship between speed and accuracy in work tasks). Accordingly, the hypothesis relating to RQ1, dealt with average processing time per deposit ($\boldsymbol{H}_1$). The accuracy of deposit processing, which was expected to drop immediately post-IV_1, was not examined, as no usable quantitative data on accuracy had been recorded pre-IV_1. Consequently, the results section for RQ1 deals with only the quantitative findings, related to the speed of deposit processing by individuals from both groups of tellers.

5.4.2 QUANTITATIVE RESULTS FOR RQ1

In order to answer RQ1, hypothesis 1 (***H_1***) was formulated. ***H_1*** hypothesised differences in the change patterns for the average number of deposits processed per unit time (speed) by the two groups of tellers (permanent and contract tellers), as a response to the first intervention (IV_1, the introduction of pay incentives for regular tellers only – see section 4.5.1). Hypothesis 1 (refer to section 3.2) is repeated below:

***H_1*:** The average processing time per deposit will decrease three and six months post IV_1, when compared to pre-IV_1. The expected decrease will be greater for regular tellers, in comparison to contract tellers.

Two-way repeated measures ANOVA with trend analysis was used as a statistical technique to analyse the expected changes in performance between the two groups of tellers. Data from three time-buckets were used to test ***H_1***; the time buckets which were used are shown in Table 17. The first time-bucket consisted of data for the period 2 months and 1 month before IV_1; the second time bucket consisted of data for the period 1 to 3 months post-IV_1; the last time bucket consisted of data for the period 4 to 6 months post-IV_1. In total, 9 months of quantitative performance data were used for RQ1.

Table 17: Time-buckets for data used for RQ1

	Bucket 1	**Bucket 2**	**Bucket 3**
Data period	2 months pre IV_1 (months -2, -1)	1 to 3 months post IV_1 (months +1, +2, +3)	4 to 6 months post IV_1 (months +4, +5, +6)

H_1 was tested using a two-way repeated measures ANOVA with trend analysis for the average straight-time per deposit processed (STTIMEDE) (refer to section 4.3.10.1) and employee status (contract employees and permanent employees) over the three time-buckets. Table 17 is a summary of the levels of the repeated measures factors; other statistics are found in the Appendix section of the report. The results of the two-way repeated measures ANOVA are shown graphically in Figure 13, the marginal means graph. The x-axis of Figure 13 contains the three time buckets and the y-axis shows the average straight time taken (in seconds) to process single deposits. Semi-structured interviews - as detailed in sections 4.9.1, 4.9.2 and 4.9.3 - were also used to answer RQ1. The average time taken per deposit was the dependent variable used for testing the changes in the speed of processing deposits, from 2 months prior to the introduction of incentives (pre-IV_1), to 1-3 months after the introduction of incentives (1-3 months post-IV_1), and then from 4-6 months after the incentives (i.e. 4-6 months post IV_1).

It was hypothesised that the changes in the speed of deposit processing post IV_1 would differ for contract tellers when contrasted with permanent tellers. The comparison was investigated in several ways. Firstly a two-way mixed-model ANOVA with linear contrasts to test the hypothesised trend was computed; the results of the ANOVA are shown in Table 18. This analysis is also known as a repeated measures ANOVA, with employment status as the between-groups factor. As outlined in section 4.8.2.1, a two-way mixed-model ANOVA can be used to examine whether the changes in the dependent variable are different for the two groups being compared.

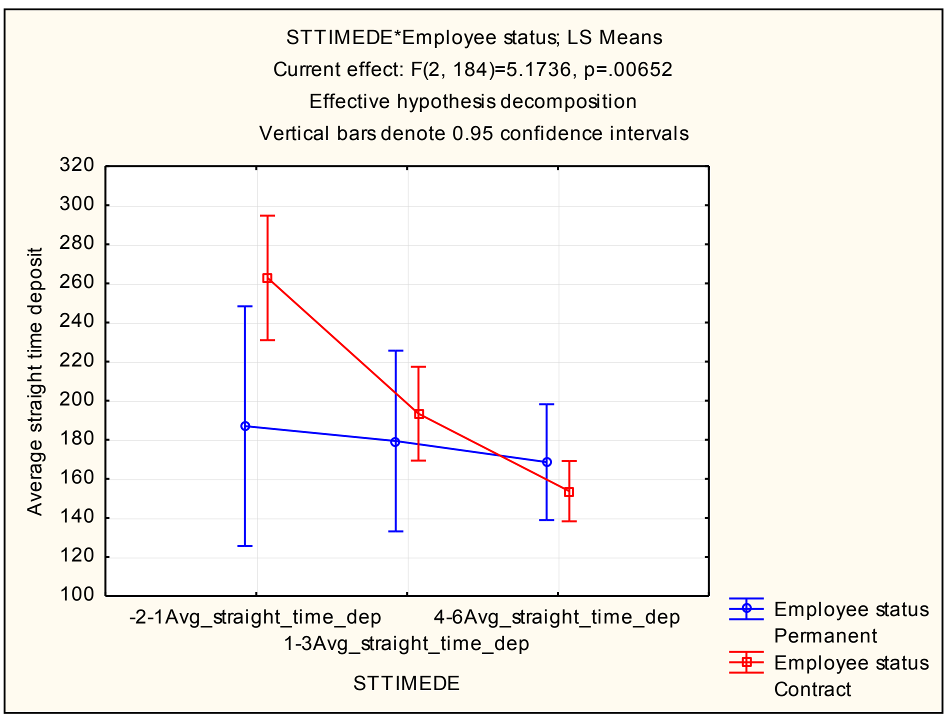

Figure 13: Marginal means graph for average straight-time per deposit pre-post IV_1

Figure 13 is the marginal means graph for the average straight time taken to process a deposit for the three time-buckets described in Table 17. From the marginal means graph, it can be seen that there is a decrease in the average time taken to process a single deposit (improvement in speed of processing) for both groups of tellers, from the time 2 months before IV_1, in comparison to the time 6 months post IV_1. The decrease in deposit processing time appears to be more pronounced for the contract teller group. From Table 18, it can be seen that the interaction effect of the time taken per deposit processed with the employee status is statistically significant (p = .007), although there are different statistical significances for the main effects of employee status (p = .242) to the main effects of the speed of processing a deposit (p = .000). The significant interaction effect (p = .007) between the two conditions (employee status and the time taken to process a deposit), suggests that the change in the average time taken to process a deposit in the 9 month period (pre-post IV_1) assessed, was somewhat affected by the employment status of the tellers.

Table 18: Repeated measures ANOVA-Standard time/deposit processed pre/post IV_1

Effect	Repeated Measures Analysis of Variance with Effect Sizes and Powers (Pre post IV_1) Sigma-restricted parameterization Effective hypothesis decomposition							
	SS	df	MS	F	p	Partial eta-squared	Non-centrality	Observed power (alpha=0.05)
Intercept	6875772	1	6875772	322.779	0.000	0.778	322.779	1.000
Employee status	29523	1	29523	1.386	0.242	0.015	1.386	0.214
Error	1959763	92	21302					
STTIMEDE	130055	2	65028	9.943	0.000	0.098	19.887	0.983
STTIMEDE*Employee status	67669	2	33834	5.174	0.007	0.053	10.347	0.823
Error	1203319	184	6540					

The ANOVA analysis assumes homogeneity of the error variances of the dependent variable across the groups. This assumption was found to hold as Levene's test of equality of error variances at each of the three time periods was not significant (*F* (1, 92) = 3.48, 3.27 and 3.29 respectively for the three periods, with *p* values of 0.07 for all comparisons). However, the assumption of sphericity was violated as Mauchly's test of sphericity was significant (W = .69, X^2 = 33.2, p<.001). In order to address the violation of the sphericity assumption (thereby controlling the α error or Type 1 error rate), the degrees of freedom of the F ratio of the ANOVA were adjusted in such a manner as to reach a more conservative p value for the F ratio of the ANOVA comparison. The adjustment was made using the Huynh-Feldt estimate (Field, 2013, p. 548) based on an epsilon value of Ɛ =, 79. After this adjustment, the repeated measures effect was still significant (F (1.57, 144.39) = 9.94, p<.001), although the effect size as measured by partial eta squared was low at η^2 = .10.

The interaction effect of employment status and the time factor was also significant after applying the Huynh-Feldt estimate to arrive at a more conservative *p* value (F(1.57,144.39) = 5.17, p<.05), although once again, the effect size as measured by partial eta squared was low at η^2 = .053. The pattern of the estimated marginal means is displayed in Figure 13 and reflects a greater rate of decrease for contractors than for permanent employees.

Several authors (Field, 2013, Chapter 16; Statistica©, 2013) advocate the use of other multivariate ANOVA or MANOVA tests, with respect to assumption violations of multivariate assumptions. This strategy was adopted as a check on the repeated measures ANOVA results for RQ1. The test of the multivariate effect of pairwise comparisons yielded consistent results to the repeated measures ANOVA (Pillai's trace exact value V = .12, F(2, 91) = 6.34, p =.01), with weak effect size as measured by partial eta squared at η^2 =.12. Finally, planned comparisons revealed a significant linear trend effect, which suggested that the average time taken per deposit decreased successively over time (F(1, 92) = 12.70, p =.001), with weak effect size as measured by partial eta squared at η^2 = .12. However, this significant linear trend was found for contractors (F(1, 73) = 37.08, p<.001) but not for the permanent employees (F(1,19) = 1.07, p=.31). This difference in the changes of the means over time is consistent with the significant interaction effect discussed previously and with the pattern of the means displayed in the figure.

Based on previous research on individual task accomplishment, which showed that there is a trade-off between the speed of individual task accomplishment and the accuracy of individual task accomplishment (Beersma et. al., 2003; Elliot et. al., 2001), the accuracy of deposit processing by each permanent teller, was expected to drop immediately post-IV_1. Unfortunately, no existing usable quantitative data on accuracy had been recorded pre-$IV_{1,}$ which meant that no pre-post IV_1 comparisons could be done.

5.5 RESULTS FOR RESEARCH QUESTION 2 (RQ2)

5.5.1 INTRODUCTION TO RESULTS FOR RQ2

The second research question (RQ2) was, *what are the effects of introducing hybrid pay incentives for supervisors, on team member performance over time?* As discussed in the General introduction to results - section 5.1 - RQ2 was concerned with the long-term effects of hybrid pay incentives for team supervisors, on individual teller performance, for the tellers within the supervisor’s span of control.

Deutsch (1949), and Johnson and Johnson, (1989) highlighted that the structuring of goals leads people to either cooperate or to compete (refer to section 2.2). The effectiveness of pay incentives within the team structure (Barnes et al., 2011; Beersma et al., 2003; Shaw et al., 2002) has also been demonstrated (see section 2.5). Critically, the trade-off between speed and the accuracy of task performance (which was expected and hypothesised in $\boldsymbol{H}_1$) was not expected within the team environment, largely due to the role of the supervisor. In addition meta-analyses on team-based incentives program also supported this view (Condly et.al., 2003) (see section 2.4.1) Hybrid pay incentives within the team structure, have also been shown in a number of studies to benefit team effectiveness (De Matteo et al., 1998; Heneman & von Hippel, 1998; Kozlowski & Ilgen, 2006) - refer also to section 2.5.3. Research using team process modeling (Cohen & Bailey, 1997; Marks et al., 2001) and empirical meta-studies using team process models (Bettenhausen, 1991; Stewart, 2006), has demonstrated the considerable influence of team processes on the performance outcomes of work-teams (refer to section 2.6).

In line with the theory, there were no differences in performance expected between the two groups of tellers, post-IV_2. However the assumption of no-difference in performance needed to be tested first, before a formal hypothesis on the nature of the change process could be advanced; these treatments are dealt-with under the results section.

Figure 14 is a flow chart illustrating the steps followed to answer RQ2 and to investigate $\boldsymbol{H_2}$. The expectation of "no differences" between the permanent and contract teller groups, was investigated using two-way repeated measures ANOVA. After finding support for the assumption of no differences between the two groups, strong factorial invariance was tested and established, using LST modeling. Repeated measures ANOVA was again used to map the changes in two performance dimensions (volumes and accuracy), using different measures of these constructs, over an 18 month period, for the combined group. Lastly, high and low performing teams were selected, based on their performance trajectories over a 12 and 22 month period; some of these teams were selected for group interviews, which were used for the qualitative components of RQ2 and RQ3, which follows later.

The hypothesis was assessed by splitting the two objectively measurable components of the performance matrix – volumes and accuracy (see section 4.5) into sub-hypotheses 2 a, b, c and d which are shown below.

Hypothesis 2:

$\boldsymbol{H_2}$a: The average performances of team members in the study, measured in terms of average number of deposits processed per unit time, will show an improvement, from six months before the introduction of IV_2 to 12 months post-IV_2

$\boldsymbol{H_2}$b: The average performances of team members in the study, measured in terms of volumes processed, will show an improvement, from six months before the introduction of IV_2 to 12 months post-IV_2

$\boldsymbol{H_2}$c: The average performances of team members in the study, measured in terms of volumes rating, will show an improvement, from six months before the introduction of IV_2 to 12 months post-IV_2

$\boldsymbol{H_2}$d: The average performances of team members in the study, measured in terms of accuracy rating, will show an improvement, from six months before the introduction of IV_2 to 12 months post-IV_2

Hybrid pay incentives for supervisors were expected to foster intra-team cooperation, greater interdependence, and improved coordination efforts by supervisors towards their tellers. It was expected that each team, would function slightly differently to the period pre-IV_2 - where tellers were not allocated to teams and supervisors. It was expected that, given the training which supervisors had received on supervisory skills (see section 4.3.9.1), each supervisor would engage more with his/her tellers to support them in improving their performances. It was also anticipated that the supervisors would try to stretch their tellers to maximum performance, since it was in supervisor's interest to earn maximum pay incentives (given that 60% of the supervisor's final performance score was a direct function of each tellers' overall monthly performance score for tellers in each team – see section 4.5.2.9). There were no expected differences in performance attributable to the employment status of the teller (see section 5.1).

Specifically, IV_2 was expected to lead to, i) increases in the number of deposits processed per unit time, ii) increases in the average monthly volumes of deposits processed by both regular and contract tellers within each team; iii) increases in the average monthly volumes ratings for deposits processed by both regular and contract tellers within each team, and iv) improvement in the accuracy rating scores for all teams. These changes were framed as research hypothesis 2 a, b, c and d. The success and sustainability of the changes to the speed, volumes and accuracy of deposit processing post-IV2 was expected to vary between members of different teams, as a result of differing team processes, and the level and effort of management and coordination skills used by the team supervisor. Although it was acknowledged that a concerted coaching effort, to improve the accuracy of deposit processing of tellers by a team supervisor could in in-time lead to the improvement in the accuracy of processing deposits by tellers, accuracy statistics were not expected to change dramatically post-IV_2.

Professionalism ratings were expected to improve post-IV_2, as dedicated supervisors were expected to focus on this aspect on their tellers' performance. Supervisors were equally expected to focus more on their own ratings of professionalism, as operationalised (see section 4.3.10.3). The introduction of the team structure (IV_2) was expected to allow for immediate feedback for breaches in professionalism (e.g. through immediate feedback from the supervisor to a teller on neatness of their work-space etc.). Attendance patterns for both supervisors and tellers were expected to improve post-IV_2 as result of the greater level of interdependency for work allocation and rewards within the fixed team structure.

The various components of hypothesis 2 were investigated as shown in Figure 14.

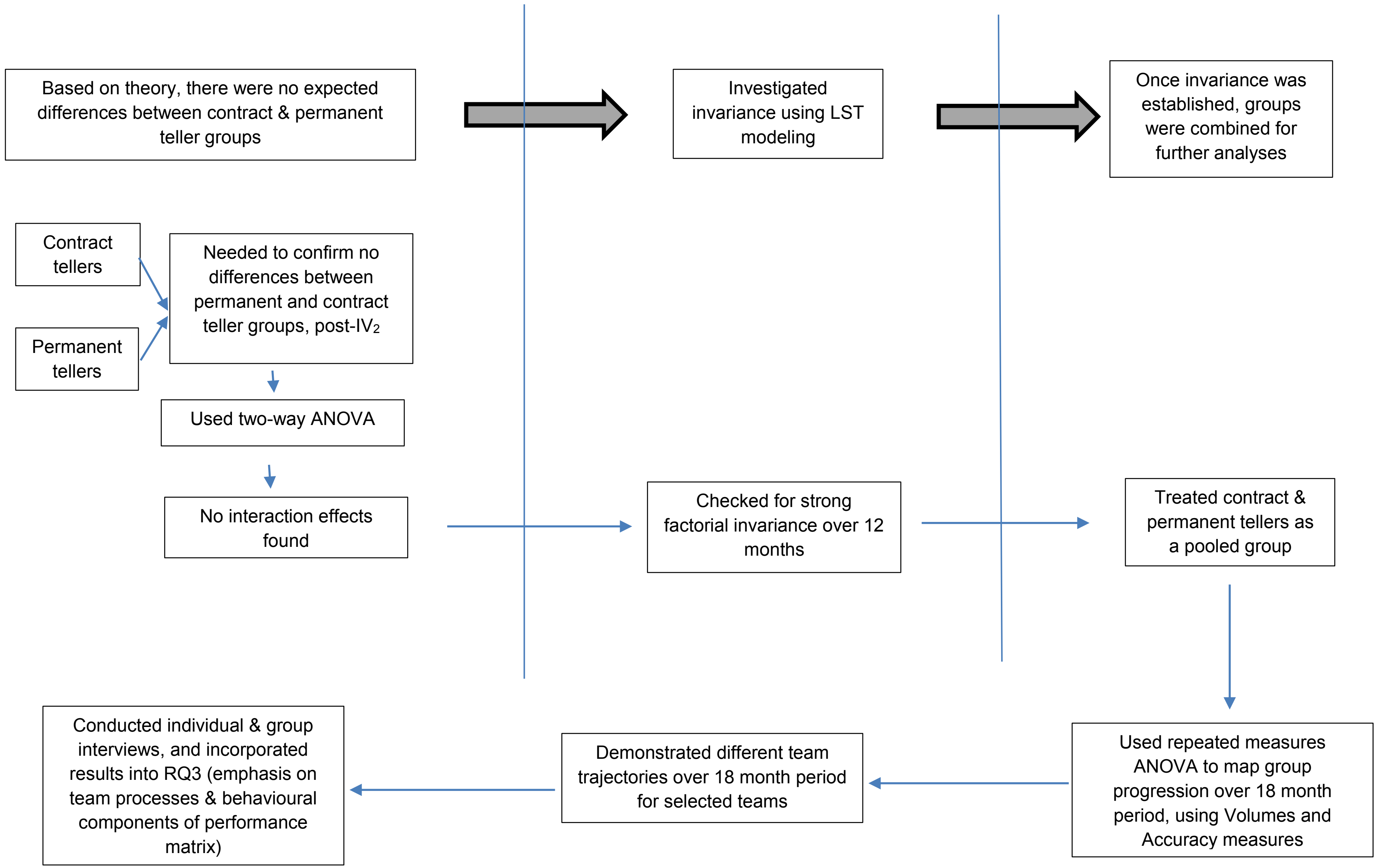

Figure 14: Process to answer RQ2

5.5.2 QUANTITATIVE RESULTS FOR RQ2

In order to answer RQ2, hypothesis 2 (***H***$_2$) was formulated, and IV$_2$ (the formation of teams and the introduction of pay incentives for supervisors – see section 4.5.2) was used as the intervention to test the hypothesis. Repeated measures ANOVA, with adjusted degrees of freedom, was used as a statistical technique to analyse the changes in overall performance, postulated under ***H***$_2$. ***H***$_2$ is shown below.

H$_2$**a:** The average performances of team members in the study, measured in terms of average number of deposits processed per unit time, will show an improvement, from six months before the introduction of IV$_2$ to 12 months post-IV$_2$

H$_2$b: The average performances of team members in the study, measured in terms of volumes processed, will show an improvement, from six months before the introduction of IV$_2$ to 12 months post-IV$_2$

H$_2$c: The average performances of team members in the study, measured in terms of volumes rating, will show an improvement, from six months before the introduction of IV$_2$ to 12 months post-IV$_2$

H$_2$d: The average performances of team members in the study, measured in terms of accuracy rating, will show an improvement, from six months before the introduction of IV$_2$ to 12 months post-IV$_2$

Data from four time-buckets was used to test hypothesis 2; the time buckets are shown in Table 19. The first time-bucket consisted of data for the period 6 months to 1 month before IV$_2$; the second time-bucket consisted of data for the period 1 month to 6 months post-IV$_2$; third time-bucket consisted of data for the period 7 to 12 months post-IV$_2$; the fourth time-bucket consisted of data for the periods 13 to 18 month post-IV$_2$. In total, 24 months of quantitative data was used in 4 periods, to answer RQ2.

Table 19: Time-buckets for data used for RQ2

	Bucket 1	Bucket 2	Bucket 3	Bucket 4
Data period	6 months pre IV_2 (months -6, -5, -4, -3, -2, -1)	1 to 6 months post IV_2 (months +1, +2, +3, +4, +5, +6)	7 to 12 months post IV_2 (months +7, +8, +9, +10, +11, +12)	13 to 18 months post IV_2 (months +13, +14, +15, +16, +17, +18)

The assumption that the effect of employee status (permanents versus contract employees) would not be significant over the various measures of performance (speed, accuracy and overall), and that the changes in these measures over time would not differ by employee status, were tested using a repeated measures ANOVA with employee status as the between-groups factor on each of the measured variables.

Table 20 summarises the Between-Subjects effects based on the employment status of the tellers. As shown in the summary, none of the Between-Subjects effects were significant (p values ranged between .16 and .92), with low effect sizes (η_2 ranging from 0 to .03), and showed a non-significant employee status main effect.

Table 21 is a summary of the Within-Subjects effects using volumes, accuracy and speed of deposits processing as dependent variables. As shown in this summary, none of the Time * Employee status interaction effects are significant, as none of the multivariate tests are significant (Pillai's Trace p values ranging between .12 and .89), supported by non-significant tests of Within-Subjects effects using conservative p-values for F tests based on Greenhouse-Geisser's adjustment to the degrees of freedom, and low partial Eta squared effect sizes. Both the multivariate tests and the adjustments to the p-values of the repeated measures ANOVAs were necessary as the ANOVA assumption of equal covariances of the difference scores between the measures over time was violated (Mauchly's test of sphericity was significant in five of the six tests – see Table 21).

Taken together, the non-significant employee status main and interaction effects are viewed as support for the researcher's assumption that employee status need not be considered further in the tests of Hypothesis 2.

Table 20: Tests of Between-Subjects Effects

	Tests of Between-Subjects Effects Source: Employee status			
Dependent variable	F	Sig.	Partial Eta Squared	df
Difference to Total Value sqrt	2.04	0.16	0.03	1;65
Accuracy Ratings	1.96	0.17	0.02	1;80
Final Ratings	0.18	0.67	0.00	1;80
Avg. straight time envelope	0.04	0.84	0.00	1;73
Volumes Rating	0.01	0.92	0.00	1;80
Avg. straight time deposit	1.76	0.19	0.02	1;73

Table 21: Tests of Within-Subjects Effects

		Multivariate Tests				Test of Repeated Measures Assumption			Tests of Within-Subjects Effects		
		Pillai's Trace				Mauchly's Test of Sphericity			Greenhouse-Geisser		
Dependent variable	Effect	F	df	p	Partial Eta Squared	Mauchly's W (df=5)	p	Greenhouse-Geisser Epsilon	F	p	Partial Eta Squared
Accuracy: Difference to Total Value sqrt	Time	10.33	3;63	< .001	0.33	0.81	0.02	0.88	10.82	< .001	0.14
	Time * Employee status	1.85		0.15	0.08				1.84	0.15	0.03
Accuracy: Accuracy Ratings	Time	34.16	3;78	< .001	0.57	0.33	< .001	0.57	57.79	< .001	0.42
	Time * Employee status	1.26		0.29	0.05				0.60	0.53	0.01
Final Ratings	Time	16.22	3;78	< .001	0.38	0.68	< .001	0.91	22.15	< .001	0.22
	Time * Employee status	0.21		0.89	0.01				0.13	0.93	0.00
Speed: Avg. straight time envelope	Time	8.12	3;71	< .001	0.26	0.68	< .001	0.83	11.66	< .001	0.14
	Time * Employee status	0.93		0.43	0.04				0.79	0.47	0.01
Speed: Volumes Rating	Time	12.16	3;78	< .001	0.32	0.57	< .001	0.73	13.43	< .001	0.14
	Time * Employee status	2.01		0.12	0.07				1.18	0.31	0.01
Speed: Avg. straight time deposit	Time	5.89	3;71	< .001	0.20	0.92	0.29	0.95	6.54	< .001	0.08
	Time * Employee status	1.67		0.18	0.07				1.71	0.17	0.02

Table 22: Comparison of means -6 to +18 months pre-post IV_2

	Multivariate Tests Pillai's Trace				Test of Repeated Measures Assumption Mauchly's Test of Sphericity			Tests of Within-Subjects Effects Greenhouse-Geisser			
	F	df	p	Partial Eta Squared	Mauchly's W (df=5)	p	Greenhouse-Geisser Epsilon	F	df	p	Partial Eta Squared
Difference to Total Value sqrt	16.37	3;64	0.00	0.43	0.81	0.02	0.88	28.05	2.74; 222.32	0.00	0.26
Accuracy Ratings	45.91	3;79	0.00	0.64	0.33	0.00	0.58	72.70	1.73; 140.39	0.00	0.47
Volumes Rating	14.41	3;79	0.00	0.35	0.58	0.00	0.73	17.83	2.20; 178.30	0.00	0.18
Final Ratings	20.73	3;79	0.00	0.44	0.86	0.03	0.91	28.05	2.74; 222.32	0.00	0.26
Avg. straight time envelope	11.54	3;72	0.00	0.32	0.69	0.00	0.83	17.31	2.49; 184.01	0.00	0.19
Avg. straight time deposit	4.18	3;72	0.01	0.15	0.92	0.27	0.95	4.92	2.84; 209.80	0.00	0.06

Table 22 is a summary of the comparison of the means of the performance indicators over time (from 6 months pre-IV_2 to 18 months post-IV_2), omitting the employee status effect. The multivariate tests show significant differences over time (Pillai's Trace p-values all less than .001), and significant tests of within-subjects effects using conservative p-values for F tests based on Greenhouse-Geisser's adjustment to the degrees of freedom. Once again, both the multivariate tests and the adjustments to the p-values of the repeated measures ANOVAs were necessary as the ANOVA assumption of equal covariances of the difference scores between the measures over time was violated (Mauchly's test of sphericity was significant in five of the six tests). Moreover the effect sizes for these tests are low to moderate with values for partial Eta squared ranging from η^2 = .15 to .64 for the multivariate tests and .06 to .47 for the adjusted repeated measures ANOVA results. There is thus support for Hypothesis 2 of the research.

Finally, the directions of the changes in the means of the indicators over time are displayed in the mean plots (Figure 15 to Figure 20). In all cases except for the indicators of speed (Average Straight Time for processing Deposits and Average Straight Time for processing Envelopes), all the means show a monotonic improvement over the entire time period. In the two exceptions cited, post hoc tests of the means between the second last and last periods were non-significant (p=.08 and .83 respectively). These unexpected directions are thus not considered contradictory to the weight of evidence in support of the improvement over time in performance from six months prior to 18 months following the introduction of IV_2 as posited by Hypothesis 2.

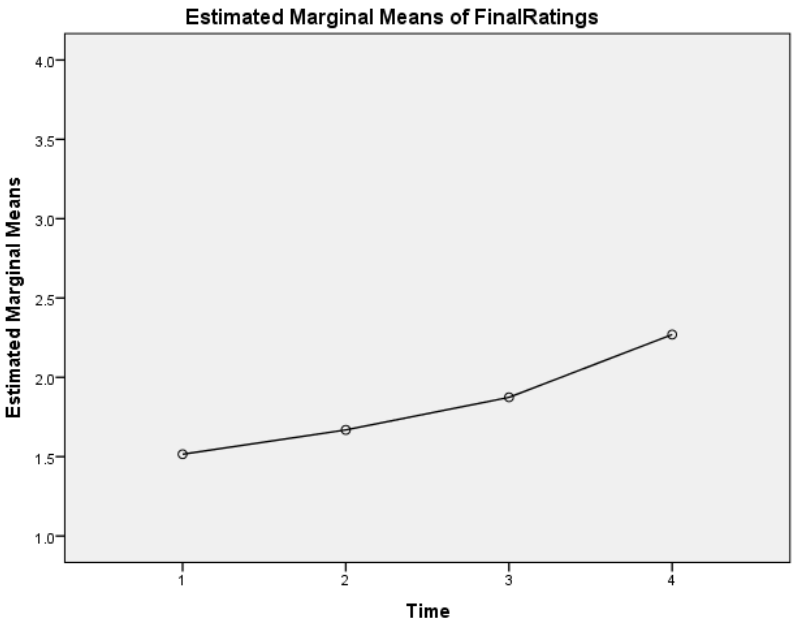

Figure 15: Marginal means for Final Ratings

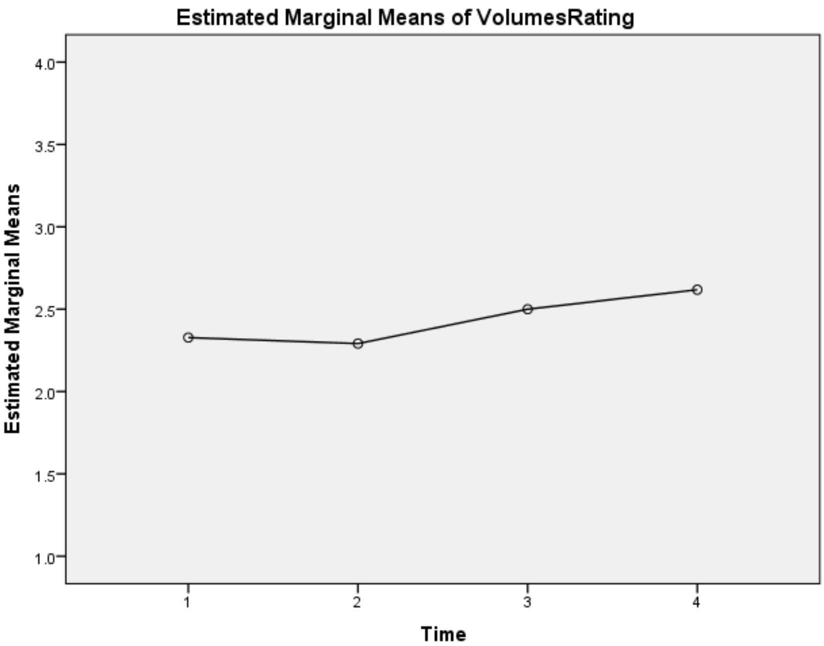

Figure 16: Marginal means of Volume Ratings

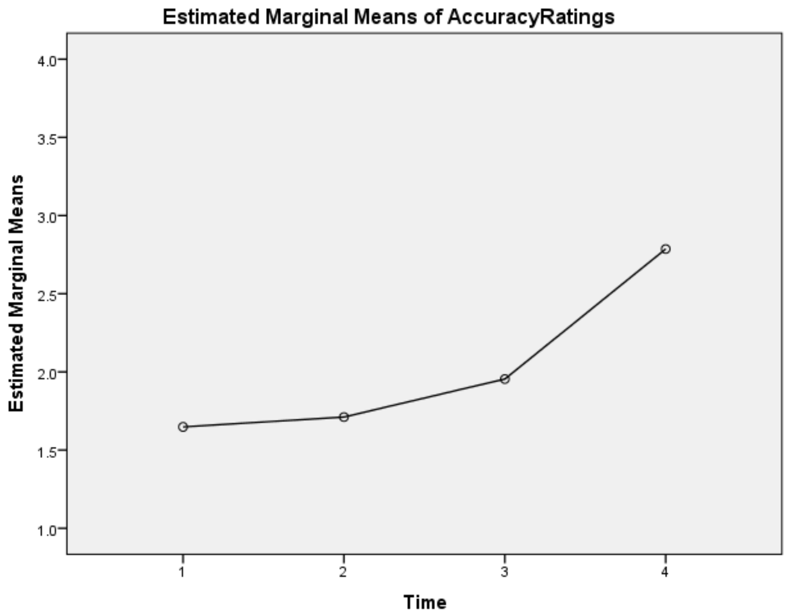

Figure 17: Marginal means for Accuracy Ratings

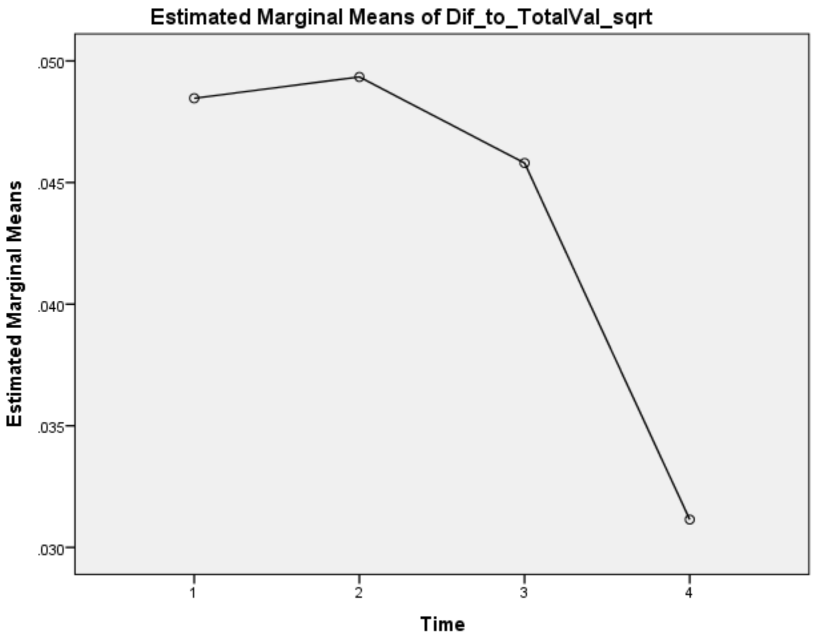

Figure 18: Marginal means for Squareroot of Differences to Total Value

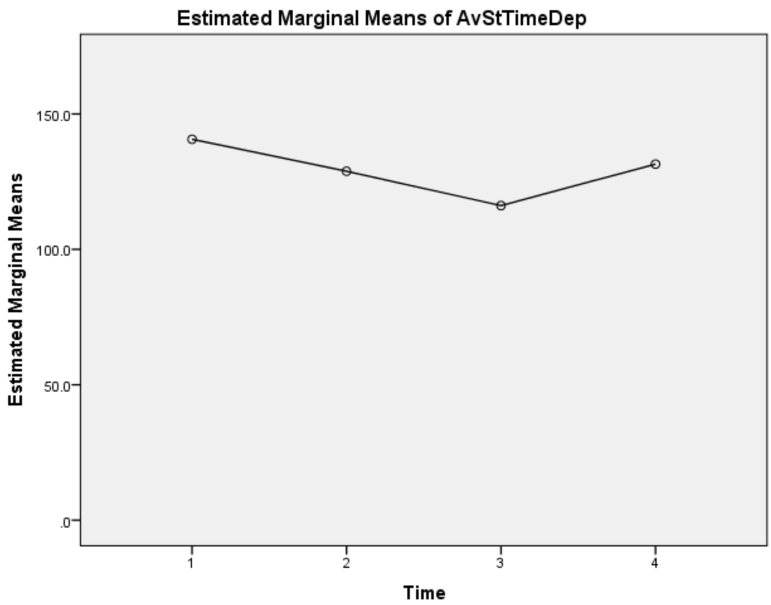

Figure 19: Marginal Means for Average Straight-time per Deposit Processed

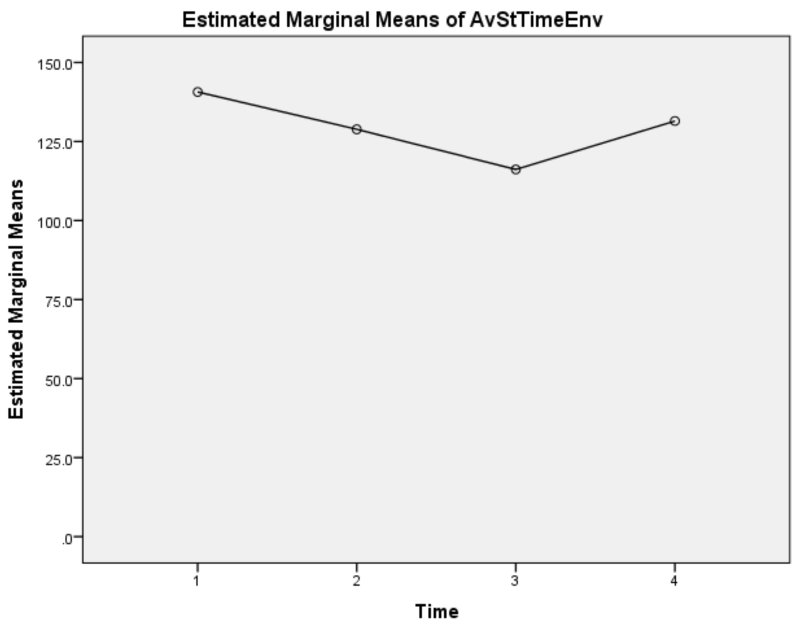

Figure 20: Marginal Means for Average Straight-time per Envelope Processed

This section of the results builds on the discussion in section 4.8.2.3, where LST modeling was shown to test factor and measurement invariance (Geiser, 2010), by splitting stable, from occasion-specific variance components on the dependent variable in longitudinal study designs. In section 4.8.2.3 the various model fit indices, their estimations and uses were also discussed; therefore, the following section will merely report on the results of the various invariance estimates.

As seen in section 4.3.10.5, the construct of overall performance as used in this study included the volumes and accuracy of deposit processing, together with behaviours linked to attendance and the professionalism of the tellers and supervisors. The performance construct, as operationalised, was not expected to change over the course of this study, as a result, a first-order Confirmatory Factor analytic approach was used in a nested-models design (Bollen & Curran, 2006; Byrne, 2012; Kline, 2010), to test factorial invariance for three time buckets using Latent states analysis (Geiser, 2010).

Figure 21, is the hypothesised baseline first-order CFA Latent States (LS) model. This baseline model was sequentially used to estimate configural invariance and weak and strong factorial invariance for two indicators of performance over three time periods, using M*plus*. The notation in the model thus represents M*plus* notation. The model shows the three different states which were modelled – STATE 1, 2 & 3 – representing the different time-period buckets used – these time periods are shown in Table 23. The observed variables are volumes 1, 2 & 3 (Vol1, Vol2 & Vol3) and Deposit rating measures 1, 2 & 3 (DepRat1, DepRat2 & DepRat3) were used to measure states 1, 2 and 3. Residuals are represented by the single headed arrows extending towards the indicators from the outside. Factor loadings are indicated by the straight single-headed arrows extending from each state, towards the indicators.

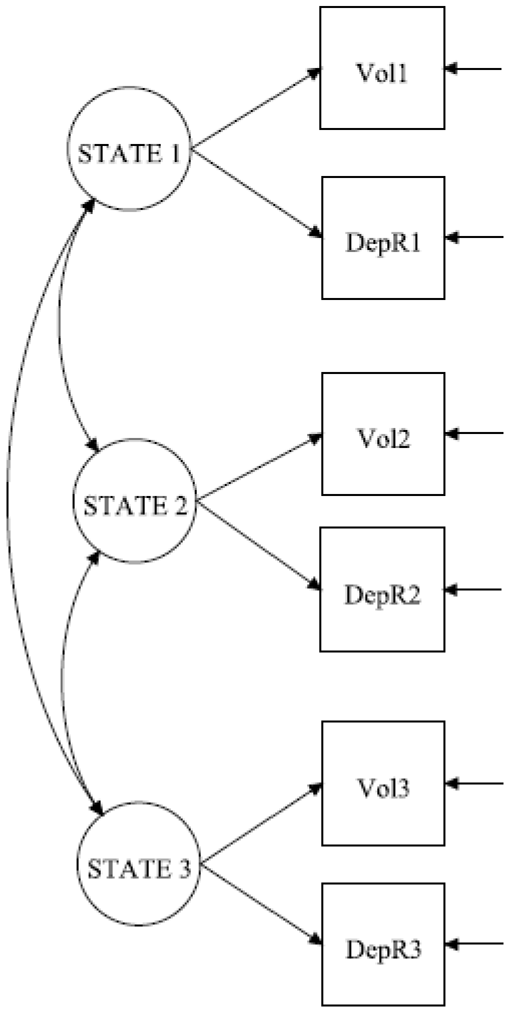

Figure 21: Components of basic LS model

Table 23: Periods represented by States

	State 1	**State 2**	**State 3**
Time bucket represented	-6 months pre IV_2 to IV_2	+1 month post-IV_2 to +6 months post IV_2	+7 months post IV_2 to +12 months post IV_2

Table 24: Goodness-of-fit statistics for Basic LS model

Test	Statistic	Baseline
Number of free parameters		
Chi-Square test of model fit		
Value	267.622	869.744
Degrees of freedom	7	15
p-value	0.000	0.000
CFI	0.695	
TLI	0.347	
Information Criteria		
AIC	2670.808	
BIC	2745.280	
ABIC	2681.849	
RMSEA		
Estimate	0.349	
90% confidence interval	0.314 -	
Probability RMSEA <=.05	0.000	
SRMSR		
Value	0.144	

The goodness-of-fit indices for the basic LS model are summarised in Table 24 showed a poor fitting model with a X^2 value of 262.622 with 7 degrees of freedom and a p-value of less than .0001. Other model fit indices such as the CFI were .695 and the TLI was .347 further supporting the poor fit of the model; compared to the baseline model however, this model was a vast improvement when one compares the X^2 value of 869.744 of the baseline model.

Figure 22 shows the model for configural invariance, with estimated covariances between states 1, 2 and 3. The diagram also shows the factor loadings between each state and its corresponding indicator variables; the residuals for indicators are also shown. In each one of the three states, the first factor loading is a fixed parameter to enable model identification and scaling (Byrne, 2012; Kline, 2011; Wang & Wang, 2012).

The goodness-of-fit results of the configural model are summarised in Table 25, which shows a significant improvement in the X^2 value which is reported as 50.911 with 5 degrees of freedom. Compared to the basic LS model, there is also a significant improvement in the CFI from .695 to .946, the TLI from .347 to .839, the RMSEA from .349 to .173 and the SRMR from .144 to .087. All the information criteria indices also improved when comparing the basic LS model to the configural invariance model. The improvement in the goodness-of-fit results supports that there was configural invariance between the three states 1, 2 and 3.

The next steps in the LS and LST models involved testing weak factorial invariance, followed by strong factorial invariance. Only the findings of the strong factorial invariance with latent states and traits for volumes and deposit ratings are dealt-with here.

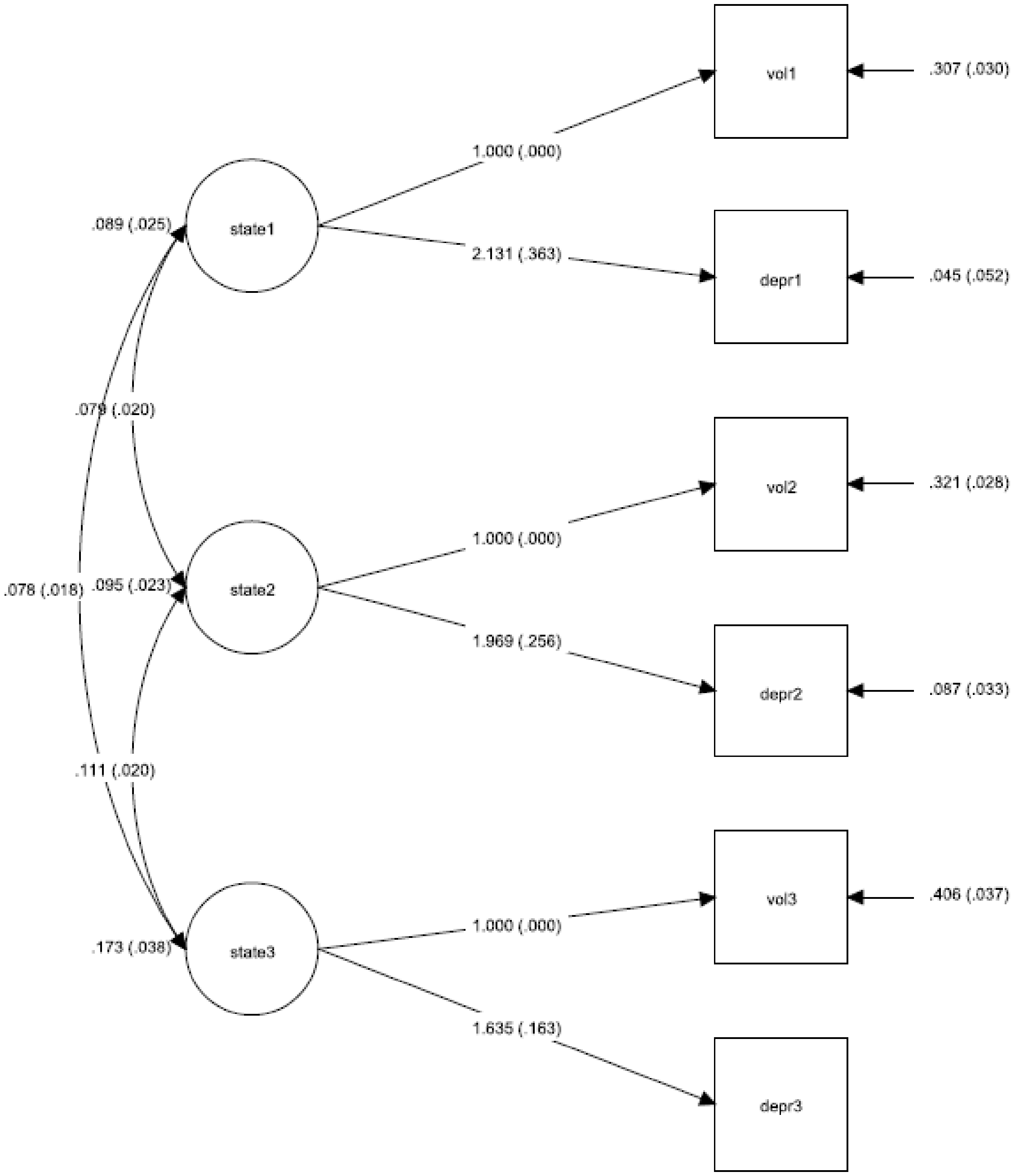

Figure 22: Model for configural invariance

Table 25: Goodness-of-fit statistics for configural invariance model

Test	Statistic
Number of free parameters	22
Chi-Square test of model fit	
Value	50.911
Degrees of freedom	5
p-value	0.000
CFI	0.946
TLI	0.839
Information Criteria	
AIC	2458.090
BIC	2540.016
ABIC	2470.242
RMSEA	
Estimate	0.173
90% confidence interval	0.132 – 0.218
Probability RMSEA <=.05	0.000
SRMR	
Value	0.087

Figure 23 shows the model for strong factorial invariance. As in Geiser (2010), the specification of the model contains an indicator specific factor for the second factor (IS_2), time invariant loadings (the intercepts of the first indicator are set to zero in the syntax), and the syntax contains time invariant intercepts.

The goodness-of-fit results for strong factorial invariance are summarised in Table 26 which shows the X^2 value at 51.190 with 10 degrees of freedom. The CFI is .952, and the TLI is .928. The RMSEA at .116 indicates a poor fit and the SRMR at .057 is marginally poor. The information criteria indices did not change much. The goodness-of-fit results support strong factorial invariance between the three states 1, 2 and 3 and the deposit processing and volumes indicator variables for indicator specific factor 2 - deposits rating.

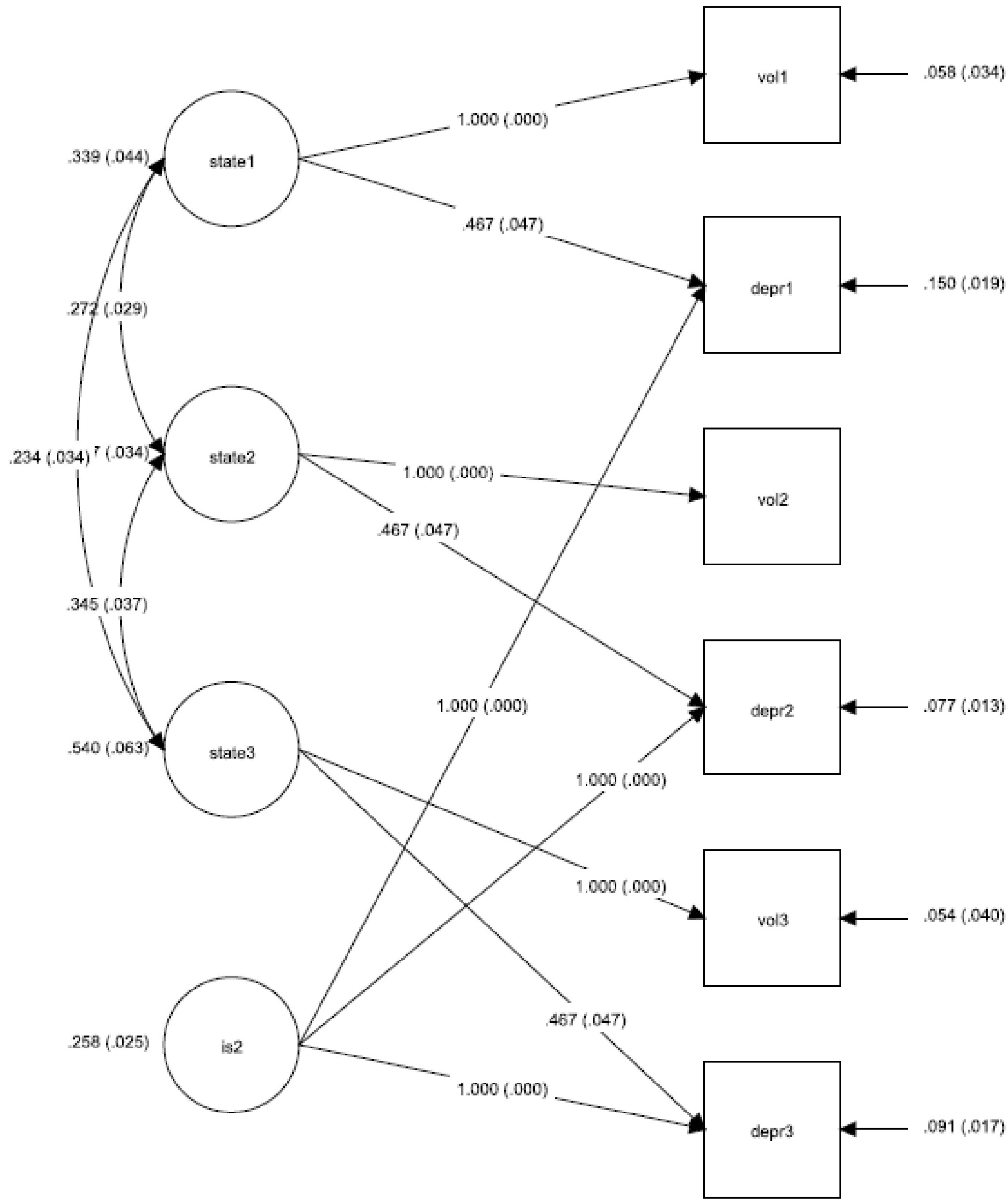

Figure 23: IS_2 model for strong factorial invariance

Table 26: IS_2 Strong Factorial Invariance Goodness-of-fit statistics

Test	Statistic
Number of free parameters	17
Chi-Square test of model fit	
Value	51.190
Degrees of freedom	10
p-value	0.000
CFI	0.952
TLI	0.928
Information Criteria	
AIC	2448.376
BIC	2511.677
ABIC	2457.760
RMSEA	
Estimate	0.116
90% confidence interval	0.086 -
Probability RMSEA <=.05	0.000
SRMSR	
Value	0.057

Figure 24 shows the model for strong factorial invariance with an indicator specific factor for the first factor (IS_1). The goodness-of-fit results for strong factorial invariance are summarised in Table 27 which shows the X^2 value at 106.229 with 10 degrees of freedom. The CFI index is .887, and the TLI index is .831, which both reflect a poorly fitting model. The RMSEA at .177 also indicates a poor fit and the SRMR at .206 is poor. The goodness-of-fit results show poor factorial invariance for indicator specific factor 1 – volumes. Although these results reflect a poor fitting model for IS1, the degree model for IS_2 (Figure 23 and Table 26) provide enough evidence for us to accept a good factorial structure of time.

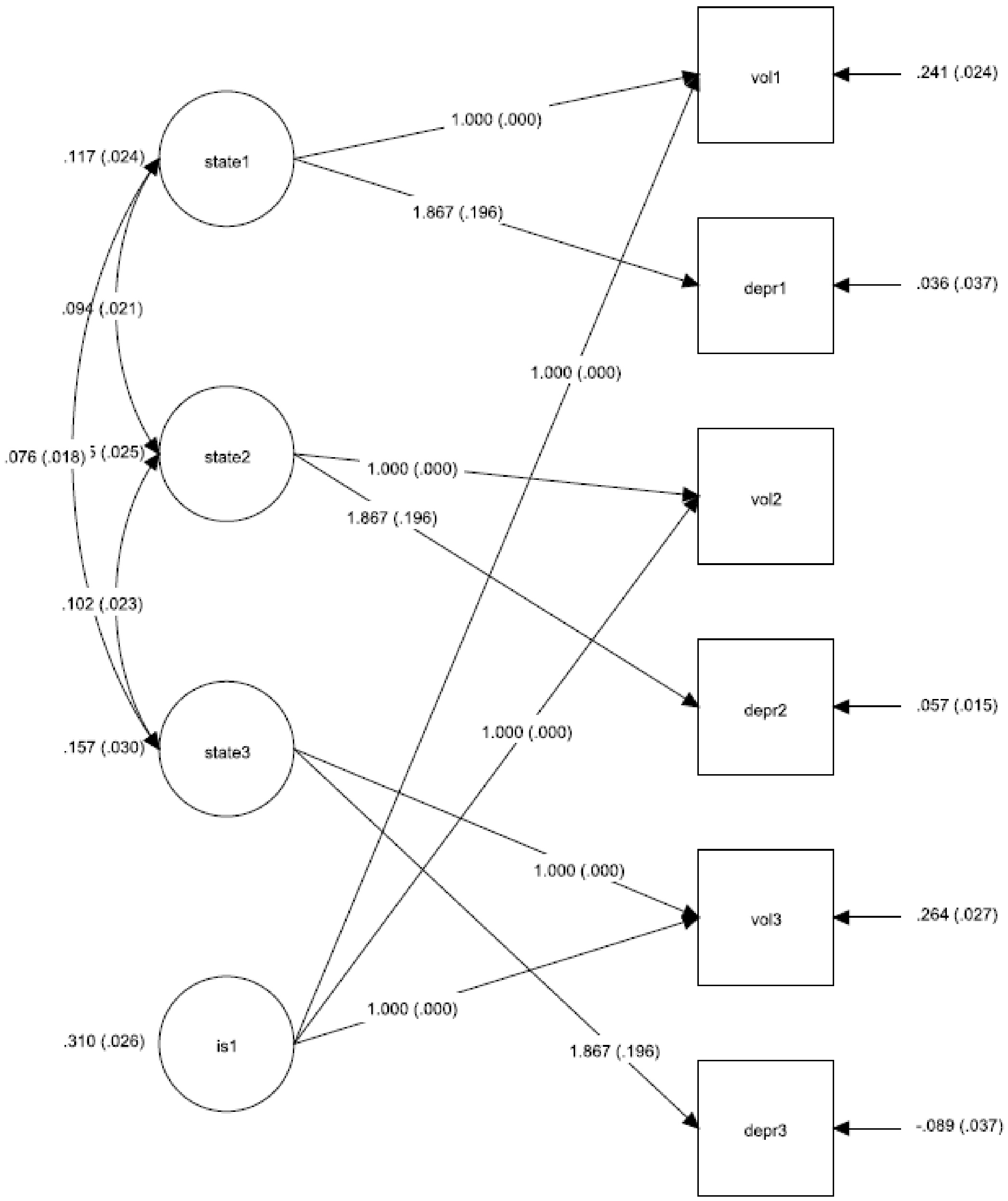

Figure 24: IS_1 model for strong factorial invariance

Table 27: IS_1 Strong Factorial Invariance Goodness-of-fit statistics

Test	Statistic
Number of free parameters	17
Chi-Square test of model fit	
Value	106.229
Degrees of freedom	10
p-value	0.000
CFI	0.887
TLI	0.831
Information Criteria	
AIC	2503.414
BIC	2566.715
ABIC	2512.799
RMSEA	
Estimate	0.177
90% confidence interval	0.148 -
Probability RMSEA <=.05	0.209
SRMSR	
Value	0.206

5.5.3 QUALITATIVE RESULTS FOR RQ2

The following section, reports on the findings from the interviews which were carried out on randomly selected tellers, within the strata of contract tellers, regular tellers and supervisors, as part of answering RQ2 of the research. The detailed interview questionnaires are attached in the appendix section of the report.

The initial batch of interviews was conducted in the period within the first six months following the introduction teams and supervisor incentives (IV_2); this period was 8 to 10 months after IV_1. The next interviews, were lagged and linked to performance findings, in the period three months preceding the interview. The sampling of the interviewees was purposive, and targeted to maximise the range of responses collected. Every attempt was made to obtain information from both contract and regular tellers, high and low performing individuals and supervisors. As mentioned in the previous chapter (section 4.9), the interviews covered various aspects of the team effectiveness model (refer to 2.9), including task interdependence, unique events, the context of the teams, goal setting within teams, feedback and progress within teams, teamwork behaviours, important historical issues and any changes in meaning and attributes during the period relevant to the study. The interview reports are shown in the timeline sequence in which they were carried out.

Table 28: Interviews carried out immediately post IV_2

	Dates interviews carried out	
Centre Name	15-Jul-10	25-Aug-10
Polokwane	**X**	
Pretoria		**X**

Table 28 shows the sequence and dates of the first set of interviews, which were carried out immediately after the introduction of teams and pay incentives for supervisors. The report for each centre outlines the time in which the interviews were done (refer to section 4.9.1), and a summary of the key findings from each interview occasion.

The Polokwane centre was first for interview and surveys. Individuals from both permanent and contract tellers groups, and some supervisors, where selected for the interview.

5.5.3.1 POLOKWANE CENTRE INTERVIEWS

SETTING AND CONTEXT

The interviews at the Polokwane centre were carried out in July 2010 – about four months after the introduction of IV_2 (teams and supervisor incentives). Five tellers and four supervisors were available for interviews, representing a total of five different teams. Table 29 shows the position of the person interviewed, the type of contract on which the person was employed at the time of the interview, the name of the team in which the person belonged, the year of birth of the person, the reason for the purposive selection of the person and the length of service of the person in the company, at the time of the interview.

Table 29: Interviews carried out immediately post IV_2

Position	Employment type	Name of team	Year of birth	Reason for selection	Length of service at (years) at the company
Teller 1	Permanent	Supervisor 3	1976	Random	3+
Teller 2	Permanent	Supervisor 1	1967	Random	1-3
Teller 3	Permanent	Supervisor 3	1983	Random	1-3
Teller 4	Contract	Supervisor 1	1985	Random	<1
Teller 5	Permanent	Supervisor 5	1984	Random	3+
Supervisor 1	Permanent	Supervisor 1	1982	Random	3+
Supervisor 2	Permanent	Supervisor 2	1979	Random	3+
Supervisor 3	Permanent	Supervisor 3	1994	Random	3+
Supervisor 4	Permanent	Supervisor 4	1985	Random	3+

The range of work experience as tellers within the company, for the sample of tellers interviewed was less than a year to more than three years, while all the supervisors had more than three years' work experience at the company. Tellers and supervisor were selected purposively in order to maximise the spectrum of people of experience and work contract types within the sample of interviewees. At the time of the interviews, the range of ages of the tellers was between twenty-five and forty three years, and the supervisors were between sixteen and thirty-one years old.

SUMMARY OF FINDINGS

General issues raised by the interviewees on the issues which affected the amount of work which tellers and supervisors could perform within a shift, included fatigue and poor work distribution, as a result of perceived high volumes of work going through the centre. During these early interviews, neither the tellers nor the supervisors had fully settled-in to understand the impact of the incentives program on interdependency, motivation and its effects on performance. However, there was a high degree of awareness of the level of interdependency which resulted from the formation of teams. It appeared that the retraining program which had been introduced by the company, targeting supervisors (in preparation for the introduction of teams) had created a higher level of awareness among some supervisors of their anchor roles within their own teams (see also section 4.3.9.1). One supervisor commented that the re-training received on the Supervisory Development Program (SDP) had helped her to understand how to manage teams of people.

> *"Training in SDP has helped me understand people"* (Supervisor #1, Polokwane centre, 15 July, 2010)

However, during the interviews of various tellers, it became clear that the mechanics of the pay incentives program had not been adequately explained to all the tellers, even though the teller incentive program had been in place for at least 8 months. Part of the reason for this was perhaps that, at the inception of the teller incentive program, tellers had not been allocated to a dedicated supervisor (i.e. there were no defined teams). Another explanation for this was perhaps that, since the supervisors had not been part of the initial pay incentive program (pay incentives for supervisors had only been introduced about 4 months prior to this set of interviews), the supervisors did not initially have a vested interest to ensure that tellers received pay incentives.

During the early interviews, self-motivation featured a great deal in the teller and supervisor interviews. A comment from the only contract teller interviewed at this centre revealed that, even though she was not benefiting from the performance incentive scheme, she was able to stay motivated to improve her performance because she was generally a self-motivated person.

> (The scheme) sic*.." has no direct benefit to me. If there is any improvement it is solely because I want to improve myself".* (Teller # 3, Polokwane centre, 15 July, 2010)

Tellers were asked about the impact of being allocated to a specific supervisor in comparison to the period when no teller was assigned to a specific supervisor. The general opinion of the tellers (as found in the assessment of ratings used during the interviews – see section 4.9.4) was that being allocated to one supervisor had resulted in an improvement in the volumes of deposits handled and an improvement in the differences carried by each teller. The general opinion was also that the professionalism and attendance of the tellers had improved.

5.5.3.2 PRETORIA CENTRE INTERVIEWS

SETTING AND CONTEXT

The interviews at the Pretoria centre were conducted in August 2010 – approximately five months after the introduction of IV_2. Table 30 shows the position of the person interviewed, the individual's type of employment contract at the time of the interview, the name of team in which the person belonged, the year of birth of the person, the reason for the purposive selection of the person and the length of service of the person in the company, at the time of the interview. Four tellers and three supervisors were available for interviews, and six different teams were represented in the sample of people. Selection was purposive, targeted to get representation of tellers classified at that stage, as poor, average and good tellers on their overall performance ratings.

Table 30: Tellers and supervisors interviewed at the Pretoria cash centre

Position	Employment type	Name of team	Year of birth	Reason for selection	Length of service at (years) at the company
Teller 1		Supervisor 2	1977	Good	3+
Teller 2	Contract	Supervisor 4	1975	Average	1-3
Teller 3	Permanent	Supervisor 5	1962	Average	3+
Teller 4	Contract	Supervisor 6	1980	Poor	1-3
Supervisor 1	Permanent	Supervisor 1	1982		3+
Supervisor 2	Permanent	Supervisor 2	1981		3+
Supervisor 3	Permanent	Supervisor 3	1980		3+

The range of work experience (as tellers within the company), for the sample of tellers interviewed was from more than a year to above three years, while all the supervisors had more than three years' work experience at the company. At the time of the interviews, the range of ages of the tellers was between thirty and forty-eight years, and the supervisors ranged were between twenty-eight and thirty years old.

SUMMARY OF FINDINGS

In reference to the introduction of pay incentives, the tellers and supervisors interviewed at the Pretoria cash centre felt that the incentives had resulted in improvements in the volumes of deposits handled, improvements in the accuracy of the counts, accompanied by improvements in the behavioural components associated with professionalism and the attendance of both groups at work. There were various reasons which were given by the groups for this, including firstly, that the tellers appeared to have changed their own behaviours when it came to attendance practices, because the incentive system rated absenteeism as a negative on their overall performance scores

> *"Changed behaviour to gain more rewards".* (Teller #1, Pretoria cash centre, 25 August, 20102)

Secondly, accuracy of performing deposit counts was quoted in some instances as being sacrificed for speed of processing the deposit, as a means to obtain higher performance ratings overall.

> *"Some improvement, but not much. Speed is being traded off for accuracy in some instances".* (Teller #3, Pretoria cash centre, 25 August, 2010)

Thirdly, competition among tellers appeared to be involved in driving tellers to try harder to achieve high performance ratings, even though higher performance ratings by one teller did not affect the rating of other tellers.

> *"Competition has helped".* (Teller #1, Pretoria cash centre, 25 August, 2010)

On the downside, one supervisor also observed that, even though performance had generally improved, the level of "sick-leave" taken by tellers had also increased since - as she put it - tellers were not taking their normal "time-off' from work anymore, because the tellers knew that they would be losing-out on the pay incentives. This same supervisor also noted that tellers were far more productive in the early part of the week, and were fatigued by the end of the week, leading to differences in performances in her team within the week.

> *"Early part of the week, the processed volumes are high. More volumes processed in early part of the week because tellers are not tired. Less volumes in late week as tellers get tired".* (Supervisor #2, Pretoria cash centre, 25 August, 2010)

> *"This is a challenge. The sick leave seems to be independent of the work load. Sick leave and absenteeism (of 3 -4 days) is the main problem*

because tellers are not taking time off". (Supervisor #2, Pretoria cash centre, 25 August, 2010)

The following section of the report details the findings from interviews which were carried out about six months after the introduction of the second intervention. During the period of these interviews, most centres had become familiar with the mechanics around the incentive pay scheme, and some of the teams had also settled into routines. There was also sufficient data to detect early performance trends, and enough data to begin more in-depth examination of the issues which were resulting in performance differences between teams and among team-members.

Purposive sampling was again used to select candidates for interview at these centres. Table 31 shows the dates on which the East London, Pietermaritzburg, Port Shepstone and Durban centres were visited for interviews. Only interviews for the East London centre will be covered here, as findings from the other centres were largely a repeat of findings from the earlier interviews, and findings from other centres relate more to other research questions, and will be covered later.

Table 31: Interviews carried out 6-12 months post IV_2

	Approx. 6 months post IV_2		
Centre Name	14-Sep-10	11-Oct-10	12-Oct-10
East London	**X**		
Pietermaritzburg		**X**	
Port Shepstone			**X**
Durban			**X**

5.5.3.3 EAST LONDON CENTRE INTERVIEWS

SETTING AND CONTEXT

Interviews at the East London cash centre were carried out in September 2010 – about six months after the introduction of IV_2 (teams and Supervisor incentives). At the time of scheduling the interviews for this centre, there was enough performance data to allow for the selection of candidates based on their historical performances.

The sample of tellers and supervisors was purposively done. As highlighted in 4.9, the logic behind these interviews was to try and establish whether the people interviewed could offer reasons or explanations for their performance trends for the period three-months prior to the interview date. Table 32 shows that four tellers and three supervisors were available for interviews, representing five different teams. Unfortunately, no contract tellers were available for this round of interviews at this centre.

Table 32: Tellers and supervisors interviewed at the East London cash centre

Position	Employment type	Name of team	Year of birth	Reason for selection	Length of service at (years) at the company
Teller 1	Permanent	Supervisor 4	1977	Rating: B to A+	1-3
Teller 2	Permanent	Supervisor 5	1979	Rating: A to A+	3+
Teller 3	Permanent	Supervisor 3	1981	Rating: A to A+	1-3
Teller 4	Permanent	Supervisor 2	1984	Rating: C	3+
Supervisor 1	Permanent	Supervisor 1	1970	Random	3+
Supervisor 2	Permanent	Supervisor 2	1978	Random	3+
Supervisor 3	Permanent	Supervisor 3	1964	Random	3+

For the sample of tellers interviewed, the range of work experience within the company was between one, to more than three years, while all the supervisors had more than three years' work experience. The ages of the tellers interviewed were between twenty-six and thirty-three years, and the supervisors were between thirty-two and forty-six years old.

SUMMARY OF FINDINGS

Findings indicated that tellers perceived improvements in the volumes of deposits which they handled over time, ascribing this to the introduction of the pay incentives.Three out of the four tellers and all the supervisors believed that the introduction of incentives had resulted in improvements in volumes, accuracy of processing, and they also believed that the incentives had resulted in a positive influence on the professionalism of the tellers and work attendance. The tellers were predominantly of the view that the pay incentives were motivating them to work harder and to compete more amongst each other on the levels of incentives received (teller incentives for high earners were usually publicised by the centre management teams, and tellers openly shared the information on their earnings among themselves). One teller however did not perceive this as having been the case; this teller (Teller #3) was specifically located within the coin processing section of the retail floor. Teller #3 was also of the belief that working faster had resulted in more counting errors. In addition, Teller #3 perceived that the separation of tellers and supervisor into teams had resulted in poor cross-team assistance between supervisors, the result of which, was overall poor performance within the centre.

> "*No cross team assistance being given by supervisors; small groups seem to have suffered as a result*" (Teller#3, East London cash centre, 14 September, 2010.

All the tellers who were interviewed rated their levels of dependency on their supervisors as moderate, while the supervisors rated their task interdependence with both individual tellers and teller teams between moderate and high.

In respect of the impact of allocation of supervisors to a team of tellers, the majority of tellers were of the view that this had not made any significant differences in terms of how they performed, nor in terms of how they behaved. Quoting teller #2, her belief was that her allocation to a supervisor had

> *"No effect at all" (*Teller #2, East London cash centre, 14 September, 2010)

All supervisors however felt that they had seen improvements in all aspects of performance and also on the behaviours associated with teller performance.

Allocation to a team was reported by two of the three tellers and by all the supervisors who responded to the question, as having resulted in improvements in all aspects of performance. When asked to qualify this response, one teller suggested that there was more sharing of the workload among tellers within the team structure, resulting in more manageable work:

> *"[I am] not as exhausted because work is equally allocated"* (Teller #4, East London cash centre, 14 September, 2010)

One teller however did not believe that the allocation to a team had resulted in any effects.

In respect of their team contexts, the tellers and supervisors raised various issues. For tellers, poor helping behaviours within some of the teams was raised as a concern. For supervisors, communication within the team, issues of lack of discipline among tellers, and the fact that contract workers did not participate in the incentive scheme were raised as concerns within cohesiveness of the team structure.

In respect of goal-setting, feedback and progress monitoring, the ratings of teller's perceptions on the level of goal-setting provided by supervisors were mixed, from low to high. There were more consistent views on the levels of feedback received, ranging between moderate and high for all tellers who responded. Supervisors also ranked the levels goal-setting similar to the tellers, while their rankings of the levels of feedback was consistently high. Both tellers and supervisors ranked the importance of tracking and making progress as very important.

On the importance of making progress, some of the comments made appear below:

> *"I was a B teller, now I am a A/A+ teller!!* " (Teller #1 East London cash centre, 14 September, 2010)
>
> *"Progress is critical to me in all aspects".* (Teller #3 East London cash centre, 14 September, 2010)
>
> "*Because you are competing and you feel more motivated*". (Teller#4 East London cash centre, 14 September, 2010)
>
> *"Progress is critical".* (Supervisor #3 East London cash centre, 14 September, 2010)

5.5.3.4 PIETERMARITZBURG CENTRE INTERVIEWS

SETTING AND CONTEXT

The Pietermaritzburg centre interviews were done in October 2010; this period was about eight months after the introduction of IV_2 at this centre. The main purpose of the interviews at this centre was to focus on practices which the teams in the centre were engaging in. The Pietermaritzburg centre had been one of the centres with the highest consistency in performance since the inception of the incentives. The second purpose was to continue to talk to people whose performance status was significant in some way within the centre. Table 33 shows some details of the two tellers who were selected for interviews at the Pietermaritzburg centre; only two tellers were selected for individual interviews. The reasons for selecting the candidates for interview were as follows: one teller was consistently considered the best performing teller at the centre, and this was reflected in her performance statistics. The second teller had shown significant changes in his performance in the previous three month period, moving from an overall performance rating of C to a rating of A+. In addition to the interviews of the two tellers, a team interview was also carried out at this centre, since the centre had the highest number of consistently good teams. The team - comprising a supervisor and a number of tellers - was selected for a group interview, which also included some members of the management team at the centre. At the time of the interviews, teller #1 was twenty-seven years old and teller #2 was forty-three years old.

Table 33: Interviews at the Pietermaritzburg cash centre

Position	Employment type	Name of team	Year of birth	Reason for selection	Length of service at (years) at the company
Teller 1	Permanent	Supervisor 1	1983	Changed from C to A	3+
Teller 2	Permanent	Supervisor 2	1967	Consistently best teller	3+

SUMMARY OF FINDINGS

In respect of historical and context-specific issues about the centre, the researcher made some observations about practices which had occurred following the introduction of incentives for tellers (IV_1). One of the significant observations about the Pietermaritzburg centre was that it had the highest number of category-A tellers than any other centre in the company, at the time of the launch of the team's intervention (IV_2). As part of the period immediately following IV_2, tellers, relied entirely on the supervisors, and there was almost no involvement of the head of department (HOD) in the organisation of the retail teller processing floor. This was in contrast to many of the other centres in the company, where the HOD's were still involved in organising the supervisors.

Some changes at retail teller floor had already taken place in readiness for the launch of the teams: weaker tellers were placed in cubicles which were surrounded by stronger tellers. The explanation for this from the supervisors was that, this had the effect of speeding up the slower tellers (a form of peer pressure). The teams had also devised visual performance boards which were visible on the retail floor to all tellers within the team. These performance boards were to be used by supervisors (some had already started using these) to capture processing volumes per teller, so that tellers were continuously aware of their targets. The centre management had decided that performance results would be demonstrated on a wall, located in a passage leading from the retail floor to the staff canteen. The notice boards on these walls showed details of the best performing tellers.

On the visit to the centre, it was also noticed that there was a very strong culture of compliance to processing procedures: this was one of the centres with the lowest processing differences per teller. On inquiry from the management, it appeared that this centre were using a very different way of managing teller differences in comparison to the majority of the other centres: the centre management used to force tellers to pay back to the company, any shortages in deposits found, when their cash was finally reconciled. Many of the other centres in the company did not have this practice. It also appeared that, due to the fact that tellers at the centre were used to managing their differences closely, the component of their performance attributable to differences, was not such a hard goal to achieve.

The next section describes the findings of the interviews which were conducted at the centre in October 2012 – eight months after the introduction of IV_2.

Feedback given by the tellers interviewed re-emphasised the trends previously seen in other centres where there were moderate perceived levels of task interdependency between tellers, and high perceived levels of task interdependence between tellers and their supervisors, for similar reasons as seen in other centres.

Both the tellers interviewed, perceived the introduction of their supervisors and their allocation into teams as having been beneficial to their performances. Teller #1 – who had improved from being a category C teller to being a category A teller within three months, placed a lot of emphasis on the improved working relationships between himself, his supervisor and the head of department for retail at the centre, as having had the major influence on his performance:

> *"[She] helps me push, [she] also motivates [me] to compete"* (Teller #1, Pietermaritzburg cash centre, 11 October, 2010)
>
> *"Help received/knowledge and feedback from HOD has helped me achieve higher volumes".* (Teller #1, Pietermaritzburg cash centre, 11 October, 2010)

On inquiry about the involvement of the head of department in this tellers' performance, it became clear that, in addition to the team supervisor, the head of department at this centre got involved in the “coaching”, encouragement and tracking of individual tellers. This finding also came out at the group interviews, which will be covered later.

Allocation to teams was emphasised by both the tellers interviewed as being a critical component of how they had managed to do well. Both tellers identified a sense of belonging and greater cooperation within their team structures, emphasising that direct access to their allocated supervisor was allowing them to control their pace of work.

> *“Teamwork has resulted in more assistance being given to each one of us”.* *(*Teller #2, Pietermaritzburg cash centre, 11 October, 2010)

This is how the tellers explained the improvements in the different performance variables of their personal rating scores:

Changes in volumes

> *“Because I can now request more work from my Supervisor’.* (Teller #1, Pietermaritzburg cash centre, 11 October, 2010)

Improvement in accuracy

> *“Because she can help me trace the source of errors existing”.* (Teller #1, Pietermaritzburg cash centre, 11 October, 2010)

Improvement in professionalism and attendance

> *“[it is] easier to get guidelines from one person”.* (Teller #1, Pietermaritzburg cash centre, 11 October, 2010)

> *“More detailed info available from dedicated Supervisor”.* (Teller #2, Pietermaritzburg cash centre, 11 October, 2010)

Effects of allocation to a team and a supervisor

> *“I can now assist a fellow team member through the Supervisor”.* (Teller #1, Pietermaritzburg cash centre, 11 October, 2010)

"I can learn from fellow members' mistakes". (Teller #1, Pietermaritzburg cash centre, 11 October, 2010)

"Teams are more competitive and this causes better performance". (Teller #2, Pietermaritzburg cash centre, 11 October, 2010)

1ST GROUP INTERVIEW AT PIETERMARITZBURG CENTRE

The background to the group interview is that the Pietermaritzburg centre had consistently outperformed all other centres on the proportion of category A tellers and supervisors (teams) in the company, in the period three months before the interview date. It was thus important to find out what was different at the centre, within the teams and between individuals.

The group interview was composed of seven tellers and three supervisors. The following critical points came out during the interview: 1) Teamwork was emphasised a great deal among the participants, and supervisors and tellers on a team were in regular communication. 2) Information sharing on performance and performance visibility was a key component for both tellers and supervisors at all times. 3) Supervisors no longer needed to set targets for categories A and A+ tellers – the setting of target was done by the tellers themselves. 4) Supervisors were closely managing and coaching categories B and C tellers as a means to get them to perform as category A tellers. In addition, the head of department was involved in the coaching of both tellers and supervisors, regarding improvements in communication among the team. 5) Tellers were encouraged to focus on the work that had been allocated to them, rather than to worry about what work was still to come their way for the rest of their shifts. This was done by packing as little work on the teller's' table as possible, at any point in time.

Other issues that came out from the group interview were as follows: The tellers emphasised the importance of supervisor knowledge and experience on how the deposit processing systems were supposed to be used and what information was available to them. Both the tellers and supervisors also highlighted what they termed "individual sacrifice" for the team. The tellers and supervisors were keen to emphasise that "sacrificing" for the sake of their teams helped everyone to complete their work early and go home to rest; they mentioned and that this eventually resulted in everyone within their teams and at the centre being more energetic and less tired. The group emphasised also highlighted that, within the team, proximity to each other was critical, in that it improved communication and assistance, and work practices were easily shared. The visibility of performance was also emphasised, with the group stating that this allowed them to monitor their progress and that this allowed them to stay motivated. The tellers also emphasised that the positivity of the supervisor was what kept them going, and that this was a critical element within the team. The tellers specifically placed emphasis in that the supervisor should motivate people individually and publicly within the group settings. The group said that they found this rewarding and motivating. The centre management had come up with a concept which they had called “Leader of the pack”, which was the recognition of any teller who was leading their team within the week, and the teller who was “leading” the whole centre in terms of performance for the week or the month.

5.6 RESULTS FOR RESEARCH QUESTION 3 (RQ3)

5.6.1 INTRODUCTION TO RESULTS FOR RQ3

The third research question (RQ3) was, *what themes emerge to explain persistent performance variance between work teams over time?* RQ3 was concerned with finding common and consistently emerging themes, which could explain persistent performance variances between teams. Although it was expected that the data relating to this question would be obtained largely from individuals (in the form of semi-structured interviews – refer to section 4.9.3 - and performance data), the emerging themes of interest were based at the team level. These emerging themes were expected to be underpinned by existing knowledge on team processes (see section 2.6.4) and also underpinned by the theory of social interdependence (see section 2.2). For this research question, it was also expected that additional emerging themes would potentially come from beyond these two anchor bodies of knowledge.

As part of the research design, the semi-structured interviews were developed in cognisance of the expected themes, as informed by the social interdependence theory (Deutsch, 1949; Johnson & Johnson, 1989; Van der Vegt et al., 2001) - see section 2.2 - and the team effectiveness model (Cohen & Bailey, 1997; Kozlowski & Ilgen, 2006; Marks et al., 2001) – see section 2.9. In designing the semi-structured interviews, recommendations from Van de Ven (2007) were used (refer to section

4.9.3); Van de Ven's recommendations deal with considerations to take into account in designing longitudinal studies. Figure 4 in section 2.9, represents the team effectiveness framework, as conceptualised by McGrath (1984) in the IPO model, and as developed by Cohen & Bailey (1997) and Marks et al., (2001) – refer to 2.9. The findings linked to RQ3 which were expected from the research are summarised using the team effectiveness framework, beginning with inputs, followed by team processes, and then by outputs.

It was expected that there would be a high level of positive task interdependence in team tasks (see sections 2.2.5 and 2.3.1), particularly between the tellers and their dedicated team supervisor; each team was expected to function slightly differently from the setting prior to IV_2 where tellers were not allocated to teams nor to supervisors. Among other things, the formalisation of teams was expected i) to provide the basis for a more formal working structure, ii) to result in some differences in team processes between different teams; iii) to lead to more defined boundaries for each team, in relation to other teams, and in relation to what each team perceived as its "external environment" (refer to 2.6.2).

The introduction of hybrid pay incentives (see section 2.5.3) for supervisors was expected to lead supervisors to maximise their support to individual tellers within their team 60% of the supervisor's final scores were derived directly from the overall monthly performance score of each of the tellers within his/her team. Hence, IV_2 was expected to result in immediate increases in average monthly volumes of deposits processed by both regular and contract tellers for all teams, as supervisors increase the focus on their dedicated tellers, and supervisors actively push tellers to process more deposits per unit time.

The success and sustainability of the changes to average volumes of deposits processed per unit time was expected to vary significantly between members of different teams, as a result of differing team processes among teams, as directed by the team supervisor. The speed, and extent to which each team developed into a formal, internally supportive and interdependent team over time was expected to account for team-level performance variances as time passed (refer to sections 2.6.4 to 2.6.7).

Both teller and supervisor professionalism (refer to section 4.3.10.3) were particularly expected to improve because of the immediate feedback which would accompany breaches. Professionalism was also expected to improve in all teams because of the interdependency of the overall weighted final score of the supervisor on each teller within their team; it was expected that each supervisor would pay increased attention to assist his/her tellers to achieve high final professionalism ratings. Similarly, attendance patterns for both supervisors and tellers were expected to improve post-IV_2 because non-attendance by any teller within the team indirectly affected the final monthly score of the supervisor and peer pressure by other tellers were expected to result in tellers feeling the pressure not to let their fellow team members down. Other unique team processes, such as intra-team coordination, target setting and feedback - which are largely driven by the effort of the supervisor (see Gladstein, 1984 and sections 2.6.2 and 2.6.3) - were expected to account for most of the explainable components of variance in average monthly performances between individuals from different teams over the time of the study.

As a result of the above, overall performance was expected to gradually, but significantly improve, when measured at both the individual and team-levels, for all teams 12 months post-IV_2; this improvement was expected to apply to both employment contract categories of tellers. Sustained differences in overall average performances for individuals with the same employment contract were expected in different teams - a result of differing processes among teams.

5.6.2 QUALITATIVE INFORMATION FOR RQ3

This section of the study is a report on the findings from interviews which were carried out about twelve months after the introduction of the second intervention. The focus of these interviews was on emerging themes which might explain performance variances among team members and amongst teams in each setting. While the whole questionnaire was used to structure questions, emphasis remained on getting deeper understanding of the impact of events, team context, and group norms on team processes for each team and its members, where possible.

By the time of these interviews, teams had settled into routines and norms. Purposive selection was employed to select candidates for interview at these centres. Table 34 shows the dates of the interview visits to the Johannesburg, Richards Bay and Durban cash centres. A summary of the reports from the Johannesburg and Richards Bay centres are presented here; the report for the Durban cash centre is excluded as it became a repeat of findings from other centres.

Table 34: Interviews carried out approx. 12 months post IV_2

	Approx. 12 months post IV_2		
Centre Name	11-Jan-11	22-Feb-11	23-Feb-11
Johannesburg	**X**		
Richards Bay		**X**	
Durban			**X**

Setting and context

The interviews at the Johannesburg centre were carried out in January 2011 – about twelve months after the introduction of IV_2. Table 35 shows the dates of the interview visit to the Johannesburg cash centre. Three tellers and three supervisors were available for interviews, representing a total of five different teams. The overall performance of individuals and teams at the centre was average, in comparison to other high-performing centres such as the Pietermaritzburg centre and others.

Table 35: Tellers and supervisors interviewed at the Johannesburg cash centre

Position	Employment type	Name of team	Year of birth	Reason for selection	Length of service at (years) at the company
Teller 1	Pemanent	Supervisor 4	1988	Poor (C/C/A)	3+
Teller 2	Pemanent	Supervisor 5	1985	Good A/A/A+	1-3
Teller 3	Pemanent	Supervisor 5	1980	Averar (B/B/A+)	3+
Supervisor 1	Pemanent	Supervisor 1	1967		3+
Supervisor 2	Pemanent	Supervsior 2	1967	A/A/B	3+
Supervisor 3	Pemanent	Supervisor 3	1988	C/C/C - specie	3+

Teller 1 was selected because her performance status had changed from being a C-category teller to being an A-category teller in the previous three months. Teller 2 was selected because she had consistently performed as either an A or A+ teller in the previous three months, while teller three was selected because she had progressed from being a B-category teller to being an A+ category teller in the same period. The first supervisor was selected randomly among the available supervisors. The second supervisor’s selection was because of the change from being an A-category supervisor to being a B-category supervisor in the preceding three months. The third supervisor was selected because he had been consistently rated a category-C supervisor in the three months prior to the interviews. The range of work experience, as tellers within the company, for the sample of tellers interviewed was from just over one year to more than three years, while all the supervisors had more than three years' work experience at the company. The purposive selection of tellers and supervisors was calculated to maximise the range of performance variances of the interviewees, observed in the periods, three months prior to the interviews. Interviews at the Richards Bay centre were carried out in February 2011 – more than twelve months after the introduction of IV_2 the overall performance of teams and individuals at the centre was poor, and the centre appeared to struggle to produce category-A tellers. Table 36 shows the dates of the interview visits to the Richards Bay cash centre. Although the general structure of the interviews carried out at the centre followed a similar pattern as in the previous centres, emphasis of the interviews at placed on getting a better understanding of events, centre context issues and team processes for teams within the centre. Three tellers and one supervisor were available for interviews, representing a total of five different teams.

Table 36: Tellers and supervisors interviewed at the Richards Bay cash centre

Position	Employment type	Name of team	Year of birth	Reason for selection	Length of service at (years) at the company
Teller 1	Pemanent	Supervisor 1	1976	Decline from A to B	3+
Teller 2	Pemanent	Supervisor 2	1986	Consistent C	1-3
Teller 3	Contract	Supervisor 3	1984	Contract teller	1-3
Supervisor 1	Pemanent	Supervisor 1	1983		1-3

The range of work experience as tellers within the company, for the sample of tellers and the supervisor interviewed was between one year and three years. Both the tellers and supervisor were selected purposively in order maximise the spectrum of people of experience and work contract types within the sample of interviewees. At the time of the interviews, the range of ages of the tellers was between twenty-seven and thirty-five years, and the supervisor was twenty-eight years old.

The general mood of both tellers and supervisors at the centre was heavy, and interviews were difficult to carry out as almost all the individuals interviewed saw the interview session as an outlet to air their frustrations around the work environment. The centre itself was a brand new centre, in comparison with other centre within the company at the time; it had been commissioned in the previous eighteen months prior to this study. It had new facilities and equipment, but the turnover of tellers and supervisors had been fairly high within the period of its establishment. Although other centres within the firm could, when required, extend their working hours into night shifts, most centres were able to get through their comparable volumes of work by early evening, and tellers were thus able to go home early. At the Richards Bay cash centre however, there was a fully-fledged night shift operation, because the centre somehow was not able to get through its allocated volumes of deposit processing work, with a comparable number of tellers.

The management team at the Johannesburg centre had decided to create what they called a “wall of fame”, where they hung pictures of the different categories of high performing tellers, and pictures of tellers who had shown noticeable improvements in their performances over the previous months. This “wall of fame” was located in such a way that all tellers could see it on the way to and from the working floor.

5.6.2.1 INTERDEPENDENCE AND PERFORMANCE

From the theory, a high level of positive task interdependence between tellers and their dedicated team supervisor was expected, with regular interactions. In addition, each team was expected to develop unique team processes over time, leading to more defined boundaries around each team - in relation to other teams, and in relation to team’s external environment as the team supervisor perceived this external environment Hybrid pay incentives for supervisors were expected to further entrench interdependence and to result in increased volumes of deposits processed by both regular and contract tellers for all teams.

FINDINGS RELATED TO INTERDEPENDENCE AND PERFORMANCE

In general, the tellers interviewed did not highlight any specific issues to explain performance variance, other than to observe that their own attendance behaviours had become more consistent in the time, which they associated with their performance improvements. Teller #1, at the Johannesburg cash centre, whose overall performance rating had moved from being a poor teller (category C-teller) to being a good teller (category A teller), credited peer pressure as a major motivation for her improvement. Teller #1 said that the way in which she had managed to get improvement her ratings was by improving her attendance record; teller #3 also highlighted the importance of a good attendance record, as contributing to her improving performance record.

> *"Everybody wants everyone to know that they are good!! Personal/individual "thank you's" and being congratulated on achieving [a high] teller rating by managers [are important]. We work hard to be on the Wall of Fame"* (Teller #1, Johannesburg cash centre, January, 2011)

From the interviews, it appeared that there was higher level of peer pressure created as a result of placing tellers and supervisor into defined team structures.

All the supervisors interviewed at the Johannesburg centre were of the opinion that the introduction of pay incentives had resulted in improved performance, on all the performance and behavioural variables being measured. Supervisor #1, who had been randomly selected, pointed out that although the nature of their tasks was repetitive and voluminous, with long working hours and generally stressful on all the people, pay incentives had made it more motivating to come to work regularly. She corroborated the importance of regular attendance on the performance ratings of both tellers and herself, highlighting that the attendance trends of tellers had improved in general, although attendance during public holidays (which required the tellers to still work), was still a problem.

> *"The bonus scheme has helped (the job is very stressful!!) to provide motivation to come to work. Because I can earn more if I work harder"* (Supervisor #1, Johannesburg cash centre, January, 2011).

> *"[It] depends on the days of the week and the time of the year (e.g. Christmas, etc). People will take "sick leave" even when there is work"* (Supervisor #1, Johannesburg cash centre, January, 2011).

There was also a perception of increased responsibility by the supervisor for their teams. Some of this responsibility was perceived by the supervisors as additional responsibility (i.e. the supervisor now had to take care of a group of tellers who were almost wholly-dependent on them for earning pay incentives). For instance, Supervisor #1, Johannesburg cash centre mentioned that the biggest frustration on her part, was that the management team had an expectation for her to take responsibility for her team, while not giving her the authority which ought to accompany the responsibility.

"People's attitude in general - tellers and managers [can make one negative]. There is a huge impact on staff and teamwork if supervisors are given responsibility but not the authority" (Supervisor #1, Johannesburg cash centre, January, 2011).

At the Johannesburg cash centre, the allocation of tellers to a supervisor was supported by all the people interviewed, the main justification for this being the perceived increased focus of the dedicated supervisor on the team. Tellers felt that they were trying harder, with the encouragement of the supervisors, and supervisors felt that the team structure suited them better in that they could focus on the individual.

*"I put more effort because the supervisor is encouraging me to do that" (*Teller #2, Johannesburg cash centre, January, 2011).

*"Dedicated supervisors reduce the amount of waiting time to deal with each incident" (*Teller #1 Johannesburg cash centre, January, 2011).

"You can focus on the individual" (Supervisor #1 Johannesburg cash centre, January, 2011).

A negative of the team structure, as observed by the some of the tellers, was perceived favouritism by some supervisors in the allocation of deposits to tellers, where difficult deposits were given to particular tellers only, while deposits which were easier to process were allocated to specific tellers only.

"Allocation of work equitably [is a negative of being allocated to a specific supervisor]" (Teller #2 Johannesburg cash centre, January, 2011).

Teller #2 specifically mentioned the importance of proper work coordination on the floor, between the runners, the tellers and the supervisor as very important for overall team performance.

Team work on the floor, between runners, supervisors and tellers.(Teller #2 Johannesburg cash centre, January, 2011).

The allocation of tellers and supervisors into teams was generally not considered by the tellers nor the supervisors to have contributed to any changes in performance of the individuals, although intra-team helping behaviours were perceived as more evident. One supervisor however perceived age as an important factor in how teams performed, alluding to the criticality of the maturity of the supervisor in team performance. On the aspect of belonging to a team, supervisor #1 made the following comment

> *"[There are] mixed effects: [The] age of supervisor can be important depending on how the team members relate to the supervisor. I do prefer to work "one-on-one" with individual tellers. Because treating people as a group does not always work e.g. management has meetings [and they sometimes] give direct instructions to all team members and do not follow the chain of command*" (Supervisor #1 Johannesburg cash centre, January, 2011).

At the Richard Bay centre, the team context issues found, reinforced earlier findings that there was poor planning, supervision and communication within the retail processing floor at this centre, which resulted in poor overall individual and team performances:

> *"The shift patterns and the allocation of work to people in a shift, whereby the management insists on ALL work to be finalized before I go home affects my attendance for the following day"* (Teller #1, Richards Bay cash centre, February, 2011)

> *"It (pay incentives) could [be beneficial] if everyone - including the supervisor - understood how it (the scheme) works and explained [to tellers]"* (Supervisor #1, Richards Bay cash centre, February, 2011).

Although the allocation of people into teams was still preferred by the tellers due an improvement on individualised attention to the teller's needs, in some cases it only served to worsen an already poorly administered work environment:

> *"[There is] more focus by supervisors"* (Teller #2, Richards Bay cash centre, February, 2011)

> *"More competition within a team is very healthy and good. So it is beneficial. It is also better to mix"* (Teller #2, Richards Bay cash centre, February, 2011)

> *"[It is] better to be allocated but then other supervisors do not want to assist*" (Teller #2, Richards Bay cash centre, February, 2011)

Allocation into a team also had its negatives, in that cross-team assistance by supervisors virtually disappeared, and some tellers felt that they were then negatively affected by this, as a result of their supervisor's poor management abilities:

> *"Some Supervisors work harder than others, depending on the HOD (head of department) on duty. Some supervisors are active and other supervisors are lazy. Some supervisors are choosy, and they practice favouritism. If you complain they tell you that you are talking too much and will punish you with more work load"* (Teller #1, Richards Bay cash centre, February, 2011)

SUMMARY OF INTERDEPENDENCE FINDINGS

Positive task interdependence was fostered by the introduction of formal teams; in addition, the introduction of hybrid pay incentives for team supervisors appeared to have further entrenched the level of interdependence between team members, possibly extending beyond the performance of tasks.

5.6.2.2 TEAM-PROCESSES & PERFORMANCE

The realisation and sustainability of improvements to average volumes of deposits processed per unit time was expected to vary between members of different teams, as a result of differing team processes as time passed (see also 5.5.1). Professionalism was expected to improve due to immediate feedback, and as a result of the interdependency of supervisor rewards with teller performances. Attendance patterns were also expected to improve due to intra-team peer pressure. Unique team processes, were expected to account variance in inter-team performance over the time of the study.

FINDINGS ON TEAM PROCESSES AND PERFORMANCE

There were substantial differences in the team practices on goal-setting, progress monitoring and feedback encountered during the course of the study, seemingly dependent on the level of rapport and mutual respect between tellers and team supervisors. Also, it appeared that the need for the setting of goals between tellers and supervisors may have transitioned, from a daily practice to more self-regulation, during the process of embedding team structures. Earlier interviews of tellers and supervisors had indicated that this interaction between tellers and supervisors may have been common; in later interviews however, it appeared that it may have been dropped. Some of the reasons for dropping the target-setting interactions included intra-team tensions between the supervisor and some tellers, and that in some teams, the tellers themselves had a firm understanding of the targets they needed to achieve for them to earn a pay incentives. In the later stages of the research, it appeared that the more successful team supervisors placed more emphasis in coaching on operational practices for their team members.

Comment from the Johannesburg centre interviews were that the setting of targets between the tellers and supervisors was not practised routinely. One teller (teller #1) commented that she actually would not want her management to give her a target, because she was concerned that she would make more errors as a result of the pressure. Tellers appeared to prefer to set their own targets.

> *"We are happy for the management not to give us goals. We make fewer errors. But, we like feedback on what we have achieved*" (Teller #1, Johannesburg cash centre, January, 2011).

The emphasis for some of the supervisors was rather on coaching tellers on ways to process deposits, in order to maximise the number of deposits processed by the teller.

> *"[I give] coaching on how to process deposits to maximize effect of counting and deposit volumes"* (Supervisor #1, Johannesburg cash centre, January, 2011).

When it came to giving performance feedback however, the tellers were keen to get regular feedback from their supervisors; both supervisors and tellers rated feedback as an important component of their performance levers. However, some supervisors had a preference to rather deal with feedback within a team framework as opposed to giving individual performance feedback:

> *"I prefer to deal with issues within a team framework instead of an individual approach"* (Supervisor #1, Johannesburg cash centre, January, 2011).

Perceived and tangible progress was deemed very important by both the supervisors and the tellers. It was clear though that some individuals were happy to monitor their own progress while others preferred to get feedback from the supervisors, and even to get public recognition and praise from within the broader cash centre. For instance, in respect of receiving performance feedback and progress monitoring, teller # 1 made the following comments:

"We do [get feedback] but we can see it ourselves on ABC (activity based costing*) and Report Writer* (a report which the teller can draw from the system)*. We see whose ABC [ratings] is the largest, that's how you win the competition"*

"I set my own targets; I target 1000 drops (deposits) to beat each other tellers. That's how we keep it interesting for ourselves. Counting cash daily can be boring"

In respect of feedback and progress monitoring, teller # 2 made the following comments:

"We used to get daily feedback from the previous supervisor"

"[We] need to hear compliments as well as part of the motivation process"

On the importance of monitoring progress, supervisor # 3 made the following comment:

"Personal satisfaction comes from achieving and progressing as an individual and to see progress as a company".

At the Richards Bay cash centre, although ad-hoc performance feedback appeared to happen in some teams, there was no target setting in any of the teams represented in the sample within the centre. Tellers expressed their frustration at the fact that they were not able to understand whether or not they were making progress in performance within the month of their assessments for pay incentives:

"Sometimes I get feedback. But this generally happens when we have counted a lot of money. It is not regular" (Teller #2, Richards Bay cash centre, February, 2011)

"[I have] never ever been given feedback. We lose interest because we don't see any stats of ours" (Teller #3, Richards Bay cash centre, February, 2011)

"It is demoralizing to only know at month end that I have done poorly/or that somebody else has done better than me. We are not allowed to view video

footage of our differences" (Teller #1, Richards Bay cash centre, February, 2011)

"It is important to get feedback. I think that if I got this I would do better – it would motivate me" (Teller #2, Richards Bay cash centre, February, 2011)

"I am not inspired because I don't know how am performing" (Teller #3, Richards Bay cash centre, February, 2011)

This phase of interviews revealed that pay incentives had resulted in individual tellers changing the work patterns in order to process more volumes deposits within their allocated time windows. This resulted from two things: working either individually or in conjunction with their supervisors, tellers set themselves higher targets. In addition, supervisors begun to expect more work output from the tellers within their teams. Pay incentives also resulted in tellers improving their attendance at work.

The allocation of dedicated supervisors for teams had resulted in improved focus for supervisors on team members; both tellers and supervisors felt this effect. The improved focus enabled tellers and teams to achieve higher performances.

The allocation of individuals into teams appeared to have somewhat improved the helping behaviours among some teams, although the effect of this was dependent on the level of belonging which team members felt within their teams.

Goals setting was not consistently practiced within the teams interviewed, and some individuals felt that they could set their own goals, without the intervention of their supervisors. Feedback and the monitoring of progress were rated as very important by the majority of tells interviewed. Most tellers felt that feedback was critical in them knowing what was expected of them, but also for them to know how they were progressing toward achieving their pay inceptive target at the end of the month. The feedback required by tellers included privately given feedback in the form of "thank you's " by management and team supervisors, to more public displays of performance improvement, where peers could see how well the individual and team were doing. Feedback and progress monitoring was found as a fairly regular practice amongst teams with high performance in the periods following the introduction of the interventions.

The major team context issues which appeared to affect performance of both individuals and team performances in these phases following the interventions included the equitable distribution of work among tellers within the team, and the provision of equipment which was in good working order.

SUMMARY OF FINDINGS ON TEAM PROCESSES AND PERFORMANCE

There were significant differences in how teams managed the team functional unit. In some teams, the supervisors played a more active support and management role; on the other end of the continuum were supervisors who were very passive in how they supported tellers within their teams. A high level of interdependence led team members to modify some of their attendance practices in particular. Professionalism practices appeared to be the behavioural aspect which the supervisor could influence, as the rating for this was given by the supervisor for their tellers. Intra-team target-setting varied widely, and in time, a number of teams were using teller-self regulation to manage performance.

FOLLOW-UP INTERVIEWS (CONDUCTED AFTER THE FINAL ANALYSES OF QUANTITATIVE DATA)

The purpose of follow-up interviews and surveys was to obtain in-depth understanding of some of the unique processes which some of the teams practiced. The emphasis of the interviews was to get better understanding of more enduring processes, with the intention to link these to team performance trends over time. The initial phase of interviews and surveys had highlighted the fair distribution of workloads, feedback and progress monitoring and coaching as the main team processes which could be associated with good teams and which poorly performing teams appeared to lack.

Supervisors and teams which had performed consistently well over time were identified and selected for group interviews. Overall performance variance for each supervisor over 12 and 22 months following the introduction on IV_2 was compared using median monthly scores of overall performance and the standard deviations (SD) of the median scores. Selection of supervisor teams to be interviewed was based on the scores over the 22 month period. Table 37 outlines the criteria which was used for categorisation and selection of supervisor teams for interview.

Table 37: Measures and classification of supervisor teams over 22 months post IV_2

	1. Consistent LOW performance	2. Varying LOW performance	3. Consistent HIGH performance	4. Varying HIGH perfomance	5. Most Change	6. Least change
Medians	Low	Low	High	High	High/Low	High/Low
Standard deviation	Low	High	Low	High	High	Low

Table 37 shows how supervisor's performances were split into six categories of 1) consistent low performance (operationalised as supervisors with low overall monthly performance median scores and a low SD); 2) varying low performance (operationalised as supervisors with low overall monthly performance medians scores and high a SD); 3) consistent high performance (operationalised as supervisors with high overall monthly performance median scores with a low SD); varying high performance (operationalised as supervisors with high overall monthly performance median scores with high a SD); most change (operationalised as supervisors with high or low overall monthly performance median scores with high SD); least change (operationalised as supervisors with high or low overall monthly performance median scores with a low SD).

Median scores of less than 2 were treated as low, while median scores greater than 3 were treated as high. Standard deviations less than 0.5 (< 0.5) were treated as low SD's, while SD's greater than 1.5 (> 1.5) were treated as high SD's.

Supervisors with consistent low performance were available for selection, as all of them had either been demoted or dismissed. None of the teams could be classified under the varying high performance category either. Table 38 shows the centres from which the two teams which were available for group interviews came from.

Table 38: Team available for group interviews

	Consistent LOW performance	Varying LOW performance	Consistent HIGH performance	Varying HIGH perfomance	Most Change	Least change
Medians	Low	Low	High	High	High/Low	High/Low
Standard deviation	Low	High	Low	High	High	Low
George centre			Available			
Pietermaritzburg centre						Available

5.6.2.3 GROUP INTERVIEW AT THE GEORGE CENTRE

The interview at the George cash centre was conducted with a team whose supervisor ratings had the highest average monthly medians with the lowest SD in the median ratings over a 22 month period. This team was thus classified as a consistent high performance team. The purpose of the group interview for this team was to ascertain which team processes the team employed in order maintain consistency in performance over the 22 month period.

The interview was carried out in one of the offices at the cash centre during normal working hours; the interview lasted just over an hour. There were seven tellers, one supervisor and one runner who presented themselves for the interview. Of the seven tellers, one of them did not belong in the team, but was interested in participating in the discussions. One of the tellers was a new member in the team, and was on a fixed term renewable contract. The team included the runner themselves, because they felt that he was a critical member supporting their consistent performance. The group was alerted to the purpose of the interview, and that they were there to merely share their experiences, good and bad, on how their team functioned. The interview questions were structured around the processes theme, but there were no pre-prepared questions posed, and the interview was carried out as a chat, but with more probing into issues which were brought up by the members. Brief notes were made, and quotes were taken where it was deemed necessary.

The team supervisor displayed a lively personality, engaging quite readily will all during the interview. The tellers who belonged in her team were fairly reserved at the beginning of the interview session, and the supervisor was doing most of the talking at this point; however, as the interview progressed, there was far more participation by most of the members, to the extent that, at some point, a lot of people were talking animatedly at the same time, which made the interview room quite a lively place.

Tellers in this team were quite aware of the volumes of deposits which they need to process on a daily basis in order to earn the pay incentive at the end of the month. The team also mentioned that they could view their volume statistics on their computers throughout the day, as a way of keeping track of where they were. Tellers in this centre did not require the supervisors to instruct the runners to send work to tellers; the tellers themselves called on a runner to bring the deposits to them. The supervisors' interventions in work distribution were to ensure that difficult deposits were rotated among tellers each day. As far as possible, this team held weekly team meetings, to which they could also invite their head of department or centre manager to attend, depending on what the team needed assistance on.

During the interview, there was a high level of energy in talking about how the team dealt with different operational challenges, intra-team motivation and conflict; team member participation levels were high, and the team got quite animated. However, when it came to how the team dealt with their immediate external environment (such as how the dealt with resource constraints, in the form of, for example, functional counting equipment, printers etc.) the mood in the team changed quite noticeably. It appeared that there was a long-standing level of frustration with a perceived lack of support from the head of department, for all teams in general. A comment made by a teller during this section of the interview:

“We don’t know what he does; we never see him”.

The supervisor mentioned that they see more of the centre manager and they get more assistance from the centre manager that they (as supervisors) get from their head of department.

This team felt that there were two things that were important in their team to sustain performance over time: 1) intra-team coordination, underpinned by communication 2) support from the centre management.

5.6.2.4 GROUP INTERVIEW AT THE PIETERMARITZBURG CENTRE

The purpose of the team interview at this centre was to understand the processes the team used to sustain consistency in overall performance over time. The team interviewed had good overall performance rating medians, with a low SD over the 22 month period post IV_2; it was thus classified as one of the teams with the least change, while performing consistently well over time.

This interview which was carried out during the normal working hours of the team at the Pietermaritzburg centre boardroom, and it lasted just under two hours. There were five tellers - one of which was a new member in the team, on a fixed term renewable contract - and one supervisor. One teller had recently converted from being a contract teller to become a permanent teller. The head of department and the centre manager were also present during interview session. The purpose of the interview was outlined to the whole group, and all were urged to share their experiences - good and bad - on how their team functioned. Although no formal interview guide was used, the questions asked were structured around sustainability of performance over time, and the motivations to continuously perform, with in-depth probing into issues which were brought up by the members. Short notes were made, throughout the session.

Although the supervisor could be brought into the discussion readily, participation had to be drawn out from the tellers. This was likely due to presence of the management team in the room, but it could also be due to the personalities of the tellers. Two of the tellers were easier than the rest to bring into the conversation, possibly due to their experience and tenure within the team. It also appeared that there was an inner-group and an outer-group within the team itself.

Fairness in work distribution, open communication between the supervisor and the tellers, intra-team member support and motivation for team members were outlined by the team as key to their sustained performances as a team. Similar to the findings of the team at the George centre, the team interviewed in Pietermaritzburg highlighted that the perceived fairness in work distribution forms a critical foundation of intra-team trust, and fosters communication and support within the team. The team outlined that, because of the repetitive nature and long hours of the work they do, going home at normal hours of work (i.e. getting the right work-life balance by going home and actually having a family life) and equipment which is in good working order allows the tellers to be ready for full attendance at work, which is critical to the balance of the team. It was clear that where any of these components were not perfectly balanced, stress resulted, and absenteeism and poor work performance resulted.

The question was asked to find out whether the motivation of tellers change after being converted to regular tellers: the contract tellers noted that the primary motivation for them is to be made regular tellers, and the reason for this was simply that they link this to more permanence. They stated that the benefits which go with permanence are also a consideration, however, it was much more than the benefits – it was the permanence that they are after.

It emerged from the interview that the allocation of work was not perceived to be done fairly by the teller supervisor. It appeared to some of the tellers - in particular, to those tellers who were very good at processing high volumes of deposits - supervisors tended to allocate even more work to them, resulting in fatigue and negativity by the teller. From the interviews, it became clear that all teams had “anchor” tellers – these were the “go-to” tellers for the supervisor, when the work pressure piled up on the team. In the case of the Pietermaritzburg, the supervisor who was interviewed agreed that they, as supervisors, did deliberately allocate easier deposits to new tellers (in this case, this happened to be the contract tellers). The reason for this was that it was the only way in which the supervisor could bring newer tellers up to speed with other tellers, without causing too many errors. An abnormal increase in the number of errors by newer tellers would take the supervisors attention from other coordination tasks within the team.

After being probed what issues drove her to perform consistently, the supervisor mentioned that the level of her pay incentive made a huge a difference on her performance, she mentioned that she consciously pushed her tellers for more volumes of deposits processed, following the introduction of the supervisor pay incentive; some of the tellers also acknowledged that they did see the supervisor pushing harder after this period.

SUMMARY OF FINDINGS IN HIGH PERFORMANCE AND CONSISTENT TEAMS

Teams which performed consistently well over time emphasised communication as key. For tellers, communication encompassed the complete accessibility of the supervisor to tellers on issues related to work, and sometimes about personal issues. The approachability and general demeanour of the supervisor was important in the communication process, conceding that a general understanding of each other's temperaments within the team was critical over time. For the supervisor, communication encompassed mature two-way communication between themselves as supervisors and the tellers, which included tellers coming up with suggestions for improvements.

Perceived equitable work-load distribution among tellers was very important to all tellers interviewed; it was clear that supervisors needed to actively and continuously engage all tellers, but especially the tellers who carried the highest loads within the team, to clarify reasons when equitable work load distribution was not possible.

Tellers in high performing work teams set themselves targets; they were clear on what needed to be accomplished. Although these tellers knew exactly what daily volumes of deposits they need to process in order to earn pay incentives, they nevertheless required weekly feedback progress reviews with their supervisors, in order to get reassurance that they were indeed on target.

Intra-team support: tellers in these two teams provide support to other tellers in the form of tips on processing deposit types, and sometimes they also intervene when they see other tellers not coping with their work loads. For supervisors, intra-team support meant two things: 1) attendance at work by all tellers scheduled to be at work, in order to ensure that the work load was equitably distributed, and to avoid over-loading other tellers; 2) where the team had tellers who were new or slower, or who made a lot or errors on difficult deposits, the supervisor needed a level of understanding and maturity from the rest of the tellers, since they were then forced to re-distribute the work to more able tellers. This seems to be the issue which was causing perceived unfairness on work distribution.

Tellers also highlighted something which had been brought up before, but without the same level of emphasis: the supervisor had to be completely competent in all aspects of processing (i.e. he/she had to really understand the types of deposits coming into the centre; the person had to know how to coach new people in processing particular deposits; the person had to always have a plan for each day, and for each part of the day, since the work pressure differed remarkably throughout the day, and the week.)

A critical process which consistently high-performing teams appeared to practice with vigour was technical coaching of tellers by the supervisor. To the extent that the supervisor was completely competent and open to two-way communication, over time, the coaching and support for newer team members assisted the whole team in the perceived distribution of work. In other words, where there was lack of communication within the team, in the long-term, it was never clear to team members why weaker tellers did not "pull their weight" as-it-were; this led to perceptions of unfairness, and led to overall team fatigue. In time, unless there was an intervention from outside the team to deal with the above (for example, from the manager or head of department), team performance appeared to gradually suffer. In time, team performance either waned or remained static or gradually improved depending on whether or not an intervention had been made.

5.7 SUMMARY OF RESEARCH QUESTIONS AND HYPOTHESES

RQ1: *Over time, what are the effects of introducing pay incentives on individual performance?* RQ1 was investigated through $\boldsymbol{H}_1$ which was, the *average processing time per deposit will decrease three and six months post IV_1, when compared to pre-IV_1. The expected decrease will be greater for regular tellers, in comparison to contract tellers.* $\boldsymbol{H}_1$ was partially supported (see section 5.4.2) in that deposit processing time did reduce for all tellers. However, the hypothesised greater improvement in deposit processing time for regular tellers was not as expected; in addition the improvement in deposit processing time for contract tellers was much greater than expected. There was an interaction effect found between the changes in deposit processing time and the employment status of the teller.

RQ2: *What are the effects of introducing hybrid pay incentives for supervisors, on team member performance over time?* RQ2 was investigated through various component of hypothesis 2. $\boldsymbol{H_2}$a was, *the average performances of team members in the study, measured in terms of average number of deposits processed per unit time, will show an improvement, from six months before the introduction of IV_2 to 12 months post-IV_2.* $\boldsymbol{H_2}$a was supported. $\boldsymbol{H_2}$b was, *the average performances of team members in the study, measured in terms of volumes processed, will show an improvement, from six months before the introduction of IV_2 to 12 months post-IV_2.* $\boldsymbol{H_2}$b was supported. $\boldsymbol{H_2}$c was, *the average performances of team members in the study, measured in terms of volumes rating, will show an improvement, from six months before the introduction of IV_2 to 12 months post-IV_2***.** $\boldsymbol{H_2}$c was supported. H_2d was, *the average performances of team members in the study, measured in terms of accuracy rating, will show an improvement, from six months before the introduction of IV_2 to 12 months post-IV_2.* $\boldsymbol{H_2}$d was supported.

In addition to the investigation of the effects of IV_2 on performance, configural (Table 25) and strong factorial invariance were investigated and established. Goodness-of-fit statistics were particularly good for the ratings of deposit volumes on the strong factorial invariance model (see Table 26).

RQ3: What themes emerge to explain persistent performance variance between work teams over time? RQ3 was explored qualitatively, using individual and group interview data from purposively sampled tellers, supervisor and teams. Interviews were performed by one researcher at different operational centres, over an 18 month period. Data from the various interviews suggested intra-team communication, equitable work-load distribution, self-regulated target setting, regular feedback, intra-team support, demonstrable supervisor competence on technical aspects of work, and technical coaching of tellers by the supervisor were important to sustained performance. The findings also showed that supervisor support and coaching – from management – was also key to developing competent supervisors and continued interest by the supervisor, as the supervisor provided the anchor and drive to sustain team performance over time.

CHAPTER 6: DISCUSSION

6.1 INTRODUCTION

The purpose of this chapter is to discuss the findings from the results section, taking into account what is in the literature. The aim of the chapter is to answer the research questions as set out in section 1.6. The discussion will simultaneously deal with both the qualitative and quantitative components of the study.

As mentioned in chapter 1 (see section 1.5), this research had two key objectives: The first objective of the research was to use existing theories on interrelationships between task-interdependent work teams, pay incentives and performance as a foundation, to test the effects of pay incentives on individual performance within work teams. The second objective of the study was to use existing theories on the effects of pay incentives and work team processes on team performance as a foundation, to explain the sources of differential performances between similar work teams; in addition, the second objective of the study was to track emerging explanations for the observed performance patterns between teams.

The relevance of the research emanated from theoretical and empirical evidence of work-teams to organise some tasks (Wageman, 1995; Wageman & Baker, 1997; Weisberg, 1996) as indicated by the level of interdependency of the tasks required to produce desired outcomes, and followed by the alignment of compensation structures to achieve desired outcomes (Wageman, 1995). From an academic standpoint, some of the questions which the study aimed to answer included questions such as: i) Can we replicate (and thus corroborate) improved performances for individuals nested within teams with moderately interdependent tasks, within a live-working environment, given appropriate pay incentive structures, as suggested in the extant literature?; ii) what are some of the key variables involved in explaining performance variance over time between teams (which are based within a live-working environment in South Africa), and how do these variables compare to the existing literature? iii) how are the key variables working together to produce the results found within the current research context (i.e. what are the types of interrelationships involved between the variables) to explain variance in team performance? From a practitioner standpoint, some of the questions which the study aimed to answer and contribute to the work team discourse included the following; i) What combination of team-type and reward structure is suitable to achieve maximum but sustainable performance improvement for teams with moderately interdependent tasks? ii) Over what period does the performance improvement get sustained – that is, for how long does this level of improvement last, and why? iii) In environments where different work teams are given comparable resources, what are the major causes of sustained differences in performance between teams and how can these be managed? iv) With many forms of work-teams having moderately interdependent tasks, and given that the literature suggests that teams with moderately interdependent tasks are less-than-ideal for achieving maximum performance improvements (Wageman, 1995), to what extent can work-teams optimise the benefits of appropriately designed team and reward structures? The importance of the research was also underpinned by the need for the efficient use of resources as a critical strategy which both firms and countries need to focus-on and leverage, if they are to be competitive (Barney, 1991; Prahalad, 1983; Vietor, 2007). Improvements in labour productivity have also been identified as a key requirement in manufacturing organisations (World Bank, 2007), more-so within the context of developing country economies, such as those found in Africa. In South Africa in particular, relatively strict controls on employment labour contracts (Vietor, 2007), make labour an expensive resource within the mix of resources which firms have at their disposal.

In designing work-team structures, this research sought to explicitly account for the incorporation of the environment of the team - the fact that teams within organisations are nested within different contexts, such as departments, departments within organisational and geographic locations (Ilgen, et al., (2005); Mathieu et al.,(2008) - and the dynamism of the effects of team composition on performance, as recommended by Ancona and Caldwell, (1992); Gladstein, (1984); Ilgen, (1999); and Kouchaki et al., (2012). This research also sought to deliberately incorporate temporal effects on team performance, as recommended by various researchers, including Harrison et al., (2003), Marks et al., (2001) and Mohammed & Nadkarni (2011).

6.2 RESEARCH QUESTION 1

RQ1 was *over time, what are the effects of introducing pay incentives on individual performance?* RQ1 was tested using $\boldsymbol{H_1}$, which was stated as: The average processing time per deposit will decrease three and six months post-IV_1, when compared to pre-IV_1. The expected decrease will be greater for regular tellers, in comparison to contract tellers. ***H***$_1$ was partially supported in that, as expected, there was indeed a decrease in the average processing time per deposit per teller three and six months following the introduction of pay incentives for permanent tellers. The expectation was for pay incentives to result in greater improvement in the speed of deposit processing for the permanent teller group as result of pay incentives (see also Jenkins et al., 2008) in comparison to the contract teller group; this was not supported. It must be noted however that the baseline times (as measured at the beginning of the study) for average deposit processing times for the two groups of tellers were different – the average deposit processing time for contract tellers was about 260 seconds per deposit, while that of the permanent group of tellers was about 185 seconds per deposit (see Figure 13). The results also showed that there was an interaction effect, between the employment status of the teller and their improvement in the speed of deposits processing, resulting in contract tellers showing a greater degree of improvement in deposit processing speed, six months after the introduction of pay incentives to permanent tellers.

In the literature, research on fixed-term contract workers, contingent workers and other types of non-permanent work contracts, is marred by poor definitions in the research literature. As a result inconsistent findings are not uncommon in the literature (Connelly & Gallagher, 2004).

On further probing, information extracted from individual and group interviews suggested that there were reasons other than the immediate pay incentives which resulted in contract tellers - in particular – to improve their speed of deposit processing. Some of the reasons cited by contract tellers included a motivation to gain permanent employment in the company, as the conversion from contract teller to permanent teller status, was premised on high performance during their contract teller phase. The need to demonstrate their ability to compete on an equal footing with their permanent teller counterparts, appeared to drive contract tellers to work even harder than the permanent tellers who were receiving the pay incentive for their “extra effort”. These findings are similar to those of Barnett and Miner (1992) who also found that temporary workers were perceived to impact the promotional chances of permanent workers for entry-level workers.

Research suggests that individuals employed on contingent or fixed-term contracts are more likely than permanent employees to have transactional rather than relational psychological contracts (Connelly & Gallagher, 2004; Rousseau & Wade-Benzoni, 1995). However, McDonald & Makin, (2000) did not find these differences between contract and permanent employees, when they studied individuals within the same organisation. Similar to our findings in this study, where contract tellers were largely motivated by a need for permanent employment, McDonald and Makin suggest that the lack of differences in the psychological contracts of the permanent and contingent workers was likely as a result of the contingent workers viewing their short-term work as an avenue for more permanent work within the organisations in which they worked.

The literature however makes distinctions on the types of relationships which contract employees are looking for within a company (i.e. not all contract workers are looking for permanent employment); this also has an impact on contract worker performance. Wilkin (2013) reaffirms (using moderator analyses) past findings in the literature which suggest that contingent workers are not a homogeneous group. Wilkin shows that agency workers for instance, have lower levels job satisfaction than their permanent employee counterparts, while contractors show similar levels of job satisfaction as their permanent employee counterparts. In investigating the impact of employee status on employee-organisation relationship, Chambel and Castanheira (2007) found that temporary only workers who preferred permanent employment relationships with the company had high socio-emotional relationships with the company – high socio-emotional relationships were linked to high satisfaction with the organisation and the employee performances.

From the interviews, it also appeared that various forms of peer pressure and inter-teller competition was driving all the tellers to work harder. As far as permanent workers were concerned, there is some evidence in the literature (Pearce, 1993; Geary, 1992) that management tends to place more burden on permanent employees to pick up a heavier load of work, when mixing contract and contingent workers. Pearce, (1993) shows that supervisors tend to limit the exposure of contingent workers to more complex interdependent tasks by shifting these tasks to the permanent workers (Ang & Slaughter, 2001; Connelly & Gallagher, 2004; Pearce, 1993; Uzzi & Barsness, 1998). Some of this behaviour was encountered during the course of interviews in the current study, especially after the allocation of teams had taken place.

Despite the mixed support for H_1, various drivers of individual motivation were found to underlie the indirect positive effects of pay incentives on the speed of processing teller deposits, by both groups of tellers. Components of intrinsic, extrinsic and interactive motivation factors (see section 2.5) resulted in the indirect but positive effects of pay incentives on the speed of deposit processing and individual performance. Contract tellers were apparently motivated by hygiene factors - such as the prospect of permanent employment - for their performance improvements. In addition, peer pressure from being compared to other tellers, and a need to show that they were also competent, also motivated contract tellers to improve their speeds of deposit processing, despite the fact that they did not receive additional financial benefit (in the form of pay incentives) for this. For this group of tellers, intrinsic (need for permanent employment), extrinsic (peer recognition by senior management) and interactive factors (peer pressure stemming from a need to be competitive) appeared to result in improvements in the speed to deposit processing, without earning pay incentives. The motivation for permanent tellers to improve their speed of deposit processing appeared to be largely associated with a need to earn pay incentives. However, it is also possible that peer pressure may have played some part in influencing this group of employees to "keep up" with the performances of other people within their processing floor, as results of some of their performances were sometimes publicly shown.

6.3 RESEARCH QUESTION 2

The second research question (RQ2) was, *what are the effects of introducing hybrid pay incentives for supervisors, on team member performance over time?* RQ2 was concerned with the long-term effects of hybrid pay incentives for team supervisors, on individual teller performance, for the tellers within the supervisor's span of control. RQ2 was answered through the formulation of $\boldsymbol{H_2}$ and its sub-hypotheses. In $\boldsymbol{H_2}$, there were a number of hypothesised changes in performance variables, as a result of combined effects of the introduction hybrid pay incentives for team supervisors, and the creation of teams of tellers with a supervisor. The combined effects of the introduction hybrid pay incentives for team supervisors, and the creation of teams of tellers with a supervisor, were hypothesised to result in improvements in performance variables for most teams over time. The expectation of improvements in performance variables over time, was as a result of the conscious alignment of team goals to achieve cooperation, through the structuring of resources, support structures and rewards (see also sections 2.5 and 5.5.1). This design was made in line with the existing theory on goal alignment Deutsch (1949), Johnson & Johnson, (1989), and the effectiveness of pay incentives (Barnes et al., 2011; Beersma et al., 2003; Shaw et al., 2002), including consideration of the recommended use of hybrid pay incentives within the team structure to benefit team effectiveness (De Matteo et al., 1998; Heneman & von Hippel, 1998; Kozlowski & Ilgen, 2006) - refer also to section 2.5.3.

As a result of the research on team processes models (Cohen & Bailey, 1997; Marks et al., 2001) and the numerous empirical studies and meta-studies using team process models (Bettenhausen, 1991; Stewart, 2006), this research expected to find explanatory power from variances in team processes for sustained performance differences between teams over time. Thus, the focus of the research question was weighted on team processes. The quantitatively testable components of RQ2 were the focus of the various sub-components of hypothesis 2; the quantitatively untestable components of the RQ2 were the focus of the qualitative component of the study; this which was further extended into RQ3. Again, this section of the report should be read in conjunction with introductory part of section 5.5.2., where more detail on the approaches to RQ2 is provided.

The resulting changes included an expected increase in the average number of deposits processed per unit time by each teller ($\boldsymbol{H}_2$a); the average deposit volumes processed by each teller per unit time were expected to increase over time ($\boldsymbol{H}_2$b); the average deposit-volumes rating scores given to each teller, were expected to increase ($\boldsymbol{H}_2$c); and the rating scores for the accuracy measure were expected to increase ($\boldsymbol{H}_2$d). All of the $\boldsymbol{H}_2$ sub-hypotheses were supported, indicating an improvement in the overall average performance scores for all tellers, following the introduction of teams and the incentivisation of team supervisors, through hybrid pay incentives.

Referring to recommendations on longitudinal research design from Ployhart & Vandenberg (2010), Singer & Willet, (2003), Van de Ven (2007), it was a critical component of the research design to establish and demonstrate measurement and construct invariance. This step in the study eased the way for the researcher to proceed with the qualitative investigation of processes which could help to explain variance in individual and team performance over time, and the investigation of emerging themes; this has been covered in great detail in section 4.8.2.3).

Interviews yielded various effects of the introduction of pay incentives and team structures. Although teams were not always stable (as a result of normal turn-over and new members joining the teams), team performance improvement, and performance sustainability could be shown within some teams. The level of intra-team interdependence had improved substantially, largely as a result of the introduction of the team structure. This suggested that sustained team performance was not only due to the additive effects of individual teller performances, but that, to a large degree, sustained performance was also associated with supervisor and team practices. This finding supports the work of Stilnglhamber and Vandenberghe (2003), who conducted a longitudinal study, which among other things looked at job conditions, perceived supervisor support, affective commitment to the supervisor, and turnover. Their longitudinal study found that affective commitment to the supervisor completely mediated the effect of perceived supervisor support on turnover, and, they also found that perceived supervisor support totally mediated the effect of favorable intrinsically satisfying job conditions on affective commitment to the supervisor. The continued benefits to team performance as time passed was illustrated in the results section of the study; it appears that the team structure in this study created a “structural interdependence” (Wageman, Gardner & Mortensen, 2012,); this concept has been elaborated upon in section 6.4.

Differences in team practices also appeared to flow from how involved the senior centre management were with their team supervisors and tellers. The frequency and quality of interactions between tellers and their supervisors, goal-setting, individual and group feedback to tellers by the supervisor and coaching were some of the practices commonly listed by both tellers and supervisors, as critical to maintain high performance. Self-regulated goal-setting was a common feature of successful teams following the settling of teams into routines. From information gathered during the interviews, in addition to a comprehensive technical understanding of the systems used and information pertinent to improvement of deposit processing performance (such as volumes, time-taken, error rates) by the supervisor, the leadership role of the supervisor and the practices which teams engaged-in, also appeared to play an important role, both in performance improvement and the maintenance of high performance over time. In examining the moderating effects of subordinate individual differences, Elangovan and Xie, (1999) showed that perceived supervisor power was strongly related to increased motivation and decreased stress for subordinates (particularly those subordinates with low self-esteem than for those with high self-esteem). They also found that supervisor legitimate, expert and referent power was more negatively related to stress, and positively associated with increased motivation for intra-team. Lee and Tan (2012) showed how trust in supervisors translates into individual job performance, through creating psychological availability and psychological safety to subordinates.

6.4 RESEARCH QUESTION 3

The third research question (RQ3) was, *what themes emerge to explain persistent performance variance between work teams over time?* The team structure appeared to provide a setting where tellers and supervisors could interact in a more focussed manner. For supervisors, the team structure appeared to result in the supervisor assuming accountability to facilitate the success of the individuals within their team, through providing support to the tellers, during the performance of tellers tasks, and during periods where there was no teller-work being performed - in the form of coaching, target-setting, and feedback. For tellers, the team setting appeared to provide an environment where they could channel issues related to work performance, in the form of inquiries on their current and required performances in order to reach expected or even self-imposed deposit processing targets.

The formation of team structures appeared to have resulted in structural benefits to sustained performance. From the interviews, it emerged that the team structure may have indirectly influenced the coordination efforts of the supervisors within the work environment. As an example, an extract from the interviews carried out the East London cash centre (see section 5.5.3.3) shows that all supervisors who were interviewed felt that they had seen improvements in all aspects of performance and also on the behaviours associated with teller performance, as a result of the introduction of teams. In addition, allocation to a team was reported by two of the three tellers interviewed, and by all the supervisors who responded to the question, as having resulted in improvements in all aspects of performance. When asked to qualify this response, one teller suggested that there was more sharing of the workload among tellers within the team structure, resulting in more manageable work:

"[I am] not as exhausted because work is equally allocated" (Teller #4, East London cash centre, 14 September, 2010)

Lewis, (2004); Moreland, Argote, and Krishnan, (1996) show that the team structure creates transactive memories through relatively stable membership. Through transactive memory, team members in successful interdependent work-teams follow established success routines; effective transactive memory systems make it possible for individuals to focus, “allowing the team to process information efficiently and perform its tasks more effectively” (Wageman et al., 2012, p. 308) and to avoid process loss. According to Wageman and colleagues (Wageman et al., 2012), the team structure creates structural interdependence, which they argue is most important for team viability; they argue that, in successful and viable teams, team members pre-occupy themselves with developing relationships, which become more important to drive future success. The scholars warn - in the light of the work of Cheng, Chua, Morris, and Lee (2012, p. 308) which showed that past team behaviours could be hindrances for future performances - that “scholars must carefully conceptualize and define effectiveness, for a specified time-frame and make a greater collective effort to study and measure performance longitudinally”.

Reflexivity defines the process through which individuals or teams take time to reflect on their shortcomings or successes, as a means to gaining further insight into how to go about improving their performances; the concept is generally used in reference to teams. Schippers, Homan, and Van Knippenberg, (2013), argue that team reflexivity has more impact in teams which are not doing well, since teams have an opportunity to alter their team processes. In this study, we argue for the importance of supervisor reflexivity, and attempt to show that supervisor reflexivity was potentially more critical in improving team processes and, thus, team performances over time. We argue that team coordination, as shown in the proposed performance model in Figure 25 is underpinned by supervisor reflexivity – implying the central role of the supervisor in team performances in such settings. There are two reasons for positing supervisor reflexivity as a critical part of the long-term performance model in this setting: 1) It is argued, that the supervisor was the constant in each one of the teams over time. Although team membership was relatively stable in many teams over the time of the study, even high-performing teams did change membership over time. Some high performing teams received new tellers and lost tellers; some teams lost both contract tellers and permanent tellers. Hence, in these instances, group norms and transactive memory were anchored through the supervisor. 2) The supervisors in this study were responsible for scheduling and creating an environment and opportunities for their teams to meet and share experiences, and to provide targets (in the earlier periods of the study) and to provide feedback. A critical component of reflexivity is feedback (Schippers, et al., 2013). Locke, Cartledge, and Knerr, (1970); Schippers, et al., (2013) show how team reflexivity can allow low performing teams to alter their performance trajectories (Bass, 2000). We argue that in the research settings encountered in this study, team reflexivity was contingent upon supervisor reflexivity.

Rousseau, Aubé, and Savoie (2006) show that the internal team functioning comprises interpersonal support and team work management, and that both these dimensions are positively related to team performance. The researchers also showed that task interdependence plays a moderator role on the interpersonal support, team work management, and performance relationships.

There appears to have been slight differences in the sources of motivations for improved performances between the permanent and contract-teller groups. A significant source of motivation for the permanent teller group appeared to be related to the pay the incentive which they aimed to earn monthly, depending on their level of overall performance. For the contract-teller group, a significant motivation appeared to have been the need to “keep-up” their individual performances with their permanent teller counterparts, for at least two reasons: the first reason was that, past performance history was used as a primary tool, to convert tellers from contract to permanent teller status. The second reason (which is related to the first) was that, contract tellers had a need to “please” their supervisors, as the supervisor’s recommendation was critical in getting the teller’s contract converted to permanent teller. In addition, 60% of the supervisor’s final rating score was derived from the scores of all the tellers within their team. The differences in the motivations for the two groups of tellers has been covered in section 6.3, and will not be repeated here.

During the three sets of group interviews, differences were observed in how team members engaged with the interviewer, and amongst themselves as a team. There were some individuals who readily engaged in the open discussions and to probing questions; other team members preferred to provide information only after some level of probing by the interviewer. It was also observed that a lot of the quieter members during the interview happened to be the best and more consistent performers when their records were scrutinised. It appeared that some tellers flourished within the environments of their tasks (deposit processing), which is largely an individually performed task. These tellers’ preferences for individualism appeared to drive their focus on the task of counting, while their requirement for support from the supervisor and other tellers (through them being present at work and doing their share of work) drove their collectivism needs. These findings appear to point to the existence of sub-groups (Carton & Cummings, 2012) in the teams which were interviewed, suggesting that the phenomenon may have been a common one within the teams in this research.

Various forms of intra-team member interdependence were acknowledged by the teams; in general, all the forms of intra-team interdependence were positive, thus encouraging intra-team cooperation and support. In instances where the team supervisor was not perceived by team-members to be playing an active task coordination role (e.g. through visible daily task planning), and in instances where the team supervisor was not perceived by team-members to be playing an active support role (through providing pertinent technical and performance related information to the tellers), the performance of team members appeared to suffer. These variances in team processes - largely reliant on the supervisor’s management skill - appeared to greatly influence the extent of performance-variance among teams over time.

6.5 EMERGING MODEL FROM QUANTITATIVE AND QUALITATIVE STUDIES

In chapter 3 (see section 3.2.3), a literature-implied model for team performance was presented, depicting the central roles of the composite latent factors - internal and external team processes - on the team performance construct. Communication, incentives, target setting, monitoring, coaching and feedback were presented as the formative indicators for the latent constructs (see Figure 11).

The focus of this study was to delve deeper into the intervening effects of internal team processes, on the combined influences of individual pay incentives and hybrid supervisor pay incentives and its effects on sustainable work-team performance. Although there was a deliberate focus on internal team processes in this study (due to the nature of the research setting of the work-teams in this study), the influence of external team processes on long-term team performance were not excluded. As a result, the report should be read, bearing in mind that there was no active effort to isolate and exclude what is conceptually understood as external team processes (see also section 2.6.4).

In this study, pay incentives appeared to have indirectly triggered improved individual teller performances and work-teams performances, when the pay incentives were introduced in the form of a combination of hybrid pay incentives for the work-team supervisors, and individual pay incentives for the tellers. Pre-existing moderate levels of task interdependency within the work teams, appeared to have transitioned into a deeper level of structural interdependence (Comeau & Griffith, 2005; Van de Ven, Delbecq & Koenig, 1976, Wageman, 2001; Wageman et al., 2012) after the formation of teller teams. Structural interdependence consists of combinations of task interdependence and outcome interdependence (Wageman, 1995, 2001). The resulting greater degree of outcome interdependence between team members, appeared to have required a more sophisticated level of team coordination - a task-driven component of interdependence - and involvement from the team supervisor - a behaviour-driven component of interdependence. This finding is in line with the implicit coordination processes model for teams, proposed by Rico, Sanchez-Manzanares, Gil, and Gibson (2008); in their model, some team and context variables were shown to contribute to implicit coordination patterns and its effects on team performance.

Although the team coordination construct (Marks et al., 2001; Stewart, 2006) is an emergent phenomenon (Rico et al., 2008; Brannick et al., 1995; Zalesny et al., 1995), most models based on input-process-output work relationships, consider coordination as key to team effectiveness (c.f. Cohen & Bailey, 1997; Gladstein, 1984; McGrath & Argote, 2001). Team processes in the current study, includes a combination of managing intra-team communication, resource allocation and work-load allocation, setting of targets, monitoring and providing visibility of performance outcomes to tellers, and representing the team's interests to its external environment (including being the "face of the team " to the rest of the company). A large part of team coordination required supervisors to closely manage issues such as the equity of work-load allocation among tellers within a team - including paying close attention to work-attendance patterns by all team members. Improved coordination by supervisors also appeared to have manifested in the higher frequency and quality of interactions between the supervisors with tellers within their team; quality interactions were required on issues such as target-setting, technical aspects of performance, progress monitoring and coaching, and performance feedback. In time, and seemingly as tellers began to understand what performance levers to pull, tellers appeared to self-regulate their own performance targets, so long as these targets did not negatively impact overall team performance.

Accordingly, when the performance construct was operationalised as the volumes, speed and accuracy of deposit processing and attendance behaviour, a model of task and reward interdependent work-team performance could be constructed. This model is now shown in Figure 25. The proposed performance model has been drawn together from the findings in this study; it is not tested.

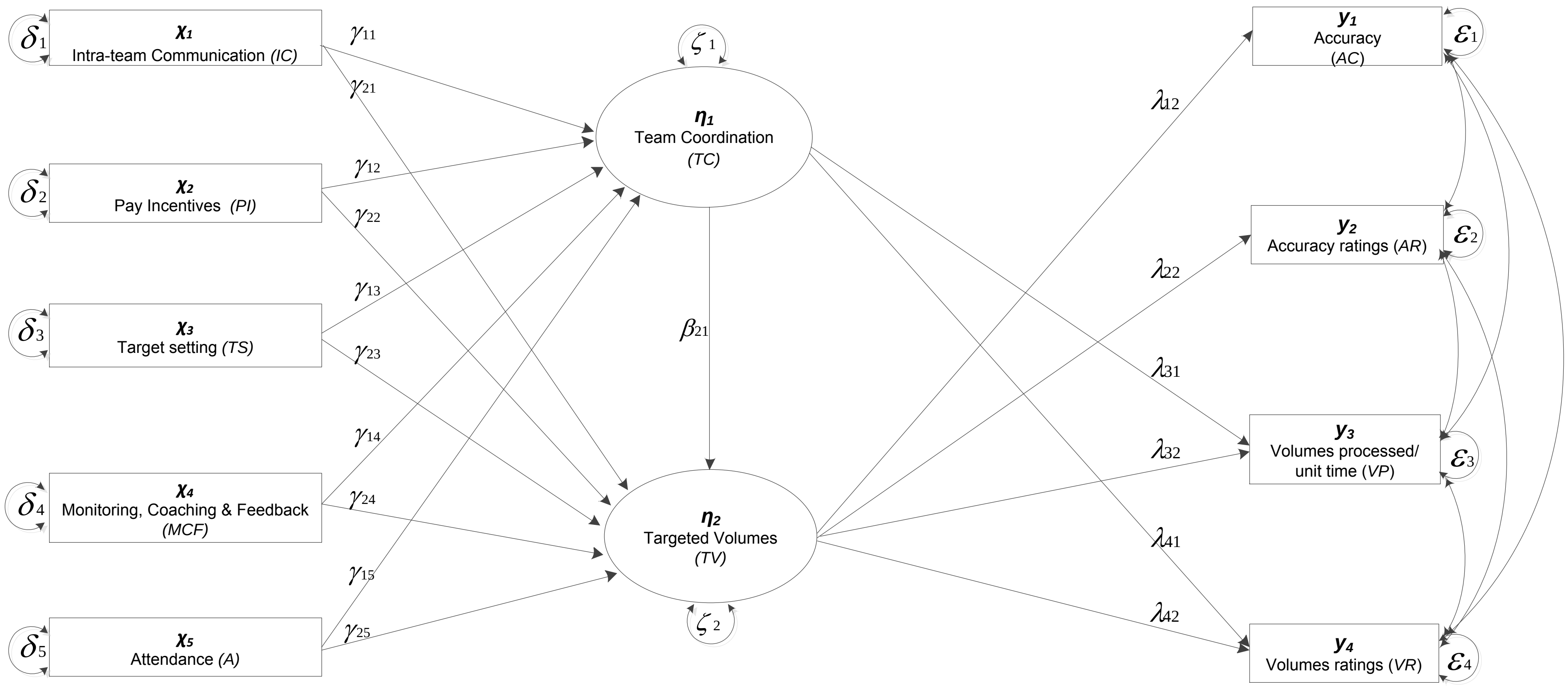

Figure 25: Proposed interdependent work-team model, with pay incentives

The emerging model is different from the literature-implied model shown at the end of chapter 3, section 3.2.3, Figure 11. There are four main differences between the literature implied model (chapter 3, Figure 11) and the proposed work-team model (chapter 6, Figure 25); three of these differences are conceptual and one difference is methodological. In the proposed model for work-team performance (in the presence of individual and hybrid supervisor incentives), 1) attendance is included as a formative indicator, affecting both team coordination and targeted volumes within the team, while, in the model based on extant literature, attendance is assumed as part of the setting. 2) Internal and external team processes were included as latent constructs in the literature-derived model; in the proposed model, internal and external team processes have been broken-down and incorporated into either the formative indicators for team coordination and targeted volumes (as shown in the model), or they have been incorporated into the team coordination construct itself (as outlined in the team coordination construct definition presented earlier in this section). 3) Because the proposed model is designed to predict and explain how performance is sustained within work-teams with individual and hybrid pay incentives, the performance construct - which was incorporated as an endogenous factor in the literature-derived model - has been removed as it is deemed superfluous; this treatment also results in better model parsimony. Instead, team coordination and targeted volumes are shown to directly affect measures of performance. 4) As recommended by various researchers (Hair et al., 2010, p. 738; Kline, 2011, p. 283; MacCallum and Browne (1993), in order to achieve identification in the proposed model, the proposed MIMIC factors (the latent composites, Team coordination and Targeted volumes) have at least two reflective indicators each (see also 3.2.3).

For moderately interdependent work-teams, where performance is assessed retrospectively in monthly periods, the proposed model implies the following relationships between the formative indicators and the latent composite factors: First: intra-team communication (which includes the perceived equity of individual team-member work-loads), mainly affects the levels of effort extended towards team coordination by the supervisor; intra-team communication has smaller direct effects on targeted volumes. Second: pay incentives, mainly influence the targeted volumes of work by team members, while hybrid pay-incentives for supervisors affect the levels of effort employed by the supervisor for team coordination effort. Third: target setting between team members, affects the levels of targeted work volumes by all team members, whether these targets are provided by the supervisor for the teller, or when the tellers set self-targets; to some extent, target setting allows supervisors to coordinate and balance workloads between individuals (a component of team coordination). Fourth: coaching, progress-monitoring and performance feedback between team members, affect the levels of targeted work volumes by team members, and - to some extent - coaching, progress-monitoring and performance feedback between team members, affects the coordination of work-load allocation to team members by the team supervisor, through an understanding of each tellers' capabilities. Fifth: regular and predictable work attendance by all team members, fosters team coordination efforts by the supervisor; attendance thus had direct effects on both team coordination and targeted volumes. It is also expected that attendance, in addition, may indirectly affect the targeted volumes processed, if it impacts the team coordination efforts of the supervisor. The following equations represent the relationships between the formative indicators and the latent composite factors:

Equation 4: $$\eta_1 = \gamma_{11}x_1 + \gamma_{12}x_2 + \gamma_{13}x_3 + \gamma_{14}x_4 + \gamma_{15}x_5 + \zeta_1$$

$$\eta_2 = \beta_{21}\eta_1 + \gamma_{21}x_1 + \gamma_{22}x_2 + \gamma_{23}x_3 + \gamma_{24}x_4 + \gamma_{25}x_5 + \zeta_2$$

where x_1 represents Intra-team communication (IC); x_2 represents Pay incentives (PI); x_3 represents Target setting (TS); x_4 represents Monitoring, coaching & feedback (MCF) and x_5 represents Attendance (A). η_1 and η_2 represent the latent factors Team coordination (TC) and Targeted volumes respectively. y_{1-4} represent Accuracy (AC), Accuracy ratings (AR), Volumes processed per unit time/speed (VP) and Volumes ratings (VR) respectively. ζ_{1-2} are the residuals terms for η_{1-2}. γ_{ij} are loadings of i^{th} factor on the j^{th} formative indicator and λ_{ij} are the loadings of i^{th} effect indicator on the j^{th} latent factor. β_{ij} is the loading of factor η_2 on η_1 and $\mathcal{E}_{1-4}$ are the error terms for y_{1-4}.

The proposed model implies the following relationship between the latent composite factors (structural implication): increasing levels of team coordination positively affect the levels of targeted volumes within the team.

The proposed model implies the following relationships between the latent composite factors and the effect indicators: First: changes in the levels of team coordination and targeted volumes will affect the volumes of deposits processed per unit time, and the volumes measures, when using ratings. Second: changes in the levels of team coordination will indirectly affect the volumes of deposits processed per unit time, and the volumes measures, when using ratings, by affecting the targeted volumes. Third: within the work-team structure, i) where a combination of individual team-member pay incentives and supervisor hybrid pay incentives are present, and ii) where team tasks are moderately interdependent, and iii) where accuracy and speed are equally weighted, changes in the levels of targeted volumes, which results in increased processing speed, will not affect the accuracy with the task is performed. This part of the model is represented through a matrix, which is equivalent to the following equations:

Equation 5: $y_1 = \upsilon_1 + \eta_2 + \varepsilon_1$

$$y_2 = \upsilon_2 + \lambda_{22}\eta_2 + \varepsilon_2$$

$$y_3 = \upsilon_3 + \lambda_{32}\eta_2 + \eta_1 + \varepsilon_3$$

$$y_4 = \upsilon_4 + \lambda_{42}\eta_2 + \lambda_{41}\eta_1 + \varepsilon_4$$

where υ_y is the vector of intercepts of indicators y_1 to y_4

The proposed model implies the following relationships: The proposed model implies that - together with the effects of intra-team communication, target setting, coaching and feedback and attendance - the combined effect of individual and hybrid supervisor pay incentives, indirectly affects team performance over time team, through 2) improving the structural interdependence (a latent effect), which results from the organisation of tellers and supervisors into task and reward interdependent work teams, and, 3) which leads to improvements over time, in implicit team coordination processes and targeted work volumes. The proposed model, which focusses on internal team processes which require seamless coordination, places emphasis on the central role of the supervisor; in addition the role of the supervisor is viewed the custodian of the transactive memory within the team structures.

CHAPTER 7: CONCLUSIONS

7.1 INTRODUCTION

This study set out to investigate the effects of introducing pay incentives, on performance, to members of work-teams, who had moderate levels of task and reward interdependence, within a working environment. The study intended to examine the effects of the pay incentives on individuals with different employment contracts. The study also aimed to find explanations for enduring performance differences for teams with similar tasks and resources. There were three research questions framed at the beginning of the study: the first research question asked what the effects of introducing pay incentives on individual performance were over time. The second research question asked what the effects of introducing hybrid pay incentives for supervisors were, on team member performance over time. The final research question asked what themes emerged during the study which could explain persistent performance variance between the work-teams in the study.

Following a literature review, research hypotheses were developed. The first hypothesis developed predicted a relationship between the introduction of pay incentives and an increase in the speed of deposit processing for the group of participants receiving the pay incentive. The second research hypothesis predicted an improvement in the speed and accuracy of deposit processing for all members within a team structure, as a result of the introduction of hybrid pay incentives for the team supervisor, and as a result of the formation of delineated work-teams.

Two interventions were used in the study; the first intervention was the introduction of pay incentives for the group of people who had permanent employment contracts at the firm at which the study was conducted. The second intervention - which was introduced later in the study (about eight to ten months later) - was the introduction of defined work-teams, led by a team supervisor; the other component of the second intervention was the introduction of hybrid pay incentives for the team supervisor.

A pilot study was undertaken before the man study commenced; the purposes of the pilot study was to check the effectiveness of the interview tools and metrics to be used in the main study. The other purpose of the pilot study was to check for the practical significance of the results, before embarking on the main study, which was a longitudinal in design.

This chapter will provide a summary of the findings from the main study, which was conducted over a period of 34 months. The summary follows the same logic as used in Figure 5. The chapter will conclude by highlighting the practical implications of this study and its contribution to the research on work-teams, incentives and performance in a live working environment. The limitations of the research will be dealt with, as well as some suggestions for future research.

7.2 SUMMARY OF FINDINGS

As mentioned at the end of the previous the findings are summarised in accordance with Figure 5: Performance model derived from literature.

In line with existing literature, individual pay incentives were found to positively indirectly influence the speed component of individual performance output, when individuals were not working within a team environment. However, there was a significant interaction effect between the type of employment contract and the improvement in the speed of task performance, when individuals worked outside the team environment. Outside the team environment, intrinsic (need for permanent employment), extrinsic (peer recognition by senior management) and interactive factors (peer pressure stemming from a need to be competitive) resulted in improvements in the speed to deposit processing, for contract tellers, in the absence of pay incentives. A need to earn pay incentives was largely associated with speed improvements for permanent tellers, although peer pressure may have also played some part, outside of the team environment.

The team setting provided an environment where supervisor coordination efforts could thrive, through the enhancement of interdependency between team members. Within the team settings, hybrid pay incentives for team supervisors, were found to indirectly positively affect team performance, through an increased level coordination and support effort by the team supervisor. Increased coordination efforts by team supervisors, as a result of hybrid pay incentives, resulted in an improvement in the volumes, speed and accuracy of deposit processing, 18 months following the introduction of hybrid incentives for team supervisor. In addition to the components of internal processes covered extensively in the literature (see Marks et al., (2001) and Cohen & Bailey, (1997), intra-team communication, perceived supervisor competency and support, coaching of individual team members – including the coaching of the supervisor – and team coordination by the supervisor were found to explain sustained variances in inter-team performances.

There were no differences in the performances of employees on permanent employment contracts and employees on renewable fixed-term contracts, when these individuals worked within a team structure, in which the team supervisor received hybrid pay incentives. In line with the literature on team-based performance, there was no trade-off between the speed of processing deposits and the accuracy with which deposit processing was done; in fact, both the speed and accuracy of deposit processing showed gradual improvements over time within the team setting.

7.3 RESEARCH CONTRIBUTION

In order to facilitate the ease of navigation of the various contributions to this study, readers are referred to Figure 5: Performance model derived from literature. This section of the research deals with the contributions of the study to research and practice, and it is separated into contributions to the literature, research methods and contributions for practice. The structure of the discussion follows the team performance model diagram, beginning with a discussion on incentives, followed by a discussion on team effectiveness, and a discussion on performance. This is then followed with a discussion on contributions of the study to research methods.

7.3.1 INCENTIVES LITERATURE

Individual motivation commonly underlies the approaches to the design of compensation approaches which are linked to performance. From Skinner's reinforcement theory (Skinner, 1953) to Goal setting and Agency Theories (Milkovich & Newman, 1999), it has been shown that higher output levels are expected when financial incentives are linked to the outputs. The results of the meta-study by Condly, et al., (2003) indicated an average 22% gain in performance as a result of the introduction of incentives in team settings, including the finding that both quantity and quality dimensions of performance were positively correlated with incentives. The complexity surrounding the use of incentives within team settings results from the varied number of intervening variables between incentives and performance outcomes, including task structures (Wageman & Baker, 1997; Crawford & LePine, 2013), autonomy preferences (Wageman, 1997; Wagner, et al., 2012), goal-setting (Wright, 1989). All of these have been shown to be some of the major intervening variables in the relationship between financial incentives and team performance. The structure of the incentive program itself (e.g. hybrid versus individual incentives) has been shown (Wageman & Baker, 1997) to act as an intervening variable between incentives and performance. Ruth Wageman's study (Wageman, 1995) concluded that a combination of hybrid tasks with hybrid incentives was the worst configuration of work-teams in that, teams with these structures were associated with the poorest performances.

The findings of this study largely support the findings that pay incentives indirectly result in performance improvements, both for individuals outside of team settings and for individuals within team settings. In addition however, this study found consistent and sustainable performance as a result of the structural interdependence conferred by the work-team structure, where a combination of individual and supervisor hybrid pay incentives were present, and in which there was moderate task interdependency between the team members. Wageman (1995) had concluded her study by pointing to a possibility that different findings could result, depending on how incentives were structured, even in teams with hybrid tasks and hybrid incentives. This possibility has found some support through the current research.

7.3.2 TEAM PROCESSES LITERATURE

Marks et al., (2001) defined team processes as "members'' interdependent acts that convert inputs to outcomes through cognitive, verbal, and behavioural activities directed toward organizing taskwork to achieve collective goals". Cohen and Bailey (1997) distinguished between team processes which are directed at and focussed on dealing with the tasks at hand and dealing with other team members (internal team processes), and external team processes which are processes aimed at the environment within which the team resides and which the team has to manage.

This research focussed on the internal processes which occur within teams during their action phases, as teams aimed to attain desired goals, and as teams proceeded through phases of improvements over the 18 months in which the study was carried out. Different to Tuckman's team lifecycle (1965) and to Tuckman & Jensen's (1977) team development lifecycle, this research focused more on the different internal team processes which promoted replication transactive memory and lasting success. This approach aimed to improve the understanding of "within-team" mechanisms which underpin team success over time. The approach to incorporate temporal effects in understanding teams is drawn from the theoretical works of Zaheer and colleagues (Zaheer, Albert & Zaheer, 1999), Marks and colleagues (Marks et al., 2001) and by Gersick (Gersick, 1988, 1989), Ballard, Tschan, and Waller, (2008); Neal and Griffin, (2006); Pitariu and Ployhart, (2010); Ployhart and Vandenberg, (2010); Sonnentag, (2012). Locke and Latham, (1990), McGrath, (1991), Marks et al., (2001) all showed that the conceptualisation of team processes is predicated upon time having an influence on processes, because all team activities happen within the context of the time dimension. Since work teams within organisations can exist for considerable periods of time, with stable and dynamic memberships, team members generally have a history together and the expectation of an existence going forward. The central role of the supervisor within the current research became clear. In this research setting, team coordination by the supervisor was found to be a critical skill which needed to be visible and demonstrated by the team supervisors to the rest of the team members. Although Marks et al., (2001) listed coordination as one of the action phase items, in this study we demonstrate the components of team coordination by the supervisor which are viewed as important by other team members (e.g. equitable work-load allocation, based on skill and the communication of this to other team members). We also show the importance of the supervisor's technical skills, and how this is perceived by other team members. These and other coordination skills, place the supervisor at the centre of sustainable performance improvements under these settings; this centrality of the supervisor was not clear from the research in other settings.

Despite the centrality of the supervisor in the current study, as time passed, goal setting in successful teams transitioned from being the primary responsibility of the supervisor, to self-regulation by tellers. Performance feedback, found by Locke & Latham (2012), to be an important moderator of the relationship between goal difficulty and performance, still played a critical role in the relationship between supervisors and their tellers, because feedback "allows people to decide if more effort or a different strategy is needed to attain their goal. When performance feedback is withheld, goal setting is ineffective for increasing performance". (Locke & Latham, 2012). In this research, within successful teams, there were open lines of communication (intra-team communication) which fostered the provision of immediate performance feedback and coaching between tellers and supervisors. This finding in the current research was in line with the literature on feedback, which suggests that immediate feedback on performance, results in the highest levels of improvement for individuals (Dihoff et al., 2003).

7.3.3 PERFORMANCE LITERATURE

Studies by Cohen and Bailey, (1997), Stewart and Barrick, (2000), Wageman, (1995) and Wageman and Baker, (1997) have all shown that task types and the design of tasks in teams, affect team performance. The common dimensions of tasks include the speed and the accuracy with which a task can be performed the ability to perform tasks differs, depending on the degree to which the tasks can be performed using independent action or group action. Complex tasks have been shown by Beersma et al., (2003) to require a combination of speed and accuracy but Elliot et al., (2001) showed that there is a trade-off between the speed and accuracy when performing these tasks. In their meta-study, Jenkins (1998) showed that incentives appear to have different influences on the degree of emphasis on speed and accuracy in teams, however Condly et al., (2003) found that incentives positively affected both task speed and task accuracy, following a review of studies on the effects of incentives on team performance. In this study, in which a combination of individual incentives for team members and hybrid incentives for team supervisors were used, pay incentives were associated with improvements in both the quality and the speed of task accomplishment as the study progressed. It is however possible that the work-team setting employed in this study may have affected the outcome achieved, and that incentives per se have different effects in other team settings.

7.3.4 RESEARCH METHODS

Amongst the various longitudinal researchers and texts concerned with longitudinal study methodology, Hair et al., (2010), Kline, (2011), Ployhart and Vandenberg, (2010) and Timmons, (2010) have shown the importance of establishing factorial invariance (also called measurement invariance or metric invariance) in longitudinal studies. Factorial invariance aims to establish that the same construct is being measured across time, and across different groups when using a multiple group design (see also 4.8.2.3). Bollen and Curran, (2006), Ployhart and Vandenberg, (2010), Singer and Willett, (2003), emphasised that ensuring longitudinal invariance is a critical consideration in the design of longitudinal studies, in that in addition to ensuring that the variable under measure has meaningful content, the variable should also be statistically and consistently measureable over time. As part of the design in this study, factorial invariance was examined, using Latent States and Traits (LST) modeling (Geiser, 2010). LST modeling uses variability modeling (Geiser, 2010) which separates "stable from occasion-specific components of variance" (Geiser, 2010, p. 85). The demonstration of factorial invariance within this study offers a robustness of longitudinal study design: a critical missing piece in a number of studies, as shown by Ployhart and Vandenberg (2010).

The use of a mixed-methods longitudinal design to study work-teams within a live-working environment is not often encountered in empirical team-based research; this study attempted and largely succeeded in using this approach.

7.3.5 PRACTITIONER

Hybrid or interdependent incentives (also called reward interdependence) represent any combination of individual and group based incentives which organisations can employ depending on the types of teams present, and the levels and types of interdependence present within the team. These, and many other intervening variables such as task structure and reward structures (Wageman & Baker, 1997; Crawford & LePine, 2013), autonomy preferences (Wageman, 1997; Wagner, et al., 2012), make the structuring of incentive programs highly complex, and have thus been the subject of much recent research into compensation programs (Barnes et al., 2011; Beersma et al., 2003; Shaw et al., 2002). For practitioners, this study offers insights on the effects of pay incentives for people working on individual behavioural tasks (McGrath, 1984). The study also offers insights on the effects of hybrid pay incentives within work-teams, and offers insights on how incentives can be structured and the consequences of this structuring.

7.4 MANAGEMENT RECOMMENDATIONS

Hybrid pay incentives, for team supervisors within work-teams with moderate levels of task interdependence, offer useful applications for sustained team performance. However, the team supervisors require continuous support from senior management on how to equitably coordinate the work-loads within the teams. Supervisor oversight from senior management is critical, to ensure that supervisors spend sufficient time on task planning, coordination and team-member support. The practice of taking time-out to plan (supervisor reflexivity), quickly embeds itself as a habit for the supervisor and forms part of the team's transactive memory, which subsequently forms part of the processes within a team, which appear to result in sustained performance and output.

Individual pay incentives appear to offer better short-term benefits, when the speed of task performance is more important than the precision of task accomplishment. Managers should thus be cautious, when designing pay incentive programs for people engaging in task work where equal emphasis on the speed and precision of task accomplishment is mandatory.

Similar to the other empirical work done in the South Africa context on reward preferences (Malambe & Bussin, 2013; Snelgar, Renard & Venter 2013), in South Africa, properly incentivised self-regulating work-teams present an opportunity for increased productivity within labour-intensive settings. In addition, these teams provide a platform reduce the levels of management oversight required.

For remuneration practitioners, this study offers an opportunity to consider the re-design and/or the introduction of incentivised team-based remuneration structures, as a means to avoid the economic and reputation damaging and protracted annual wage negotiations that are so common in various sectors of the South African economy.

7.5 RESEARCH LIMITATIONS

The findings of this research are limited to the responses obtained from work-teams operating within the bulk cash banking sector in South Africa, where the research was conducted.

The extent of task interdependence among work-team members (dealt with in section 4.5.2.1) was estimated by analysing the qualitative responses of team members, and translating this estimate into a score of high medium and low. In order to provide more rigour to an estimate of this construct, it would have been better to have developed a formal interdependence scale for this estimate.

Similarly, comparable team maturity was assumed; team-work behaviours (Rousseau, Aubé, and Savoie, 2006) associated with team maturity were thus assumed to be comparable, at the inception of teams. These elements were controlled-for through the introduction of formal teams at about the same time at each individual cash processing centre – approximately 8 to 10 months post IV_1. A formal analysis of team maturity, prior to results analyses or as part of the interview processes post-IV_2, would have added more rigour in estimating the potential confounding effects of this variable when doing cross-team analyses.

A consideration of deep-level team composition variables, such as individual values and attitudes (Bell, 2007) and the influence of sub-groups (Carton & Cummings, 2012), were considered outside the scope of this study. The potential effects of surface-level (Bell, 2007) team composition factors - the potential confounding effects gender, age and skills - was catered-for through the formal re-training and pre-qualification of all tellers and supervisors prior to the commencement of the interventions (refer to the section on the research setting in 4.3). Although all measures were taken to control for the skilling component, it is expected that some gender and age (experience) effects would have played some part in influencing team performance outcomes.

This research proposed, but did not test, a predictive model for incentivised work-team performance. An opportunity exists to test the proposed model. There is also an opportunity to replicate and improve on this study, using multi-level modeling techniques and perhaps using non-linear modeling techniques as well.

7.6 RECOMMENDATIONS FOR FUTURE RESEARCH

The limitation of this study to teams within bulk-cash processing centres in South Africa, offers an opportunity replicate the study on work-teams in other industry settings. There is an abundance of task inter-dependent work-teams in manufacturing settings (motor industry), educational settings (research groups) (c.f. Johnson & Johnson, 2005); the variety of forms which work-teams can take (such as quality circles; research teams), offers a wonderful opportunity to replicate the findings from this research. Hollenbeck and colleagues' (Hollenbeck et al., 2012) dimensional scaling framework for describing teams (which delineates teams based on the authority levels provided to the team, the temporal stability of the team and the skill levels required for tasks accomplishment within the team) also provides another opportunity to re-classify the types of teams to which this study can be applied.

This research focussed on the intervening effects of internal team processes on performances of pay-incentivised work teams, using both individual and hybrid pay incentives. There are a number of potential research variants which have not been touched-on in this study. Firstly, the focus on external team processes, defined as processes aimed at the environment within which the team resides and which the team has to manage, were not explicitly explored. There is an opportunity to investigate these, in similar settings as in the current study. Secondly, intra-team conflict (which includes task conflict, relationship conflict and process conflict - De Dreu & Weingart, 2003; de Wit et al., 2012), and how this affects performances within the work-team settings, also provides an opportunity for further research. Thirdly, group development - as understood through the well-established framework developed by Tuckman and Jensen (1977) (forming, storming, norming, performing and adjourning) - requires a deeper examination, in the light of continuing work-teams with hybrid incentives structures. The findings in the current study suggest that, in the presence of a combination of individual and hybrid supervisor incentives, the development trajectories of high-performing, continuing, task-interdependent work-teams, may involve additional stages, which are different to the Tuckman and Jensen (1977) model, but perhaps more in-line with the punctuated equilibrium suggested by Gersick (1989), but in which “junior” team members take–over some of the roles which are critical to team performance. In-effect, these high-performing work-teams appear to assume the form of self-directing teams. What could be conceptually different in the teams found in this study is the influence of time on team processes which underpin sustained high performance, as suggested by Mathieu, Tannenbaum, Donsbach and Alliger (2014).

7.7 CONCLUSION

This study replicated findings, and provided support for a number of existing theories on the effects of pay incentives on performance in work-teams. The setting of the study (live working setting) and the longitudinal design of the study, facilitated the examination of sustained performance variance within work-teams. Continued longitudinal research on how and why interrelationships in working environments influence performance, can only but enhance the effectiveness of work design on performance outputs for firms.

REFERENCES

Abelson, M. A., & Baysinger, B. D. (1984). Optimal and dysfunctional turnover: Toward an organizational-level model. *Academy of Management Review, 9,* 331-341. doi: 10.5465/AMR.1984.4277675

Abbott, A. (1988). Transcending general linear reality. *Sociological Theory, 6(2),* 169-186.

Adams, J. S. (1965). Inequity in social exchange. In L. Berkowitz (Ed.), *Advances in experimental social psychology*. New York: Academic Press.

Adler, S., & Weiss, H. M. (1988). Recent developments in the study of personality and organizational behaviour. In C. L. Cooper & I. T. Robertson (Eds.), *International review of industrial and organizational psychology* 1988, ix, (pp. 307-330). Oxford, United Kingdom: Wiley

Akaike, H. (1987). Factor analysis and AIC. *Psychometrika, 52(3),* 317-332.

Algera, J. A. (1990). Feedback systems in organisations. *International Review of Industrial and Organizational Psychology, 5,* 169-193.

Allen, N. J., & Hecht, T. D. (2004). The 'romance of teams': toward and understanding of its psychological underpinnings and implications. *Journal of Occupational and Organizational Psychology, 77*, 439-461. doi: 10.1348/0963179042596469

Allen, B. L., Sargent, L. D., & Bradley, L. M. (2003). Differential effects of task and reward interdependence on perceived helping behavior, effort, and group performance. *Small Group Research*, *34,* 716-740. doi: 10.1177/1046496403257615

Ancona, D. G. (1990). Outward bound: Strategies for team survival in an organization. *Academy of Management Journal, 33*, 334-365. doi: 10.2307/256328

Ancona, D. G., & Caldwell, D. F. (1992). Bridging the boundary: External activity and performance in organizational teams. *Administrative Science Quarterly*, *37*, 634-665. doi: 2393475

Ancona, D. G., Goodman, P. S., Lawrence, B. S., & Tushman, M. L. (2001). Time: A new research lens. *Academy of Management Review, 26*, 645–663. doi: 10.5465/AMR.2001.5393903

Ancona, D. G., Okhuysen, G. O., & Perlow, L. A. (2001). Taking time to integrate temporal research. *Academy of Management Review, 26*, 512–529. doi: 10.5465/AMR.2001.5393887

Ang, S., & Slaughter, S. A. (2001). Work outcomes and job design for contract versus permanent information systems professionals on software development teams. *MIS Quarterly*, *25,* 321–350. doi: 10.2307/3250920

Antonakis, J., Bendahan, S., Jacquart, P., & Lalive, R. (2010). On making causal claims: a review and recommendations. *The Leadership Quarterly, 21,* 1086-1120. doi:10.1016/j.leaqua.2010.10.010

Ashforth, B. E., & Mael, F. (1989). Social identity theory and the organization. *The Academy of Management Review*, *14*, 20-39. doi: 10.5465/AMR.1989.4278999

Babbie, E., & Mouton, J. (2006). *The practice of social research.* Cape Town, South Africa: Oxford University Press.

Baker, G. P., Jensen, M. C., & Murphy, K. J. (1988). Compensation and incentives: Practice vs. theory. *Journal of Finance, 43*, 593-616. doi: 10.1111/j.1540-6261.1988.tb04593.x

Ballard, D. I., Tschan, F., & Waller, M. J. (2008). All in the timing: Considering time at multiple stages of group research. *Small Group Research, 39,* 328-351. doi: 10.1177/1046496408317036

Bandura, A. (1982). Self-efficacy mechanism in human agency. *American Psychologist, 37,* 122-148. doi: 10.1037/0003-066X.37.2.122

Bandura, A. (2012). On the functional properties of perceived self-efficacy revisited. *Journal of Management, 38,* 9-44. doi: 10.1177/0149206311410606

Bandura, A., & Locke, E. A. (2003). Negative self-efficacy and goal effects revisited. *Journal of Applied Psychology, 88*, 87-99. doi: 10.1037/0021-9010.88.1.87

Banker, R. D., Field, J. M., Schroeder, R. G., & Sinha, K. K. (1996). Impact of work teams on manufacturing performance: A longitudinal study. *Academy of Management Journal, 39*, 867–890. doi: 10.2307/256715

Barnard, C. I. (1938).*The Functions of the executive.* Harvard. Cambridge, USA.

Barnes, R. M. (1949). *Motion and time study*. New York: Wiley.

Barnes, C. M., Hollenbeck, J. R., Jundt, D. K., DeRue, D. S., & Harmon, S. J. (2011). Mixing individual incentives and group incentives: best of both worlds or social dilemma? *Journal of Management, 37,* 1611-1635. doi: 10.1177/0149206309360845

Barnett, W. P., & Miner, A. S. (1992). Standing on the shoulders of others: Career independence in job mobility. *Administrative Science Quarterly*, 37: 262–281. doi: 2393224

Barney, J. B. (1991). Firm resources and sustained competitive advantage. *Journal of Management 17,* 99–120. doi: 10.1177/014920639101700108

Bass, B. M. (2000). The future of leadership in learning organizations. *Journal of Leadership Studies, 7,* 18–40. doi: 10.1177/107179190000700302

Bavelas, J., & Lee, E. S. (1978). Effect of goal level on performance: A trade-off of quantity and quality. *Canadian Journal of Psychology, 32,* 219-240. doi: 10.1037/h0081692

Beersma, B., Hollenbeck, J. R., Humphrey, S. E., Moon, H., Conlon, D. E. & Ilgen, D. R. (2003). Cooperation, competition, and team performance: toward a contingency approach. *Academy of Management Journal, 46,* 572–90. doi: 10.2307/30040650

Behar, A. (2010). Would cheaper capital replace labour?. *South African Journal of Economics*, *78*(2), 131-151.

Bell, S. T. (2007). Deep-level composition variables as predictors of team performance: a meta-analysis. *Journal of Applied Psychology*, *92,* 595–615. doi: 10.1037/0021-9010.92.3.595

Bell, S. T. & Marentette, B. J. (2011). Team viability for long-term and ongoing organizational teams. *Organizational Psychology Review, 1,* 275-292. doi: 10.1177/2041386611405876

Bentler, P. M. (1990). Comparative fit indexes in structural models. *Psychological Bulletin, 107,* 238-246. doi: 10.1037/0033-2909.107.2.238

Bentler, P. M., & Chou, C-P. (1987). Practical issues in structural equation modeling. *Sociological Methods & Research, 16,* 78-117. doi: 10.1177/0049124187016001004

Bettenhausen, K. L. (1991). Five years of groups research: What we have learned and what needs to be addressed. *Journal of Management, 17,* 345-381. doi: 10.1177/014920639101700205

Bhorat, H., & Hodge, J. (1999). Decomposing shifts in labour demand in South Africa. *South African Journal of Economics*, *67*(3), 155-168. doi: 10.1111/j.1813-6982.1999.tb01146.x

Bollen, K. A. (2007). Interpretational confounding is due to misspecification, not to type of Indicator: Comment on Howell, Breivik, and Wilcox (2007). *Psychological Methods, 12*, 219–228. doi: 10.1037/1082-989X.12.2.219

Bollen, K. A., & Curran, P. J. (2006). *Latent curve models: A structural equation perspective.* Wiley. Hoboken, USA.

Brannick, M. T., Prince, A., Prince, C., & Salas, E. (1995). The measurement of team process. *Human Factors*, *37*, 641–651. doi: 10.1518/001872095779049372

Brannick, M. T., Roach, R. M., & Salas, E. (1993). Understanding team performance: A multimethod study. *Human Performance, 6*, 287-308.

Browne, M. W., & Cudeck, R. (1993). Alternative ways of assessing model fit. In K. A. Bollen & J. S. Long (Eds.). *Testing structural equation models* (pp. 136-162). Newbury Park, California: Sage.

Browne, M. W., MacCallum, R. C., Kim, C-T., Andersen, B. L, & Glaser, R. (2002). When fit indices and residuals are incompatible. *Psychological Methods, 7,* 403-421. doi: 10.1037/1082-989X.7.4.403

Bussin, M. (2011). *The remuneration handbook for Africa*. Randburg: Knowres Publishing (Pty) Ltd.

Byrne, B. M. (2012). *Structural equation modeling with Mplus: Basic concepts, applications and programming.* Routledge. Kentucky, USA.

Campion, M. A., Medsker, G. J., & Higgs, A. C. (1993). Relations between group work characteristics and effectiveness: implications for designing effective work groups. *Personnel Psychology, 46, 823*-850. doi: 10.1111/j.1744-6570.1993.tb01571.x

Campion, M. A., Papper, E. M., & Medsker, G. J. (1996). Relations between work team characteristics and effectiveness: A replication and extension. *Personnel Psychology, 49,* 429-452. doi: 10.1111/j.1744-6570.1996.tb01806.x

Cannon-Bowers, J. A., Tannenbaum, S. I., Salas, E., & Volpe, C. E. (1995). Defining competencies and establishing team training requirements. In R. A. Guzzo, E. Salas, & Associates (Eds.), *Team effectiveness and decision making in organizations* (pp. 333-380). San Francisco: Jossey-Bass.

Carton, A. M., & Cummings, J. N. (2012). A theory of subgroups in work teams. *Academy of Management Review, 37,* 441–470. doi: 10.5465/amr.2009.0322

Chambel, M. J., & Castanheira, F. (2007). They don't want to be temporaries: similarities between temps and core workers. *Journal of Organizational Behavior, 28,* 943–959. doi: 10.1002/job.471

Cheng, C., Chua, R. Y. J., Morris, M. W., & Lee, L. (2012). Finding the right mix: How the composition of self-managing multicultural teams' cultural value orientation influences performance over time. *Journal of Organizational Behavior, 33,* 389–411. doi: 10.1002/job.1777

Child, C. M. (1924). *Physiological foundations of behavior.* Holt. New York.

Coff, R. W. (1997). Human assets and management dilemmas: coping with hazards on the road to resource-based theory. *Academy of Management Review, 22,* 372–402. doi: 10.5465/AMR.1997.9707154063

Coff, R. W., & Kryscynski, D. (2011). Drilling for microfoundations of human capital-based competitive advantages. *Journal of Management, 37,* 1429–1443. doi: 10.1177/0149206310397772

Cohen, J. (1992). A power primer: Quantitative methods in Psychology. *Psychological Bulletin, 112*, 155-159. doi: 10.1037/0033-2909.112.1.155

Cohen, S. G., & Bailey, D. E. (1997). What makes teams work: Group effectiveness research from the shop floor to the executive suite. *Journal of Management*, *23*, 239-290. doi: 10.1177/014920639702300303

Cohen, J., Cohen, P., West, S. G., & Aiken, L. S. (2003). *Applied multiple regression/correlation analysis for the behavioral sciences.* Routledge. Mahwah. New Jersey.

Comeau, D. J., & Griffith, R. L. (2005). Structural interdependence, personality, and organizational citizenship behavior: an examination of person-environment interaction. *Personnel Review, 34,* 310-330. doi: 10.1108/00483480510591453

Condly, S. J., Clark, R. E., & Stolovitch, H. D. (2003). The effects of incentives on workplace performance: A meta-analytic review of research studies. *Performance Improvement Quarterly*, *18*, 46-63. doi: 10.1111/j.1937-8327.2003.tb00287.x

Connelly, E. C., & Gallagher, D. G. (2004). Emerging trends in contingent work research. *Journal of Management, 30,* 959–983. doi: 10.1016/j.jm.2004.06.008

Cosier, R., & Rose, G. (1977). Cognitive conflict and goal conflict effects on task performance. *Organizational Behavior and Human Decision Processes*, *19*, 378–391. doi: 10.1016/0030-5073(77)0071-X

Crawford, E. R., & LePine, J. A. (2013). A configural theory of team processes: accounting for the structure of taskwork and teamwork. *Academy of Management Review, 38,* 32-48. doi: 10.5465/amr.2011.0206

Crook, T. R., Todd, S. Y., Combs, J. G., Woehr, D. J., & Ketchen, D. J. (2011). Does human capital matter? A meta-analysis of the relationship between human capital and firm performance. *Journal of Applied Psychology, 96,* 443–456. doi: 10.1037/a0022147

Cummings, J. N. (2004). Work groups, structural diversity, and knowledge sharing in a global organization. *Management Science, 50,* 352-364. doi: 10.1287/mnsc.1030.0134

Datta, D. K., Guthrie, J. P., & Wright, P. M. (2005). HRM and labor productivity: Does industry matter? *Academy of Management Journal, 48,* 135-145. doi: 10.5465/AMJ.2005.15993158

Deci, E. L. (1971). Effects of externally mediated rewards on intrinsic motivation. *Journal of Personality and Social Psychology, 18,* 105-115. doi: 10.1037/h0030644

Deci, E. L. (1972a). The effects of contingent and non-contingent rewards and controls on intrinsic motivation. *Organizational Behavior and Human Performance, 8,* 217-229. doi: 10.1016/0030-5073(72)90047-5

Deci, E. L. (1972b). Intrinsic motivation, extrinsic motivation, and inequity. *Journal of Personality and Social Psychology, 22,* 113-120. doi: 10.1037/h0032355

Deci, E. L., & Ryan, R. M. (1985). *Intrinsic motivation and self determination in human behavior*. New York: Plenum.

Denison, D., Hart, S., & Kahn, J. (1996). From chimneys to cross-functional teams: Developing and validating a diagnostic model. *Academy of Management Journal, 39,* 1005-1023. doi: 10.2307/256721

DeMatteo, J. S., Eby, L. T., & Sundstrom, E. (1998). Team-based rewards: Current empirical evidence and directions for future research. *Research in Organizational Behavior, 20*, 141-183.

Demming, W. E. (1986). *Out of the Crisis: Quality, productivity and competitive position.* Cambridge, United Kingdom: Cambridge University Press.

Deutsch, M. (1949). A Theory of Cooperation and Competition. *Human Relations, 2(2),* 129-151.

De Cuyper, N., de Jong, J., De Witte, H., Isaksson, K., Rigotti, T., & Schalk, R. (2008). Literature review of theory and research on the psychological impact of temporary employment: Towards a conceptual model. *International Journal of Management Reviews*, *10*, 25–51. doi: 10.1111/j.1468-2370.2007.00221.x

De Cuyper, N., & De Witte, H. (2006). The impact of job insecurity and contract type on attitudes, well-being and behavioural reports: A psychological contract perspective. *Journal of Occupational and Organizational Psychology, 79,* 395–409. doi: 10.1348/096317905X53660

De Dreu, C. K. W., & Weingart, L. R. (2003). Task versus relationship conflict, team effectiveness, and team member satisfaction: A metaanalysis. *Journal of Applied Psychology, 88,* 741–749. doi: 10.1037/0021-9010.88.4.741

De Dreu, C. K. W., & Gelfand, M. J. (2008). Conflict in the workplace: Sources, functions, and dynamics across multiple levels of analysis. In C. K. W. De Dreu & M. J. Gelfand (Eds.), *The psychology of conflict and conflict management in organizations*. New York, NY: Erlbaum.

Devine, D. J., Clayton, L. D., Philips, J. L., Dunford, B. B., & Melner, S. B. (1999). Teams in organizations. *Small Group Research, 30*, 678-711. doi: 10.1177/104649649903000602

de Wit, F. R. C., Greer, L. L. & Jehn, K. A. (2012). The paradox of intra-group conflict: A meta-analysis*. Journal of Applied Psychology, 97*, 360-390. doi: 10.1037/a0024844

Dickinson, T. L., & McIntyre, R. M. (1997). A conceptual framework for teamwork measurement*.* In M. T. Brannick, E. Salas, & C. Prince (Eds.), *Team performance and measurement: Theory, methods, and applications* (pp. 19-43). Mahwah, NJ, USA.

Dihoff, R. E., Brosvic, G. M. & Epstein, M. L. (2003). The role of feedback during academic testing: The delay retention effect revisited. *The Psychological Record, 53(4)*, 533-548.

Dijk, M. (2003). South African manufacturing performance in international perspective 1970–1999. *South African Journal of Economics*, *71*(1), 119-142.

Donovan, J. J., & Radosevich, D. J. (1998). The moderating role of goal commitment on the goal difficulty-performance relationship: A meta-analytic review and reanalysis. *Journal of Applied Psychology, 83,* 308-315. doi: 10.1037/0021-9010.83.2.308

Duncan, T. E., Duncan, S. C., & Strycker, L. A. (2010). *An Introduction to Latent Variable Growth Curve Modeling.* Psychology Press. Mahwah, NJ.

Edmondson, A. C. (2002). The local and variegated nature of learning in organizations: A group-level perspective. *Organization Science, 13,* 128-146. doi: 10.1287/orsc.13.2.128.530

Edwards, L. (2004). A firm level analysis of trade, technology and employment in South Africa. *Journal of International Development*, *16*, 45-61. doi: 10.1002/jid.1062

Edwards, L., & Golub, S. S. (2004). South Africa's international cost competitiveness and exports in manufacturing. *World Development*, *32*(8), 1323-1339.

Eisenberger, R., & Cameron, J. (1996). Detrimental effects of rewards: Reality or myth? *American Psychologist, 51,* 1153-1166. doi: 10.1037/0003-066X.51.11.1153

Elangovan, A. R., & Xie, J. L. (1999). Effects of perceived power of supervisor on subordinate stress and motivation: the moderating role of subordinate characteristics. *Journal of Organizational Behavior, 20*, 359-373. doi: 10.1002/(SICI)1099-1379

Elliott, D., Helsen, W. F., & Chua, R. (2001). A century later: Woodworth's (1899) two-component model of goal-directed aiming. *Psychological Bulletin, 127,* 342-357. doi: 10.1037/0033-2909.127.3.342

Evans, C. R., & Dion, K. L. (1991). Group cohesion and performance: A meta-analysis. *Small Group Research, 22,* 175-186. doi: 10.1177/1046496491222002

Field, A. (2013). *Discovering Statistics using SPSS.* Sage. California, USA.

Fleishman, E. A., & Zaccaro, S. J. (1992). Toward a taxonomy of team performance functions. In R. W. Swezey & E. Salas (Eds.), *Teams: Their training and performance* (pp. 31-56). Norwood, NJ: Ablex.

Gallagher, D. G., & Sverke, M. (2005). Contingent employment contracts: are existing employment theories still relevant? *Economic and Industrial Democracy, 26,* 181-203. doi: 10.1177/0143831X05051513

Geary, J. F. (1992). Employment flexibility and human resource management: The case of three American electronics plants. *Work, Employment and Society*, *6,* 251-270. doi: 10.1177/095001709262005

Geiser, C. (2010). *Data analysis with Mplus.* The Guilford Press. New York

Geiser, C., & Lockhart, G. (2012). A comparison of four approaches to account for method effects in latent state–trait analyses. *Psychological Methods, 17,* 255-283. doi: 10.1037/a0026977

George, J. (1990). Personality, affect, and behavior in groups. *Journal of Applied Psychology, 75(2)*, 107-116.

Gerhart, B., Rynes, S. L. & Fulmer, I. S. (2009). Pay and Performance: individuals, groups, and executives. *The Academy of Management Annals, 3,* 251-315. doi: 10.1080/19416520903047269

Gerring, J. (2008). *Case study research: principles and practices.* Cambridge: Cambridge University Press.

Gersick, C. J. G. (1988). Time and transition in work teams: Toward a new model of group development. *Academy of Management Journal, 31,* 9-41. doi: 10.2307/256496

Gersick, C. J. G. (1989). Marking time: Predictable transitions in task groups. *Academy of Management Journal*, 32, 274-309. doi: 10.2307/256363

Gersick, C. J. G. (1994). Pacing strategic change: the case of a new venture. *Academy of Management Journal, 37,* 9-45. doi: 10.2307/256768

Gist, M. E., Locke, E. A., & Taylor, M. S. (1987). Organizational behaviour: group structure, process and effectiveness. *Journal of Management, 13,* 237-257. doi:10.1177/014920638701300204

Gladstein, D. L. (1984). Groups in context: A model of task group effectiveness. *Administrative Science Quarterly,* 29, 499–517. doi: 2392936

Griffin, M. A., Patterson, M. G., & West, M. A. (2001). Job satisfaction and teamwork: the role of supervisor support. *Journal of Organizational Behavior, 22,* 537-550. doi: 10.1002/job.101

Gully, S. M., Incalcaterra, K. A., Joshi, A., & Beaubien, J. M. (2002). A meta-analysis of team-efficacy, potency, and performance: Interdependence and level of analysis as moderators of observed relationships. *Journal of Applied Psychology*, *87*, 819-832. doi: 10.1037/0021-9010.87.5.819

Guzzo, R. A., & Dickson, M. W. (1996). Teams in organizations: Recent research on performance and effectiveness. *Annual review of psychology, 47,* 307-338. doi: 10.1146/annurev.psych.47.1.307

Hackman, J. R. (1987). The design of work teams. In *Handbook of organizational behavior*. Englewood Cliffs, NJ: Prentice-Hall.

Hackman, J. R. (1990). Why teams don't work. In S. R. Tindale & L. Heath (Eds.), *Theory and research on small groups 10.1146/annurev.psych.47.1.307* (pp. 245-265). New York: Plenum.

Hair, J. F., Black, W. C., Babin, B. J., & Anderson, R. E. (2010). *Multivariate data analysis.* Prentice Hall. NJ

Harrison, D. A., Mohammed, S., McGrath, J. E., Florey, A. T., & Vanderstoep, S.W. (2003). Time matters in team performance: Effects of member familiarity, entrainment, and task discontinuity on speed and quality. *Personnel Psychology, 56*, 633-669. doi: 10.1111/j.1744-6570.2003.tb00753.x

Heider, F. (1946). Attitudes in cognitive organization. *Journal of Psychology, 21,* 107-112. doi:10.1080/00223980.1946.9917275

Heneman, R. L., & von Hippel, C. (1995). Balancing group and individual rewards: Rewarding individual contributions to the team. *Compensation and Benefits Review, 274*, 63-68. doi: 10.1177/088636879502700410

Herzberg, F. (1968). *One more time: How do you motivate employees?* Harvard Business Review Classics. Harvard, MA.

Hitt, M. A., Bierman, L., Shimizu, K., & Kochhar, R. (2001). Direct and moderating effects of human capital on strategy and performance in professional service firms: a resource-based perspective. *Academy of Management Journal, 44,* 13–28. doi: 10.2307/3069334

Hollenbeck, J. R., Beersma, B., & Schouten, M. E. (2012). Beyond team types and taxonomies: A dimensional scaling conceptualization for team description. *Academy of Management Review,* 37, 82–106. doi: 10.5465/amr.2010.0181

Howell, R. D., Breivik, E., & Wilcox, J. B. (2007). Reconsidering formative measurement. *Psychological Methods, 12,* 205-218. doi: 10.1037/1082-989X.12.2.205

Huber, V. L. (1985). Effects of task difficulty, goal setting and strategy on performance of heuristic task. *Journal of Applied Psychology, 70,* 492-504. doi: 10.1037/0021-9010.70.3.492

Huselid, M. (1995). The impact of human resource management practices on turnover, productivity and corporate financial performance. *Academy of Management Journal, 38,* 635-672. doi: 10.2307/256741

Huysamen, G. K. (2001). *Methodology for the social and behavioural sciences*. Oxford. Cape Town.

Ilgen, D. R., Hollenbeck, J. R., Johnson, M., & Jundt, D. (2005). Teams in organizations: from input-process-output models to IMOI Models. *Annual Review of Psychology*, *56,* 517-543. doi: 10.1146/annurev.psych.56.091103.070250

Jacques, E., Rice, A. K., & Hill, J. M. M. (1951). The social and psychological impact of a change in method of wage payment. *Human Relations, 4,* 115-140. doi: 10.1177/001872675100400401

Jehn, K. (1995). A multimethod examination of the benefits and detriments of intragroup conflict. *Administrative Science Quarterly*, *40*, 256–282. doi: 2393638

Jehn, K. A. (1997). Qualitative analysis of conflict types and dimensions in organizational groups. *Administrative Science Quarterly, 42,* 530–557. doi: 2393737

Jehn, K. A., & Bendersky, C. (2003). Intragroup conflict in organizations: A contingency perspective. *Research in Organizational Behavior*, *25*,189–244. doi: 10.1016/S0191-3085(03)25005-X

Jehn, K., & Mannix, E. (2001). The dynamic nature of conflict: A longitudinal study of intragroup conflict and group performance*. Academy of Management Journal, 44*, 238–251. doi: 10.2307/3069453

Jenkins, G. D. (1986). Financial incentives*.* In E. A. Locke (Ed.), *Generalizing from laboratory to field settings* (pp. 167—180). Lexington, MA: Lexington Books.

Jenkins, G. D., & Gupta, N. (1982). Financial incentives and productivity improvement. *Journal of Contemporary Business, 11*, 43-56. doi: 10.1037/0021-9010.83.5.777

Jenkins, G. D., Mitra, A., Gupta, N., & Shaw, J. D. (1998). Are financial incentives related to performance? A meta-analytic review of empirical research. *Journal of Applied Psychology*, *83*, 777-787. doi: 10.1037/0021-9010.83.5.777

Jentsch, F., Barnett, J., Bowers, C. A., & Salas, E. (1999). Who is flying this plane anyway? What mishaps tell us about crew member role assignment and air crew situational awareness? *Human Factors, 41*, 1-14. doi: 10.1518/001872099779577237

Johns, G. (2006). The essential impact of context on organizational behavior. *Academy of Management Review, 31,* 286-408. doi: 10.5465/AMR.2006.20208687

Johnson, D. W., & Johnson, R. (1979). Conflict in the classroom: Controversy and learning. *Review of Educational Research, 49,* 51-70. doi: 1169926

Johnson, D. W., & Johnson, R. (1981). Effects of cooperative and individualistic learning experiences on interethnic interaction. *Journal of Educational Psychology, 73,* 454-459. doi: 10.1037/0022-0663.73.3.444

Johnson, D. W., & Johnson, R. T. (1989). *Cooperation and competition: theory and research. Edina.* MN: Interaction Boon Co.

Johnson, D. W., & Johnson, R. (1992). *Positive interdependence: Activity manual and guide.* Edina, MN: Interaction Book Company.

Johnson, D. W., & Johnson, R. T. (2005). New development in social interdependence theory. *Genetic, Social, and General Psychology Monographs, 131*. doi: 10.3200/MONO.131.4.285-358

Johnson, D. W., Johnson, R. T., & Roseth, C. J. (2012). Competition and performance: more facts, more understanding? Comment on Murayama and Elliot (2012). *Psychological Bulletin, 138,* 1071-1078. doi: 10.1037/a0029454

Johnson, D. W., Maruyama, G., Johnson, R., Nelson, D., & Skon, L. (1981). Effects of cooperative, competitive, and individualistic goal structures on achievement: A meta-analysis. *Psychological Bulletin, 89,* 47-62. doi: 10.1037/0033-2909.89.1.47

Junor, A. (2004). Casual university work: choice, risk, inequity and the case for regulation. *Economic and Labour Relations Review, 14,* 276–304. doi: 10.1177/103530460401400020

Karau, S. J., & Williams, K. D. (1993). Social loafing: a meta-analytic review and theoretical integration. *Journal of Personality and Social Psychology, 65*, 681-706. doi: 10.1037/0022-3514.65.4.681

Katzenbach, J. R., & Smith, D. K. (1993). *The wisdom of teams – Creating the high performance organisation.* Boston, MA: Harvard Business School Press.

Kimberly, J. (1976). Organizational size and the structuralist perspective: A review, critique and proposal. *Administrative Science Quarterly, 21,* 571-597. doi: 2391717

Kline, R. B. (2011). *Principles and practice of structural equation modeling.* The Guilford Press. New York

Koffka, K. (1935). *Principles of Gestalt psychology.* Harcourt-Brace. CA, USA.

Kohn, A. (1993). Why incentives plans cannot work. *Harvard Business Review,* September/October, 54-63.

Komaki, J. L., Coombs, T., & Schepman, S. (1996). Motivational implications of reinforcement theory*.* In R. M. Steers, L. W. Porter, & G. A. Bigley (Eds.), *Motivation and leadership at work* (pp. 34-52). New York: McGraw-Hill.

Kouchaki, M., Okhuysen, G. A., Waller, M. J., & Tajeddin, G. (2012). The treatment of the relationship between groups and their environments: A review and critical examination of common assumptions in research. *Group & Organization Management, 37,* 171–203. doi: 10.1177/1059601112443850

Kozlowski, S. W. J., & Bell, B. S. (2003). Work groups and teams in organizations. In W. C. Borman, D. R. Ilgen, & R. J. Klimoski (Eds.), *Handbook of psychology: Industrial and organizational psychology* (Vol. 12, pp. 333-375). London: Wiley.

Kozlowski S. W. J., Gully S. M., Nason E. R., & Smith, E. M. (1999). Developing adaptive teams: a theory of compilation and performance across levels and time. In D. R. Ilgen & E. D. Pulakos (Eds.), *The Changing Nature of Performance* (240–292). San Francisco, CA: Jossey-Bass.

Kozlowski, S. W. J., & Ilgen, D. R. (2006). Enhancing the effectiveness of work groups and teams. *Psychological Science in the Public Interest, 7*, 77-124. doi: 40062361

Kozlowski, S. W. J., & Klein, K. J. (Eds.) (2000). A multilevel approach to theory and research in organizations: Contextual, temporal, and emergent processes. In *Multilevel theory, research, and methods in organizations* (pp. 3-90). San Francisco: Jossey-Bass.

Langfred, C. W. (2000a). The paradox of self-management: individual and group autonomy in work groups. *Journal of Organizational Behaviour, 21(5),* 563-583.

Langfred, C. W. (2000b). Work-group design and autonomy: a field study of the interaction between task interdependence and group autonomy. *Small Group Research, 31;* 54-70. doi: 10.1177/104649640003100103

Langley, A. (1999). Strategies for theorizing from process data. *Academy of Management Review, 24, 691*-710. doi: 10.5465/AMR.1999.2553248

Latane, B., Williams, K., & Harkins, S. (1979). Many hands make light the work: The causes and consequences of social loafing. *Journal of Personality and Social Psychology, 37,* 822-832. doi: 10.1037/0022-3514.37.6.822

Latham, G. P., & Locke, E. A. (2007). New developments in and directions for goal-setting research. *European Psychologist, 12,* 290-300. doi: 10.1027/1016-9040.12.4.290

Latham, G. P., & Locke, E. A. (1975). Increasing productivity with decreasing time limits: A field replication of Parkinson's Law. *Journal of Applied Psychology, 60,* 524-526. doi: 10.1037/h0076916

Latham, G. P., & Saari, L. M. (1979). The importance of supportive relationships in goal setting. *Journal of Applied Psychology, 64,* 151-156. doi: 10.1037/0021-9010.64.2.151

Latham, G. P., & Saari, L. M. (1982). The importance of union acceptance of productivity improvement through goal setting. *Personnel Psychology, 35,* 781-787. doi: 10.1111/j.1744-6570.1982.tb02221.x

Lawler, E. E. (1971). *Pay and organizational effectiveness.* New York: McGraw-Hill.

Lawler, E. E. (1973). *Motivation in the workplace.* Monterey, CA: Brooks/Cole.

Lee, W. T., Locke, E. A., & Phan, S. H. (1997). Explaining the assigned goal-incentive interaction: the role of self-efficacy and personal goals. *Journal of Management, 23,* 541-559. doi: 10.1177/014920639702300403

Lee, A. N., & Tan, H. H. (2013). What happens when you trust your supervisor? Mediators of individual performance in trust relationships. *Journal of Organizational Behavior, 34*, 407–425. doi: 10.1002/job.1812

LePine, J. A., Piccolo, R. F., Jackson, C. L., Mathieu, J. E. & Saul, J. R. (2008). A meta-analysis of teamwork processes: tests of a multidimensional model and relationships with team effectiveness criteria. *Personnel Psychology, 61,* 273–307. doi: 10.1111/j.1744-6570.2008.00114.x

Levine, J. M. & Moreland, R. L. (1990). Progress in small group research. *Annual Review of Psychology, 41,* 585-634. doi: 10.1146/annurev.ps.41.020190.003101

Lewin, K. (1947). Frontiers in group dynamics. *Human Relations, 1,* 1. doi: 10.1177/001872674700100103

Little, T. D. (2013). *Longitudinal structural equation modeling.* Guilford. New York.

Locke, E. A., Cartledge, N., & Knerr, C. S. (1970). Studies of the relationship between satisfaction, goal-setting, and performance. *Organizational Behavior and Human Performance, 5,* 135–158. doi: 10.1016/0030-5073(70)90011-5

Locke, E. A., Feren, D. B., McCaleb, V. M., Shaw, K. N., & Denny, A. T. (1980). The relative effectiveness of four methods of motivating employee performance. In K. D. Duncan, M. M. Gruneberg, & D. Wallis (Eds.), *Changes in working life* (pp. 363-388). London: Wiley.

Locke, E. A., Latham, G. P., & Erez, M. (1988). The determinants of goal commitment. *Academy of Management Review*, *13*, 23-39. doi: 10.5465/AMR.1988.4306771

Locke, E. A., & Latham, G. P. (1990). *A theory of goal setting and task performance.* Englewood Cliffs, NJ: Prentice Hall.

Locke, E. A., & Latham, G. P. (2012). *New developments in goal setting and task performance.* Englewood Cliffs, NJ: Prentice Hall.

Locke, E. A., Shaw, K. N., Saari, L. M., & Latham, G. P. (1981). Goal setting and task performance: 1969-1980. *Psychological Bulletin, 90,* 125-152. doi: 10.1037/0033-2909.90.1.125

MacCallum, R. C., & Browne, M. W. (1993). The use of causal indicators in covariance structure models: some practical issues. *Psychological Bulletin, 114,* 553-541. doi: 10.1037/0033-2909.114.3.533

MacCallum, R. C., Browne, M. W., Sugawara, H. M. (1996). Power analysis and determination of sample size for covariance structure modeling. *Psychological Methods, 1,* 130-149. doi: 10.1037/1082-989X.1.2.130

Magjuka, R. J., & Baldwin, T. T. (1991). Team-based employee involvement programs: Effects of design and administration. *Personnel Psychology, 44*, 793-812. doi: 10.1111/j.1744-6570.1991.tb00699.x

Malambe, L., & Bussin, M. (2013). Short-term incentive schemes for hospital managers: original research. *SA Journal of Human Resource Management*, *11*(1), 1-9. doi.org/10.4102/ sajhrm.v11i1.487

Marks, M. A., DeChurch, L. A., Mathieu, J. E., Panzer, F. J., & Alonso, A. (2005). Teamwork in multiteam systems. *Journal of Applied Psychology, 90*, 964-971. doi: 10.1037/0021-9010.90.5.964

Marks, M. A., Mathieu, J. E., & Zaccaro, S. J. (2001). A temporally based framework and taxonomy of team processes. *Academy of Management Review*, *26,* 356-376. doi: 10.5465/AMR.2001.4845785

Marriott, R. (1957). *Incentive payment systems: A review of research and opinion.* London: Staples.

Marriott, R. (1968). *Incentive payment systems*. London: Staples.

Marrone, J. A. (2010). Team boundary spanning: A multilevel review of past research and proposals for the future. *Journal of Management, 36,* 911-940. doi: 10.1177/0149206309353945

Mathieu, J., Maynard, M. T., Rapp, T., & Gilson, L. (2008). Team effectiveness 1997-2007: A review of recent advancements and a glimpse into the future. *Journal of Management, 34*, 410. doi: 10.1177/0149206308316061

Mathieu, J. E., Tannenbaum, S. I., Donsbach, J. S., & Alliger, G. M. (2014). A review and integration of team composition models: moving toward a dynamic and temporal framework. *Journal of Management, 40,* 130-160. doi: 10.1177/0149206313503014

McDonald, D. J., & Makin, P. J. (2000). The psychological contract, organizational commitment and job satisfaction of temporary staff. *Leadership & Organizational Development Journal*, *21*, 84–91. doi: 10.1108/01437730010318174

McGrath, J. E. (1964). *Social psychology: A brief introduction*. New York: Holt, Rinehart & Winston.

McGrath, J. E. (1984). *Groups: Interaction and performance*. Englewood Cliffs, NJ: Prentice-Hall

McGrath, J. E. (1991). Time, interaction, and performance (TIP): A theory of groups. *Small Group Research, 22*, 147-174. doi: 10.1177/1046496491222001

McGrath, J. E. (1997). Small group research, that once and future field: An interpretation of the past with an eye to the future. *Group Dynamics: Theory, Research, and Practice*, *1*, 7-27. doi: 10.1037/1089-2699.1.1.7

McGrath, J. E., & Argote, L. (2001). Group processes in organizational contexts. In M. A. Hogg & R. S. Tindale (Eds.), *Blackwell handbook of social psychology: Group processes.* Oxford: Blackwell.

McGrath J. E., Arrow, H., & Berdahl J. L. (2000). The study of groups: past, present, and future. *Personality and Social Psychology Review, 4,* 95–105. doi: 10.1207/S15327957PSPR0401_8

Mento, A. J., Steele, R. P., & Karren, R. J. (1987). A meta-analytic study of the effects of goal setting on task performance: 1966 – 1984. *Organizational Behavior and Human Decision processes, 39,* 52-83. doi: 10.1016/0749-5978(87)90045-8

Messersmith, J. G., Patel, C. P., & Lepak, D. P (2011). Unlocking the black box: exploring the link between high-performance work systems and performance. *Journal of Applied Psychology, 96,* 1105-1118. doi: 10.1037/a0024710

Meyer, H. H. (1975). The pay for performance dilemma. *Organizational Dynamics, 3,* 39-50. doi: 10.1016/0090-2616(75)90029-7

Milkovich, G. T., & Newman, J. M. (1999). *Compensation.* Boston: Irwin.

Miller, L., & Hamblin, R. (1963). Interdependence, differential rewarding, and productivity. *American Sociological Review, 28*, 768-778. doi: 2089914

Mitchell, T. R., & Silver, W. S. (1990). Individual and group goals when workers are interdependent—Effects on task strategies and performance. *Journal of Applied Psychology, 75,* 185-193. doi: 10.1037/0021-9010.75.2.185

Mohammed, S., & Nadkarni, S. (2011). Temporal diversity and team performance: the moderating role of team temporal leadership. *Academy of Management Journal, 54,* 489-508. doi: 10.5465/AMJ.2011.61967991

Moreland, R. L. (1996). Lewin's legacy for small groups research. *Systems Practice, 9*, 7–26. doi: 10.1007/BF02173416

Mowday, R. T., & Sutton, R. I. (1993). Organizational behavior: Linking individuals and groups to organizational contexts. *Annual Review of Psychology, 44*, 195-229. doi: 10.1146/annurev.ps.44.020193.001211

Mullen, B., & Copper, C. (1994). The relation between group cohesiveness and performance: An integration. *Psychological Bulletin, 115*, 210-227. doi: 10.1037/0033-2909.115.2.210

Mullen, B., Symons, C., Hu, L-T, & Salas, E. (1989). Group size, leadership behavior, and subordinate satisfaction. *The Journal of General Psychology, 116*, 155-169. doi: 10.1080/00221309.1989.9711120

Mullen, B., Johnson, D. A., & Drake, S. D. (1987). Organizational productivity as a function of group composition: A self-attention perspective. *Journal of Social Psychology, 127, 143-150.* doi: 10.1080/00224545.1987.9713673

Murayama, K., & Elliot, A. J. (2012). The competition–performance relation: A meta-analytic review and test of the opposing processes model of competition and performance. *Psychological Bulletin, 138,* 1035–1070. doi: 10.1037/a0028324

Nieva, V. F., Fleishman, E. A., & Reick, A. (1985). *Team dimensions: Their identity, their measurement, and their relationships* (Research note 85-12). Washington, DC: U.S. Army, Research Institute for the Behavioral and Social Sciences. doi: ADA149662

O'Leary-Kelly, A. M., Martocchio, J. J., & Frink, D. D. (1994). A review of the influence of group goals on group performance. *Academy of Management Journal, 37,* 1285-1301. doi: 10.2307/256673

Olsen, K., & Kalleberg, A. L. (2004). Non-standard work in two different employment regimes: Norway and the United States. *Work, Employment and Society, 18,* 321-348. doi: 10.1177/09500172004042772

Opsahl, R. L., & Dunnette, M. D. (1966). The role of financial compensation in industrial motivation. *Psychological Bulletin, 66,* 94-118. doi: 10.1037/h0023614

O'Reilly, C. A., & Roberts, K. H. (1977). Task group structure, communication, and effectiveness in three organizations. *Journal of Applied Psychology, 62,* 674--681. doi: 10.1037/0021-9010.62.6.674

Organ, D. W. (1988). *Organizational citizenship behavior: The good soldier syndrome.* Lexington, MA: Lexington Books.

Pearce, J. L. (1993). Toward an organizational behavior of contract laborers: Their psychological involvement and effects on employee coworkers. *Academy of Management Journal*, *36,* 1082–1096. doi: 10.2307/256646

Pentland, B. (1999). Building process theory with narratives: from description to explanation. *Academy of Management Review, 24,* 711-724. doi: 10.5465/AMR.1999.2553249

Peters, L. H., Chassie, M. B., Lindholm, H. R., O'Connor, E. J., & Kline, C. R. (1982). The joint influence of situational constraints and goal setting on performance and affective outcomes. *Journal of Management, 8,* 7-20. doi: 10.1177/014920638200800201

Ployhart, R. E., & Vandenberg, R. J. (2010). Longitudinal research: The theory, design and analysis of change. *Journal of Management, 36*, 94-120. doi: 10.1177/0149206309352110

Ployhart, R. E., Weekley, J. A., & Ramsey, J. (2009). The consequences of human resource stocks and flows: a longitudinal examination of unit service orientation and unit effectiveness. *Academy of Management Journal, 52*(5)*:* 996–1015. doi: 10.5465/AMJ.2009.44635041

Prahalad, C. K. (1983). Developing strategic capability: An agenda for top management. *Human Resource Management, 22*, 237-354. doi: 10.1002/hrm.3930220304

Preacher, K. J., Wichman, A. L., MacCallum, R. C., & Briggs, N. E. (2008). *Latent Growth Curve Modeling.* Sage Publications. CA, USA.

Prussia, G. E., & Kinicki, A. J. (1996). A motivational investigation of group effectiveness using social-cognitive theory. *Journal of Applied Psychology, 81,* 187-198. doi: 10.1037/0021-9010.81.2.187

Podsakoff, P. M., Ahearne, M., & MacKenzie, S. B. (1997). Organizational citizenship behavior and the quantity and quality of work group performance. *Journal of Applied Psychology, 82,* 262-270. doi: 10.1037/0021-9010.82.2.262

Polivka, A. E., & Nardone, T. (1989). On the definition of contingent work. *Monthly Labour Review, 112(9),* 9–16.

Raudenbush, S. W., & Bryk, A. S. (2002). *Hierarchical linear models: applications and data analysis methods.* Advanced quantitative techniques in the social science series 1. Sage Publications. London, UK.

Raudenbush, S., Bryk, A., Cheong, Y. F., Congdon, R., & du Toit, M. (2004). *HLM6: Hierarchical linear and nonlinear modeling*. Scientific Software International, Lincolnwood, IL.

Rico, R., Sanchez-Manzanares, M., Gil, F., & Gibson, C. (2008). Team implicit coordination processes: a team knowledge–based approach. *Academy of Management Review, 33,* 163–184. doi: 10.5465/AMR.2008.27751276

Rogosa, D., Brandt, D., & Zimowski, M. (1982). A growth curve approach to the measurement of change. *Psychological Bulletin, 92,* 726-748. doi: 10.1037/0033-2909.92.3.726

Rosenbaum, M. E., Moore, D. L., Cotton, J. L., Cook, M. S., Hieser, R. A., Shovar, M. N., & Gray, M. J. (1980). Group productivity and process: Pure and mixed reward structures and task interdependence. *Journal of Personality and Social Psychology, 39*, 626-642. doi: 10.1037/0022-3514.39.4.626

Rosenstein, B. (2002). Video use in social science research and program evaluation*. International Journal of Qualitative Methods, 1(3),* 1-36.

Rousseau, D. M., & Wade-Benzoni, K. A. (1995). Changing individual-organizational attachments—A two way street. In A. Howard (Ed.), *The changing nature of work*. San Francisco: Jossey-Bass.

Rousseau, V., Aubé, C., & Savoie, A. (2006). Teamwork behaviors: a review and an integration of frameworks. *Small Group Research, 37,* 540-570. doi: 10.1177/1046496406293125

Saavedra, R., Earley, P. C., & Van Dyne, L. (1993). Complex interdependence in task-performing groups. *Journal of Applied* Psychology, *78*, 61-72. doi: 10.1037/0021-9010.78.1.61

Saris, W. E., Satorra, A., & van der Veld, W. M. (2009). Testing structural equation models or detection of misspecifications? *Structural Equation Modeling, 16,* 561-582. doi: 10.1080/10705510903203433

Sclove, L. S. (1987). Application of model-selection criteria to some problems in multivariate analysis. *Psychometrika, 52,* 333-343. doi: 10.1007/BF02294360

Schippers, M. C., Homan, A. C., & Van Knippenberg, D. (2013). To reflect or not to reflect: Prior team performance as a boundary condition of the effects of reflexivity on learning and final team performance. *Journal of Organizational Behavior, 34*, 6-23. doi: 10.1002/job.1784

Shadish, W. R., Cook, T. D., & Campbell, D. T. (2002). *Experimental and quasi-experimental designs for generalized causal inference*. Boston: Houghton Mifflin.

Shaw, J. D., Gupta, N., & Delery, J. E. (2002). Pay dispersion and workforce performance: moderating effects of incentives and interdependence. *Strategic Management Journal, 23,* 491-512. doi: 10.1002/smj.235

Shaw, J. D., Park, T., & Kim, E. (2013). A resource-based perspective on human capital losses, HRM investments, and organizational performance. *Strategic Management Journal, 34,* 572–589. doi: 10.1002/smj.2025

Singer, J. D. & Willett, J. B. (2003). *Applied longitudinal data analysis.* Oxford University Press.

Skaggs, K. J., Dickinson, A. M., & O'Connor, K. A. (1992). The use of concurrent schedules to evaluate the effects of extrinsic rewards on "intrinsic motivation": A replication. *Journal of Organizational Behavior Management, 12,* 45-83. doi: 10.1300/J075v12n01_04

Skinner, B. F. (1953). *Science and human behavior*. Simon and Schuster.

Snelgar, R. J., Renard, M., & Venter, D. (2013). An empirical study of the reward preferences of South African employees: original research. *SA Journal of*

Human Resource Management, *11*(1), 1-14. doi.org/10.4102/ sajhrm.v11i1.351

Sobel, M. F., & Bohrnstedt, G. W. (1985). Use of null models in evaluating the fit of covariance structure models. In N. B. Tuma (Ed.), *Sociological methodology 1985* (pp. 152-178). San Francisco: Jossey-Bass.

Sonnentag, S. (2012). Time in organizational research: catching up on a long neglected topic in order to improve theory. *Organizational Psychology Review, 2,* 361–368. doi: 10.1177/2041386612442079

Spector, P. E. (2003). *Industrial and organizational psychology: Research and practice.* Wiley. Hoboken, New Jersey

Statistica 12. StatSoft Inc. 1984 – 2013.

Steers, R. M., Porter, L. W., & Bigley, G. A. (1996). *Motivation and leadership at work*. New York: McGraw-Hill.

Steiner, I. D. (1972). *Group process and productivity*. New York: Academic.

Stewart, G.L. (2010). The past twenty years: Teams research is alive and well at the Journal of Management. *Journal of Management, 36*, 801. doi: 10.1177/0149206310371512

Stewart, G. L. (2006). A meta-analytic review of relationships between team design features and team performance. *Journal of Management, 32,* 29-54. doi: 10.1177/0149206305277792

Stewart, G. L., & Barrick, M. R. (2000). Team structure and performance: Assessing the mediating role of intrateam process and the moderating role of task type. *Academy of Management Journal, 43*, 135-148. doi: 10.2307/1556372

Steyer, R., Ferring, D., & Schmitt, M. J. (1992). States and traits in psychological assessment. *European Journal of Psychological Assessment, 8*(2), 79-98.

Steyer, R., Schmitt, M. J., & Eid, M. (1999). Latent state-trait theory and research in personality and individual differences. *European Journal of Personality, 13,* 389-408. doi: 10.1002/(SICI)1099-0984(199909/10)13:5

Stinglhamber, F., & Vandenberghe, C. (2003). Organizations and supervisors as sources of support and targets of commitment: a longitudinal study. *Journal of Organizational Behavior, 24*, 251–270. doi: 10.1002/job.192

Stout, R. J., Cannon-Bowers, J. A., Salas, E., & Milanovich, D. M. (1999). Planning, shared mental models, and coordinated performance: An empirical link is established. *Human Factors, 41,* 61-71. doi: 10.1518/001872099779577273

Sundstrom, E., DeMeuse, K. P., & Futrell, D. (1990). Work teams: Applications and effectiveness. *American Psychologist, 45,* 120-133. doi: 10.1037/0003-066X.45.2.120

Tajfel, H., & Turner, J. C. (1985). The social identity theory of intergroup behavior. In S. Worchel & W. G. Austin (Eds.), Psychology of intergroup relations (2nd ed., pp. 7-24). Chicago: Nelson-Hall.

Tashakkori, A., & Teddlie, C. (2003). *Handbook of mixed methods in social and behavioral research.* Thousand Oaks, CA: Sage.

Tashakkori, A., & Teddlie, C. (2008). Quality of inferences in mixed methods research: Calling for an integrative framework. In Bergman, M. M. (Eds.), *Advances in mixed methods research*. London: Sage.

Teddlie, C., & Yu, F. (2007). Mixed methods sampling: a typology with examples. *Journal of Mixed Methods Research, 1,* 77-100. doi: 10.1177/2345678906292430

Terborg, J. R. (1976). The motivational components of goal setting. *Journal of Applied Psychology, 61,* 613-621. doi: 10.1037/0021-9010.61.5.613

Tjosvold, D. (1989). *Team organization: An enduring competitive advantage.* Chichester, England: Wiley.

Tjosvold, D. (1991). *The conflict positive organization.* Reading, MA: Addison-Wesley.

Tjosvold, D., & Johnson, D. W., (Eds). (1983). *Productive conflict management: Perspectives for organisations.* New York: Irvington Publishers.

Tubbs, M. E. (1986). Goal-setting: A meta-analytic examination of the empirical evidence. *Journal of Applied Psychology, 71,* 473-483. doi: 10.1037/0021-9010.71.3.474

Tucker, L. R., & Lewis, C. (1973). A reliability coefficient for maximum likelihood factor analysis. *Pyschometrika, 38,* 1-10. doi: 10.1007/BF02291170

Tuckman, B. W. (1965). Developmental sequence in small groups. *Psychological Bulletin, 63,* 384-399. doi: 10.1037/h0022100

Tuckman, B. W., & Jensen, M. C. (1977). Stages of small-group development revisited. *Group & Organization Studies, 2,* 419-427. doi: 10.1177/105960117700200404

Turner, J. C., & Oakes, P. J. (1986). The significance of the social identity concept for social psychology with reference to individualism, interactionism and social influence. *British Journal of Social Psychology*, *25*, 231-252. doi: 10.1111/j.2044-8309.1986.tb00732.x

Tushman, M., & Katz, R. (1980). External communication and project performance: An investigation into the role of gatekeepers. *Management Science, 26,* 1071-1085. doi: 2631174

Uzzi, B., & Barsness, Z. I. (1998). Contingent employment in British establishments: Organizational determinants of the use of fixed-term hires and part-time workers. *Social Forces*, *76*, 967–1007. doi: 10.1093/sf/76.3.967

Van de Ven, A. H. (1992). Suggestions for studying strategy process: A research note. *Strategic Management Journal, 13:* 169-188. doi: 10.1002/smj.4250131013

Van de Ven, A. H. (2007). *Engaged scholarship: A guide for organisational and social research.* Oxford. New York.

Van de Ven, A. H., & Delbecq, A. L. (1974). A task contingent model of work-unit structure. *Administrative Science Quarterly, 19*, 183-197. doi: 2393888

Van de Ven, A. H., Delbecq, A. L. & Koenig, R. (1976). Determinants of coordination modes within organizations. *American Sociological Review, 41*, 322-38. doi: 2094477

Van Der Vegt, G. S., & Bunderson, S. J. (2005). Learning and performance in multidisciplinary teams: The importance of team identification. *Academy of Management Journal, 48,* 532-547. doi: 10.5465/AMJ.2005.17407918

Van Der Vegt, G. S., Emans, B. J., & Van De Vliert, E. (2001). Patterns of interdependence in work teams: a two-level investigation of the relations with job and team satisfaction. *Personnel Psychology, 54*, 51-69. doi: 10.1111/j.1744-6570.2001.tb00085.x

Van Dyne, L. & Ang, S. (1998). Organizational citizenship behavior of contingent workers in Singapore. *Academy of Management Journal, 41,* 692-703. doi: 10.2307/256965

Vietor, R. H. K. (2007). *How countries compete: Strategy, structure, and government in the global economy.* Harvard Business School Press.

Vroom, V. H. (1964) *Work and motivation*. New York: Wiley.

Wageman, R. (1995). Interdependence and group effectiveness. *Administrative Science Quarterly, 40,* 145-180. doi: 2393703

Wageman, R. (2001), "The meaning of interdependence". In Turner, M. (Ed.), *Groups at Work.* Mahwah, NJ.

Wageman, R., & Baker, G. (1997). Incentives and cooperation: The joint effects of task and reward interdependence on group performance. *Journal of*

Organizational Behaviour, 18, 139-158. doi: 10.1002/(SICI)1099-1379(199703)18:2

Wageman, R., Gardner, H., & Mortensen, M. (2012). The changing ecology of teams: new directions for teams research. *Journal of Organizational Behavior, 33,* 301-315. doi: 10.1002/job.1775

Wagner, J. A., Humphrey, S. E., Meyer, C. J., & Hollenbeck, J. R. (2012). Individualism–collectivism and team member performance: Another look. *Journal of Organizational Behavior, 33,* 946-963. doi: 10.1002/job.783

Waller, M. J. (1999). The timing of adaptive group responses to nonroutine events. *Academy of Management Journal, 42,* 127-137. doi: 10.2307/257088

Wang, J., & Wang, X. (2012). *Structural equation modeling: applications using Mplus.* United Kingdom: Wiley.

Weisberg, J. (1996). Differential teamwork performance: The impact of general and specific human capital levels, *International Journal of Manpower, 17,* 18 – 29. doi: 10.1108/EUM0000000004274

Welbourne, T. M., & Gomez Mejia, L. R. (1995). Gainsharing - A critical-review and a future-research agenda. *Journal of Management, 21*, 559-609. doi: 10.1177/014920639502100307

Wildman, J. L., Thayer, A. L., Rosen, M. A., Salas, E., Mathieu, J. E., & Rayne, S. R. (2012). Task types and team-level attributes: synthesis of team classification. *Human Resource Development Review, 11*, 97-129 doi: 10.1177/1534484311417561

Wilkin, C. L. (2013). I can't get no job satisfaction: Meta-analysis comparing permanent and contingent workers. *Journal of Organizational Behavior, 34,* 47–64. doi: 10.1002/job.1790

Wood, R. E., Mento, A. J., & Locke, E. A. (1987). Task complexity as a moderator of goal effects: A meta-analysis. *Journal of Applied Psychology. 72*, 416-425. doi: 10.1037/0021-9010.72.3.416

World Bank. (2007). *Global economic prospects: Managing the next wave of globalization.*

World Economic Forum. (2012). The Global Competitiveness Index 2012–2013.

Wright, P. M. (1989). Test of the mediating role of goals in the incentive-performance relationship. *Journal of Applied Psychology, 74,* 699-705. doi: 10.1037/0021-9010.74.5.699

Yin, R. K. (2003). *Applications of case study research*. Thousand Oaks, CA: Sage.

Zaheer, S., Albert, A., & Zaheer, A. (1999). Timescales and organizational theory. *Academy of Management Review, 24*, 725–741. doi: 10.5465/AMR.1999.2553250

Zalesny, M. D., Salas, E., & Prince, C. (1995). Conceptual and measurement issues in coordination: Implications for team behavior and performance. *Research in Personnel and Human Resources Management, 13:* 81-115. doi:

Zajonc, R. B. (1965). Social facilitation. *Science, 149 (3681).* 269-274.

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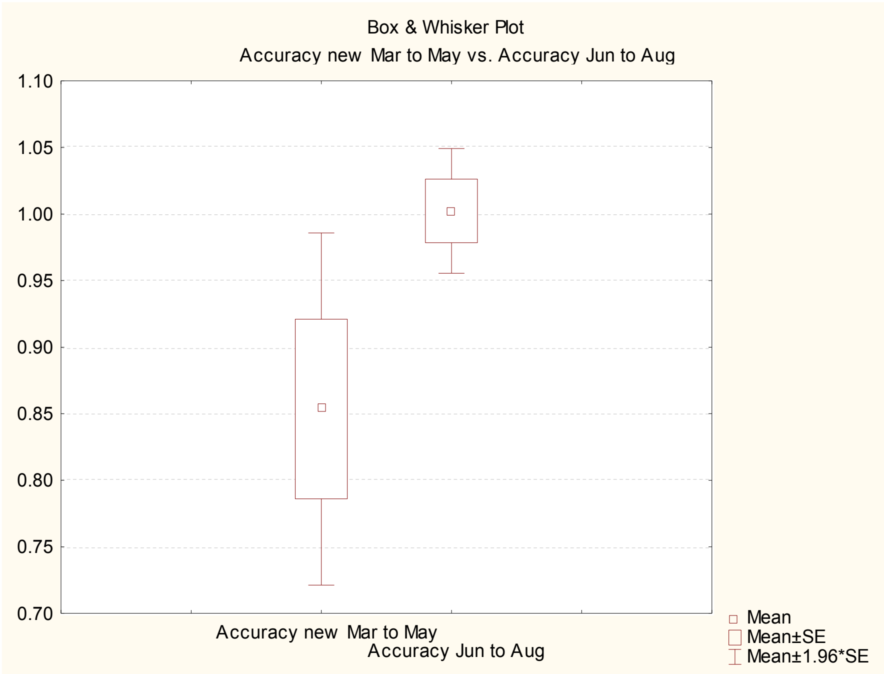
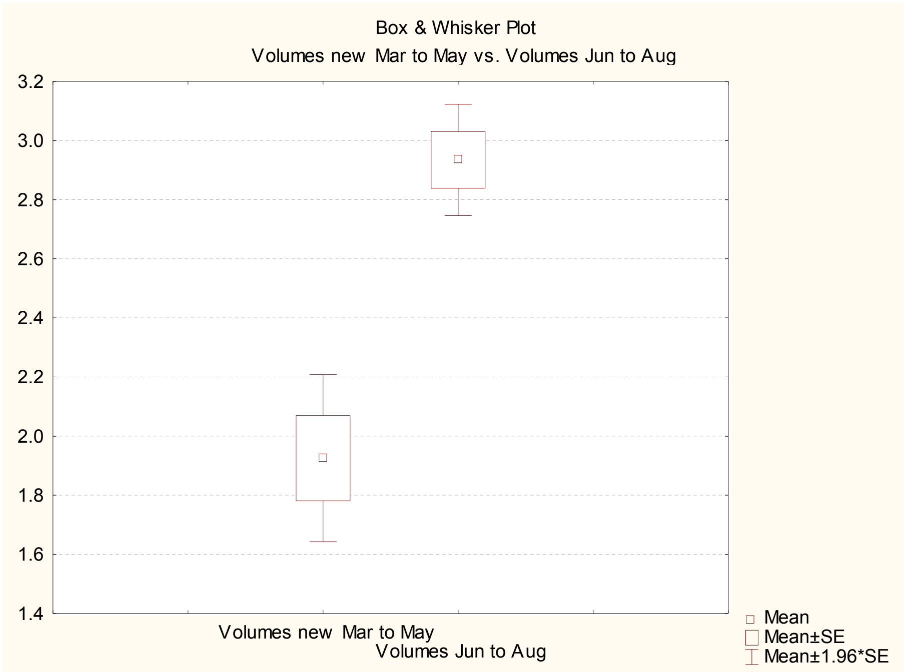
APPENDIX A

Variable	Mean	Std.Dv.	N	Diff.	Std.Dv. Diff.	t	df	p	Confidence -95.000%	Confidence +95.000%
	T-test for Dependent Samples (April analysis 2009 merged3 JHB Pret checked (2)) Marked differences are significant at p < .05000									
Volumes new Mar to May	1.925581	0.945690								
Volumes Jun to Aug	2.934884	0.629393	43	-1.00930	0.877717	-7.54051	42	0.000000	-1.27942	-0.739181

Variable	Mean	Std.Dv.	N	Diff.	Std.Dv. Diff.	t	df	p	Confidence -95.000%	Confidence +95.000%
	T-test for Dependent Samples (April analysis 2009 merged3 JHB Pret checked (2)) Marked differences are significant at p < .05000									
Accuracy new Mar to May	0.853488	0.442584								
Accuracy Jun to Aug	1.002326	0.156583	43	-0.148837	0.403185	-2.42070	42	0.019893	-0.272919	-0.024755

APPENDIX B


Box & Whisker Plot
Accuracy new Mar to May vs. Accuracy Jun to Aug
1.10
1.05
1.00
0.95
0.90
0.85
0.80
0.75
0.70
Accuracy new Mar to May
Accuracy Jun to Aug
Mean
Mean±SE
Mean±1.96*SE


Box & Whisker Plot
Volumes new Mar to May vs. Volumes Jun to Aug
3.2
3.0
2.8
2.6
2.4
2.2
2.0
1.8
1.6
1.4
Volumes new Mar to May
Volumes Jun to Aug
Mean
Mean±SE
Mean±1.96*SE

APPENDIX C

Variable	Correlations (April analysis 2009 merg Marked correlations are significant at N=43 (Casewise deletion of missing d		
	Means	Std.Dev.	Volumes new to May
Volumes new Mar to May	1.925581	0.945690	1.00
Volumes Jun to Aug	2.934884	0.629393	0.43
Accuracy new Mar to May	0.853488	0.442584	0.61
Accuracy Jun to Aug	1.002326	0.156583	0.44

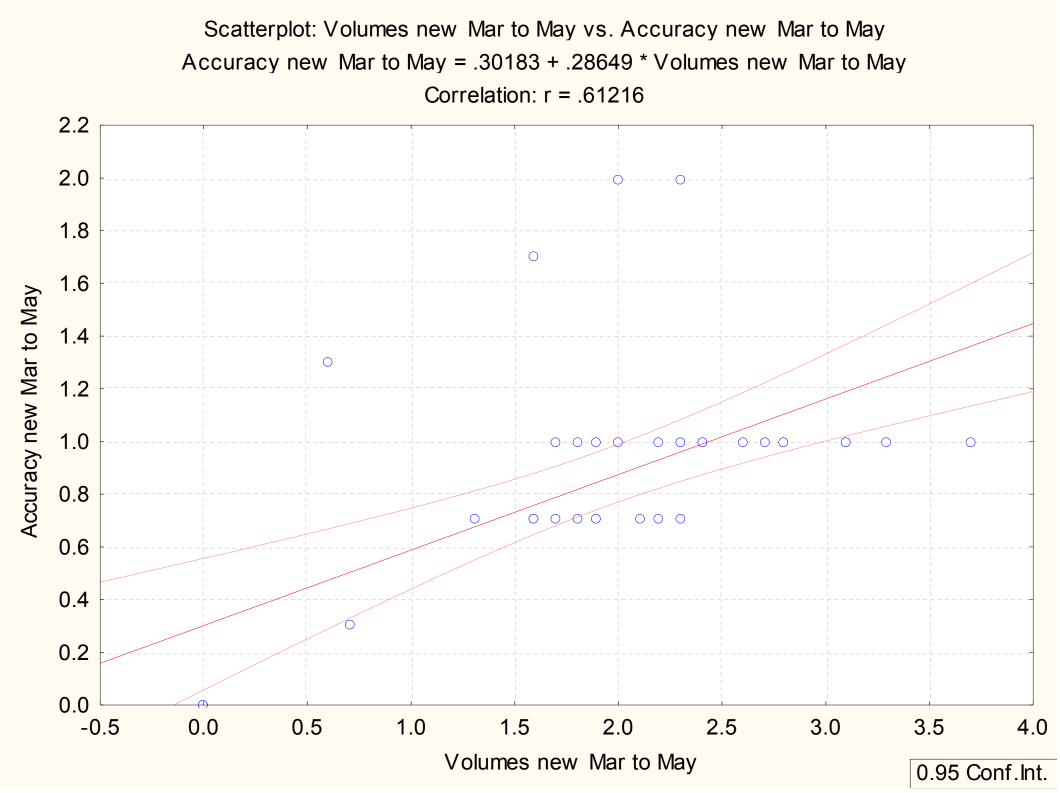
APPENDIX D

Variable	Correlations (April analysis 2009 merged3 JHB Pret checked (2)) Marked correlations are significant at p < .05000			
	Volumes new Mar to May	Volumes Jun to Aug	Accuracy new Mar to May	Accuracy Jun to Aug
Volumes new Mar to May	1.0000	.4369	.6122	.4482
	N=43	N=43	N=43	N=43
	p= ---	p=.003	p=.000	p=.003
Volumes Jun to Aug	.4369	1.0000	.4333	.2794
	N=43	N=43	N=43	N=43
	p=.003	p= ---	p=.004	p=.070
Accuracy new Mar to May	.6122	.4333	1.0000	.4173
	N=43	N=43	N=43	N=43
	p=.000	p=.004	p= ---	p=.005
Accuracy Jun to Aug	.4482	.2794	.4173	1.0000
	N=43	N=43	N=43	N=43
	p=.003	p=.070	p=.005	p= ---

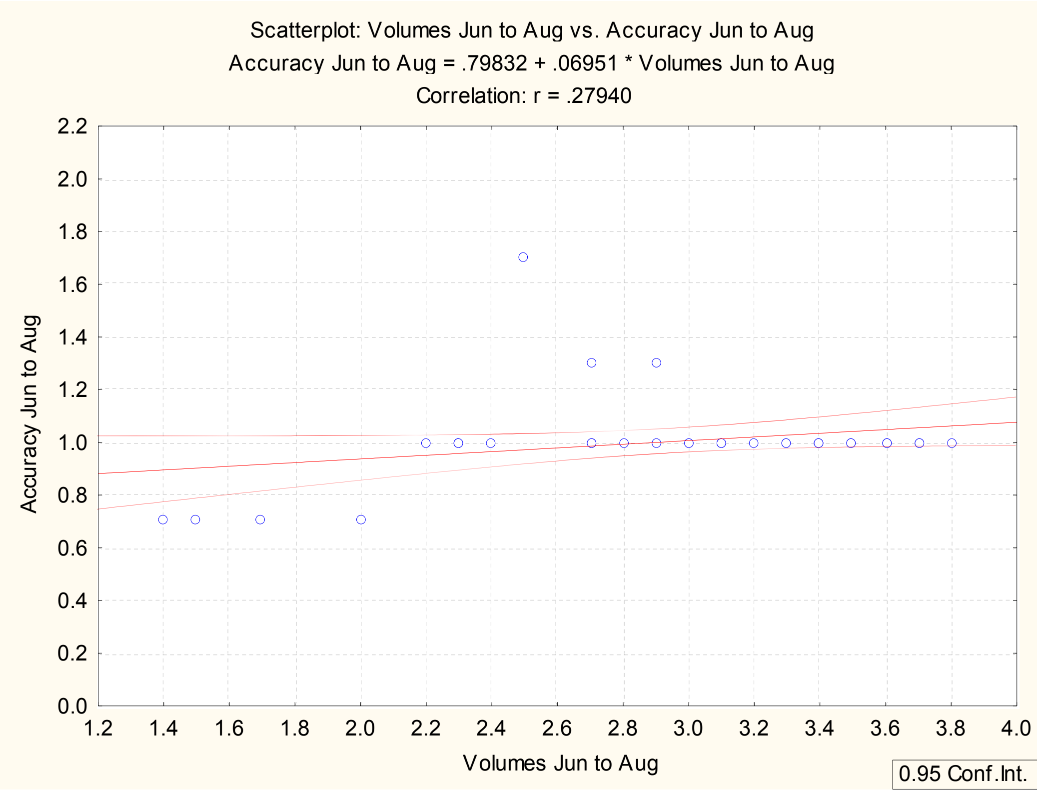
APPENDIX E

Supervisor	Volumes Mar to May	Volumes Jun to Aug	Accuracy Mar to May	Accuracy Jun to Aug	Number of tellers	% Vol increase	% Accuracy increase
Dorah Seleme Average	**2.6**	**2.6**	**1.0**	**1.1**	3	-1%	11%
Emelda Mokobane Average	**2.6**	**2.7**	**1.0**	**1.0**	7	6%	-5%
Iyanda Ringane Average	**1.9**	**3.6**	**0.8**	**1.0**	2	90%	20%
Khumbudzo Ramukhithu Average	**0.0**	**1.5**	**0.0**	**0.7**	2		
Lebogang Kekana Average	**1.6**	**2.3**	**0.6**	**0.9**	4	41%	57%
Mariette Short Average	**2.1**	**3.2**	**1.2**	**1.0**	6	50%	-14%
Ntombi Nyaqela Average	**2.0**	**3.3**	**0.8**	**1.0**	4	59%	20%
Rejoice Mkhabela Average	**1.9**	**3.6**	**0.7**	**1.0**	4	92%	50%
Rose Motsepe Average	**0.0**	**2.0**	**0.0**	**0.7**	1		
Roselyn Mgadi Average	**2.5**	**3.6**	**1.0**	**1.0**	2	41%	0%
Wedson Makgoo Average	**1.6**	**3.0**	**0.8**	**1.1**	5	83%	33%

APPENDIX F

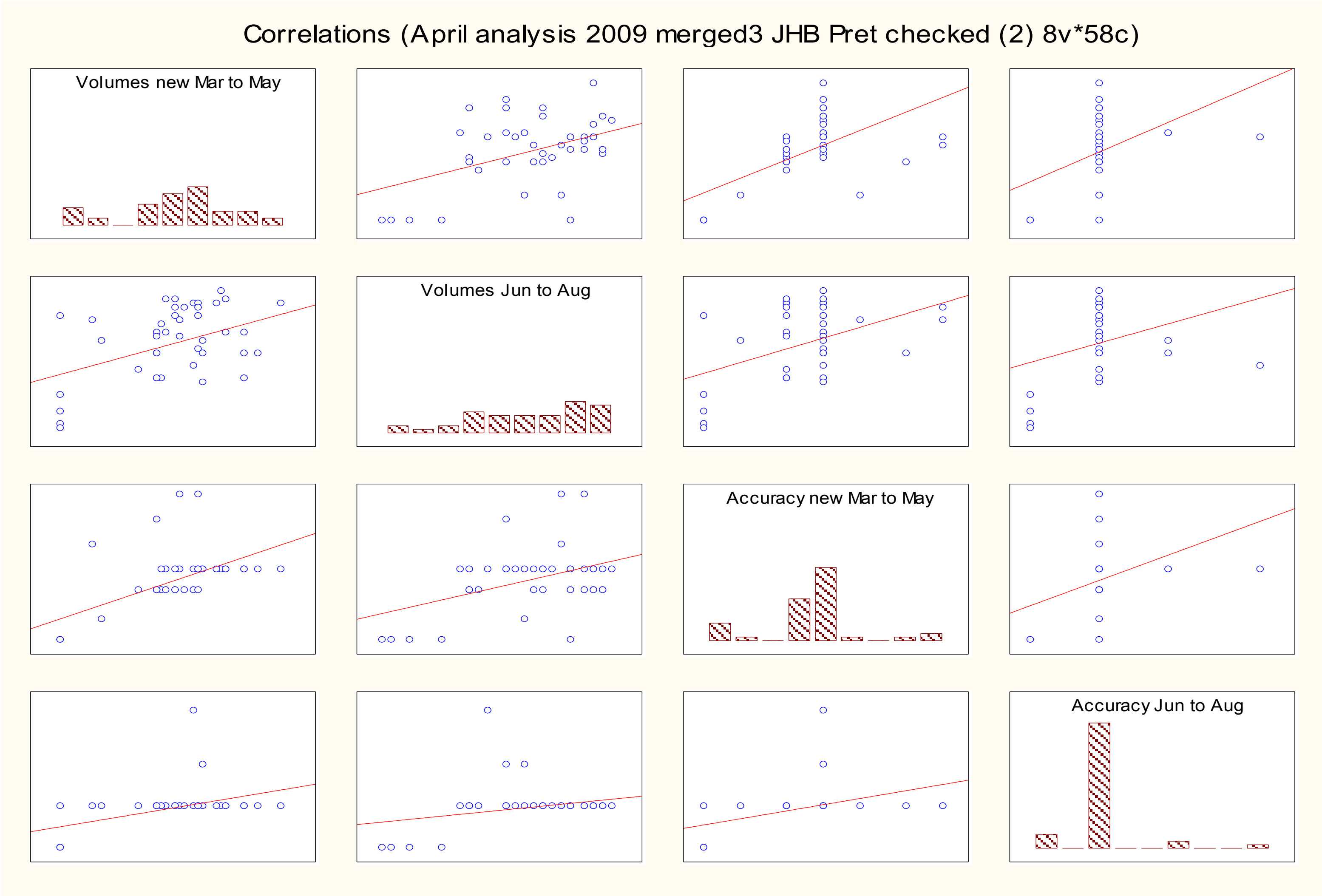


Scatterplot: Volumes new Mar to May vs. Accuracy new Mar to May
Accuracy new Mar to May = .30183 + .28649 * Volumes new Mar to May
Correlation: r = .61216
Accuracy new Mar to May
2.2
2.0
1.8
1.6
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
-0.5
0.0
0.5
1.0
1.5
2.0
2.5
3.0
3.5
4.0
Volumes new Mar to May
0.95 Conf.Int.

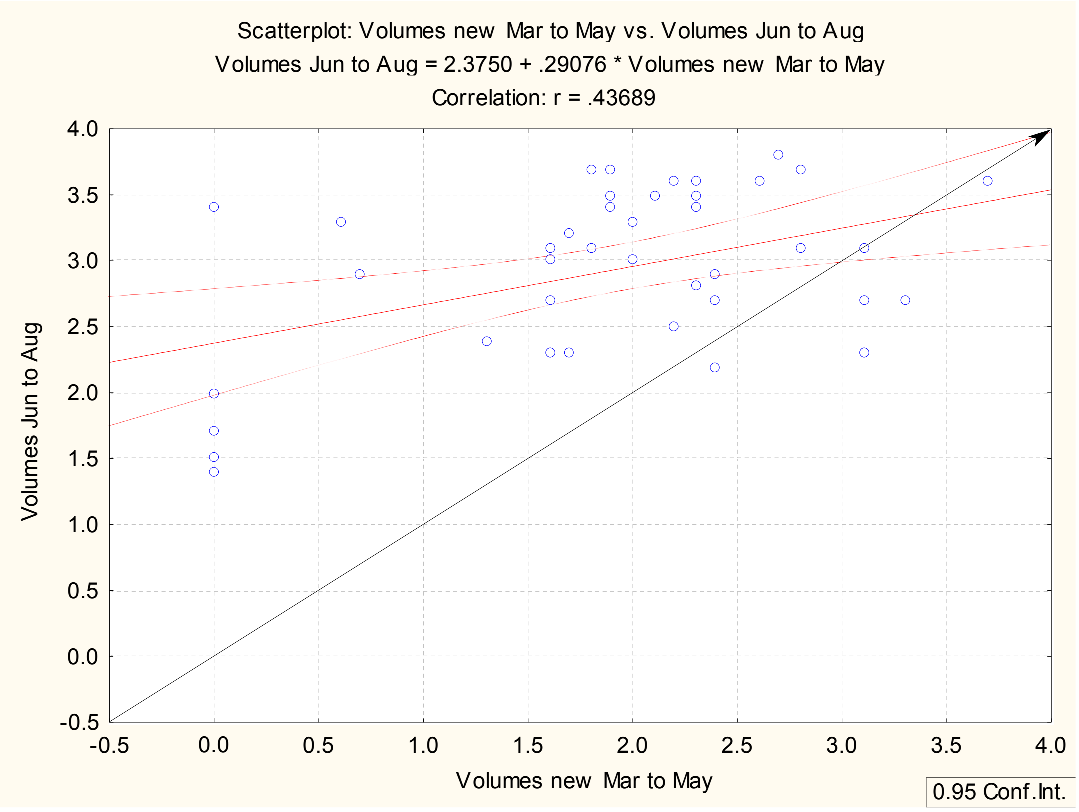


Scatterplot: Volumes Jun to Aug vs. Accuracy Jun to Aug
Accuracy Jun to Aug = .79832 + .06951 * Volumes Jun to Aug
Correlation: r = .27940
Accuracy Jun to Aug
2.2
2.0
1.8
1.6
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
1.2
1.4
1.6
1.8
2.0
2.2
2.4
2.6
2.8
3.0
3.2
3.4
3.6
3.8
4.0
Volumes Jun to Aug
0.95 Conf.Int.

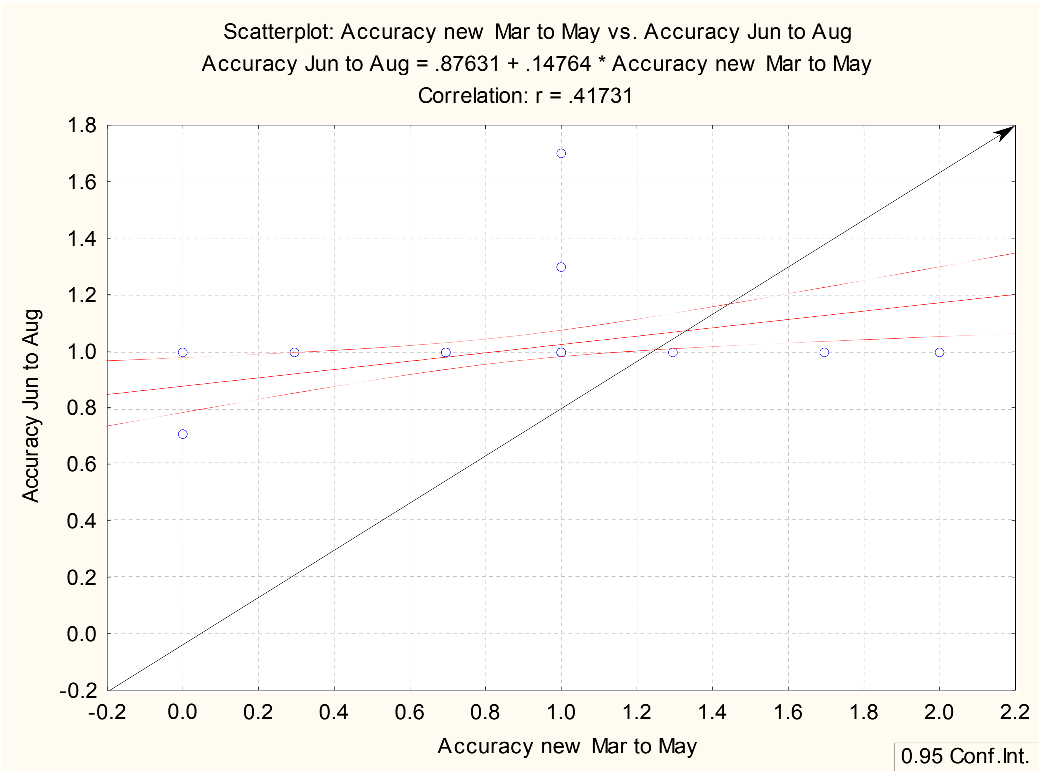
APPENDIX G


Correlations (April analysis 2009 merged3 JHB Pret checked (2) 8v*58c)
Volumes new Mar to May
Volumes Jun to Aug
Accuracy new Mar to May
Accuracy Jun to Aug

APPENDIX H



Scatterplot: Volumes new Mar to May vs. Volumes Jun to Aug
Volumes Jun to Aug = 2.3750 + .29076 * Volumes new Mar to May
Correlation: r = .43689
Volumes Jun to Aug
Volumes new Mar to May
-0.5
0.0
0.5
1.0
1.5
2.0
2.5
3.0
3.5
4.0
0.95 Conf.Int.



Scatterplot: Accuracy new Mar to May vs. Accuracy Jun to Aug
Accuracy Jun to Aug = .87631 + .14764 * Accuracy new Mar to May
Correlation: r = .41731
Accuracy Jun to Aug
Accuracy new Mar to May
-0.2
0.0
0.2
0.4
0.6
0.8
1.0
1.2
1.4
1.6
1.8
2.0
2.2
0.95 Conf.Int.

APPENDIX I

Calculation of supervisor rewards: example

CATEGORIES	CATEGORY RATING	WEIGHT	FINAL RATING
Teller Ratings (average of tellers)	1.5	60%	0.90
Attendance	0	negative	0
Incident management	4	15%	0.60
Equipment & Stationary	4	5%	0.20
Self-Audit exceptions	4	10%	0.40
Supervisor skills	4	10%	0.40
		100%	**3.0**

APPENDIX J

Rating scale for supervisors

SUPERVISOR RATING	CATEGORY	ALLOWANCE CALCULATION
4 Rating	Supervisor A+	50% of his/her Teller allowances
3 Rating	Supervisor A	40% of his/her Teller allowances
2 Rating	Supervisor B	30% of his/her Teller allowances
1 Rating	Supervisor C	Nil

APPENDIX K

Example of calculated supervisor rewards as proportion of teller rewards

SUPERVISOR	TELLERS	TELLER ALLOWANCES
Susan	Melissa	R300
	John	R300
	Elmarie	R300
	Jennifer	-
	Sipho	R700
		R1,600

If Susan is rated a Supervisor A, she would earn 40% of R 1,600 = R 640

If Susan is rated a Supervisor B, she would earn 30% of R 1,600 = R 480

APPENDIX L

Interview sheet for tellers

CASH CENTRE	
TELLER NAME	
NAME OF SUPERVISOR	
DATE OF SURVEY	
NO. OF SURVEYS PREVIOUSLY PARTICIPATED IN BY TELLER	
NAME OF INTERVIEWER	
POSITION OF INTERVIEWER	

Section 1 – Background Information

Age particulars	**Year of birth**		
If you were to approximate, what is the number of years that you have been working in SBV retail cash processing?	**Less than 1 year**	**More than 1 year but less than 3 years**	**3 or more years**
What is your present position in Retail	**Teller**	**Acting Supervisor**	**Other**
What is your highest level of education?	**Below Matric**	**Matric**	**Above Matric**
	Yes	**No**	**Comments**
Have you received teller training?			

Section 2 – Task Interdependency (people)

	Low	**Moderate**	**High**
To what extent would you describe your work as dependent on other tellers?			

Please explain			
To what extent would you describe your work as dependent on what your supervisor does?			
Please explain			

Section 3 - Events

Are there any events / changes at work which have helped you to get through more retail processing volumes in a shift?				
Are there any events / changes at work which have slowed you down from getting through more retail processing volumes in a shift?				
In general, has the introduction of rewards had any influence on any of the following for you?	**Worse**	**Much the same**	**Much better**	**Briefly explain**
Volumes processed				
Accuracy				
Professionalism				
Attendance				

Section 4 - Context

Are there any issues in this cash centre which you believe could affect how retail cash processing tellers and teams perform?				
Has allocation to the **supervisor** affected your work in any of the following?	**Worse**	**Much the same**	**Much better**	**Briefly explain**
Volumes processed				
Accuracy				
Professionalism				
Attendance				

Has allocation to the **team** affected your work in any of the following?	**Worse**	**Much the same**	**Much better**	**Briefly explain**
Volumes processed				
Accuracy				
Professionalism				
Attendance				

Section 5 – Goal Setting, Feedback and Progress

To what extent does your supervisor provide you with goals/targets to be achieved in the areas below	**Low**	**Moderate**	**High**	**Comments**
Volumes processed				
Accuracy				
Professionalism				
Attendance				
To what extent does your supervisor provide you with individual feedback on how you are performing against the goals/targets to be achieved in the areas below	**Low**	**Moderate**	**High**	**Comments**
Volumes processed				
Accuracy				
Professionalism				
Attendance				
To what extent does your progress/lack of progress affect your performance on the areas below?	**Low**	**Moderate**	**High**	**Comments**
Volumes processed				
Accuracy				
Professionalism				
Attendance				

Section 6 - Teamwork

	Poor	**Satisfactory**	**Good**	**Comments**

How would you characterise your overall satisfaction with your present supervisor				
To what extent do you believe your supervisor supports your on dealing with incidents?				
To what extent do you believe your supervisor supports you in providing you with counting equipment in good working order?				
To what extent do you believe that your supervisor supports you in obtaining stationery (stamps, rubber bands, and paper)?				
Are there any other things that you believe your supervisor could help you with in order for you to perform your job better?				

Section 7 - History

Section 8 – Changes in meaning and attributes

APPENDIX M

Interview sheet for supervisors

Section 1 – Background Information

Age particular	**Year of birth**		
If you were to approximate, what is the number of years that you have been working in SBV retail cash processing?	**Less than 1 year**	**More than 1 year but less than 3 years**	**3 or more years**
What is your present position in Retail	**Supervisor**	**Acting Supervisor**	**Other**
What is your highest level of education?	**Below Matric**	**Matric**	**Above Matric**
	Yes	**No**	**Comments**
Have you received formal supervisor training at SBV?			

Section 2 – Task Interdependency (people)

	Low	**Moderate**	**High**
To what extent would you describe your work as dependent **on individual tellers** in your team?			
Please explain			
To what extent would you describe your work as dependent on how **your whole team** performs?			
Please explain			

Section 3 - Events

Are there any events / changes at work which have helped you to get through more retail processing volumes in a shift?				
Are there any events / changes at work which have slowed you down from getting through more retail processing volumes in a shift?				
In general, has the introduction of rewards had any influence on any of the following for you?	**Worse**	**Much the same**	**Much better**	**Briefly explain**
Volumes processed				
Accuracy				
Professionalism				
Attendance				

Section 4 - Context

Are there any issues in this cash centre which you believe could affect how retail cash processing tellers and teams perform?				
Has allocation to the **supervisor** affected your work in any of the following?	**Worse**	**Much the same**	**Much better**	**Briefly explain**
Volumes processed				
Accuracy				
Professionalism				
Attendance				
Has allocation to the **team** affected your work in any of the following?	**Worse**	**Much the same**	**Much better**	**Briefly explain**
Volumes processed				
Accuracy				
Professionalism				
Attendance				

Section 5 – Goal Setting, Feedback and Progress

To what extent do you set goals/targets to your team members in the areas below	**Low**	**Moderate**	**High**	**Comments**

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	Low	Moderate	High	Comments
Volumes processed				
Accuracy				
Professionalism				
Attendance				
To what extent do you provide **individual feedback** on how your tellers are performing against the goals/targets to be achieved in the areas below	**Low**	**Moderate**	**High**	**Comments**
Volumes processed				
Accuracy				
Professionalism				
Attendance				
To what extent does your progress/lack of progress affect your performance as a supervisor in the areas below? (i.e. does it matter to your if you are making progress or not in the areas below)	**Low**	**Moderate**	**High**	**Comments**
Volumes processed				
Accuracy				
Professionalism				
Attendance				

Section 6 - Teamwork

	Low	Moderate	High	Comments
How would you characterise your overall satisfaction with your present team?				
To what extent do you believe that you provide support to your team in dealing with incidents?				
To what extent do you believe that you provide support yo your team in providing cash counting equipment in good working order?				
To what extent do you believe that you provide support to your team in obtaining stationery (stamps, rubber bands, and paper)?				

Are there any other things that you believe your team could help you with in order for you to perform your job better?	

Section 7 - History

Section 8 – Changes in meaning and attributes

APPENDIX N

FINAL RATING

Tukey unequal N HSD Final Rating

Cell No.	Unequal N HSD; variable DV_1 (1234 based on means for 3of5 no zeros 2) Approximate Probabilities for Post Hoc Tests Error: Between; Within; Pooled MSE = .61090, df = 277.03											
	Employee status	FINALRAT	{1} 1.5295	{2} 1.4486	{3} 1.6694	{4} 1.9083	{5} 2.2823	{6} 1.4798	{7} 1.3904	{8} 1.6667	{9} 1.7857	{10 2.23
1	Permanent	FinalRating: -6-1		0.999584	0.973962	0.041676	0.000012	1.000000	0.999860	0.999874	0.983693	0.066
2	Permanent	FinalRating: 0	0.999584		0.683753	0.003657	0.000012	1.000000	1.000000	0.994911	0.906873	0.022
3	Permanent	FinalRating: 1-6	0.973962	0.683753		0.575645	0.000020	0.998258	0.970945	1.000000	0.999969	0.290
4	Permanent	FinalRating: 7-12	0.041676	0.003657	0.575645		0.047182	0.696900	0.424419	0.989231	0.999952	0.920
5	Permanent	FinalRating: 13-18	0.000012	0.000012	0.000020	0.047182		0.017906	0.004306	0.185490	0.488443	1.000
6	Contract	FinalRating: -6-1	1.000000	1.000000	0.998258	0.696900	0.017906		0.999982	0.992717	0.836116	0.002
7	Contract	FinalRating: 0	0.999860	1.000000	0.970945	0.424419	0.004306	0.999982		0.904879	0.527409	0.000
8	Contract	FinalRating: 1-6	0.999874	0.994911	1.000000	0.989231	0.185490	0.992717	0.904879		0.999793	0.074
9	Contract	FinalRating: 7-12	0.983693	0.906873	0.999969	0.999952	0.488443	0.836116	0.527409	0.999793		0.328
10	Contract	FinalRating: 13-18	0.066423	0.022229	0.290207	0.920095	1.000000	0.002366	0.000304	0.074502	0.328643	

APPENDIX O

Final rating unweighted means

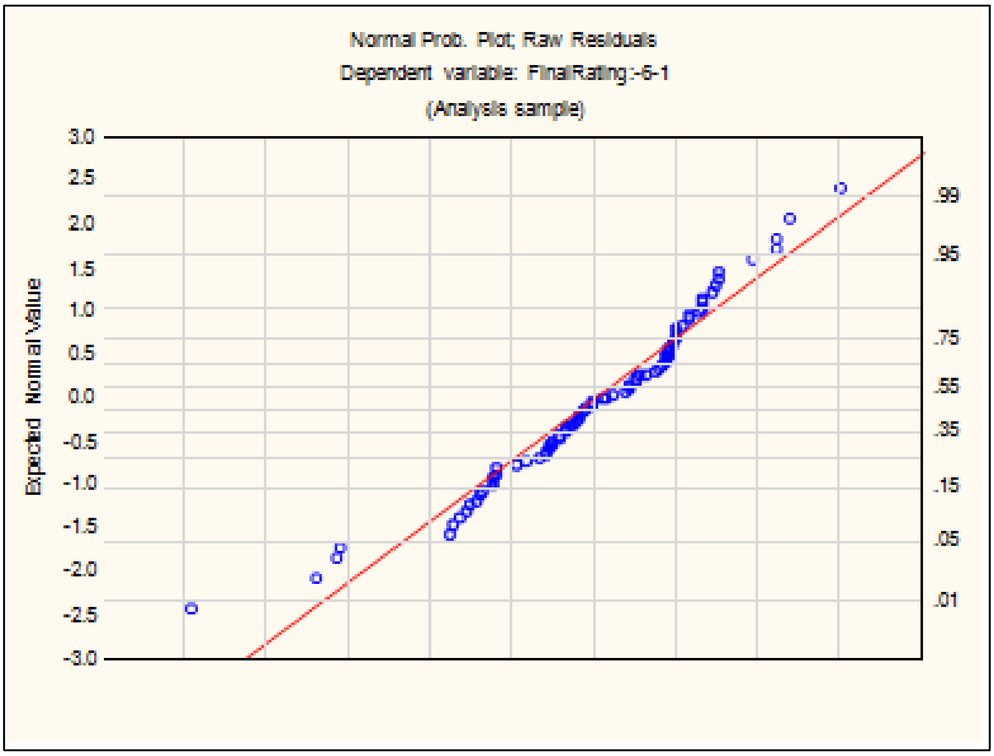
Cell No.	FINALRAT*Employee status; Unweighted Means (1234 based on means for 3of5 no zeros 2) Current effect: F(4, 320)=.07538, p=.98966 Effective hypothesis decomposition						
	Employee status	FINALRAT	DV_1 Mean	DV_1 Std.Err.	DV_1 -95.00%	DV_1 +95.00%	N
1	Permanent	Final Rating: -6-1	1.529464	0.089693	1.350969	1.707958	59
2	Permanent	Final Rating: 0	1.448609	0.129617	1.190664	1.706555	59
3	Permanent	Final Rating: 1-6	1.669376	0.090910	1.488459	1.850293	59
4	Permanent	Final Rating: 7-12	1.908253	0.087107	1.734904	2.081602	59
5	Permanent	Final Rating: 13-18	2.282290	0.105232	2.072871	2.491708	59
6	Contract	Final Rating: -6-1	1.479770	0.143655	1.193889	1.765652	23
7	Contract	Final Rating: 0	1.390403	0.207598	0.977270	1.803536	23
8	Contract	Final Rating: 1-6	1.666683	0.145604	1.376921	1.956444	23
9	Contract	Final Rating: 7-12	1.785663	0.139513	1.508022	2.063304	23
10	Contract	Final Rating: 13-18	2.236437	0.168543	1.901026	2.571848	23

APPENDIX P

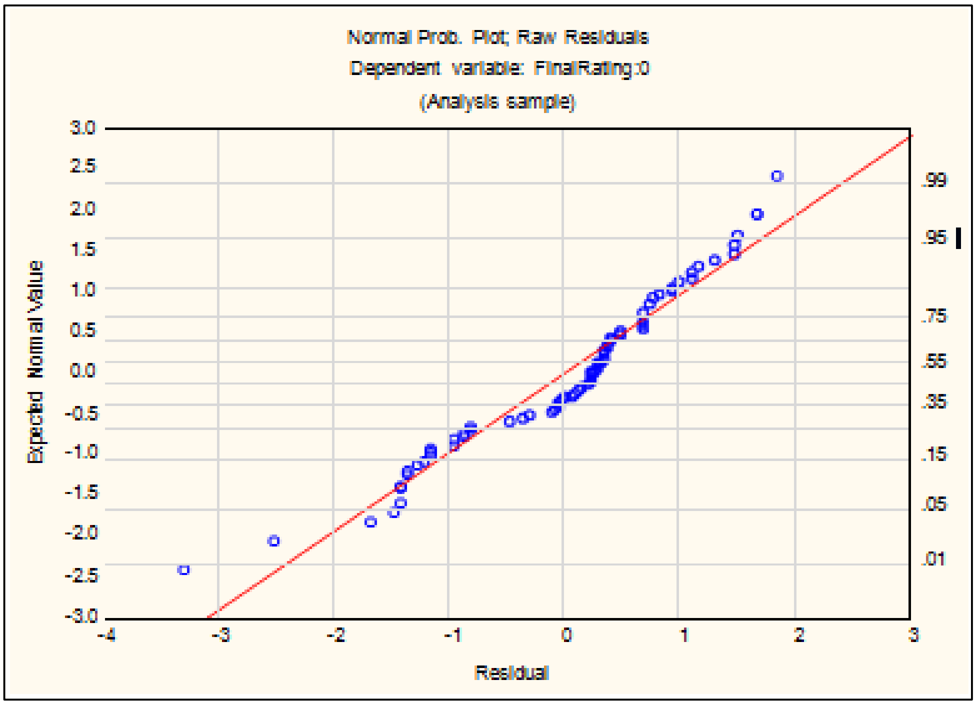
Levene's test for Final rating

	Levene's Test for Homogeneity of Variances Effect: "Employee status" Degrees of freedom for all F's: 1, 80			
	MS Effect	MS Error	F	p
FinalRating:-6-1	0.613087	0.175898	3.485469	0.065573
FinalRating:0	0.000006	0.384381	0.000017	0.996732
FinalRating:1 6	0.359809	0.193556	1.858938	0.176572
FinalRating:7 12	0.144890	0.164492	0.880835	0.350798
FinalRating:13 18	0.016227	0.253832	0.063930	0.801038

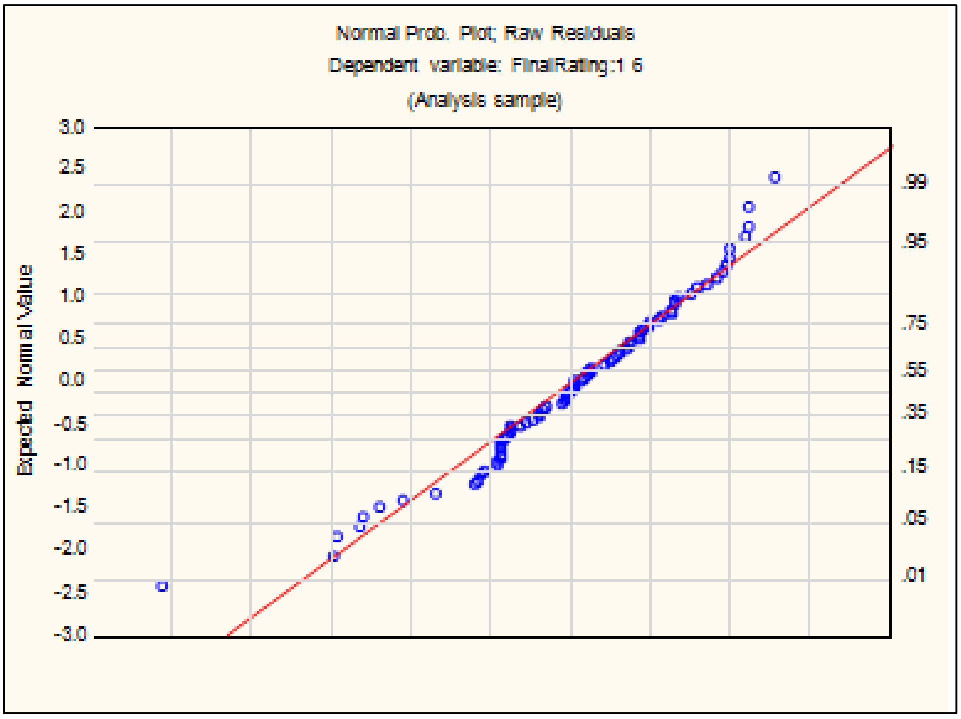
APPENDIX Q



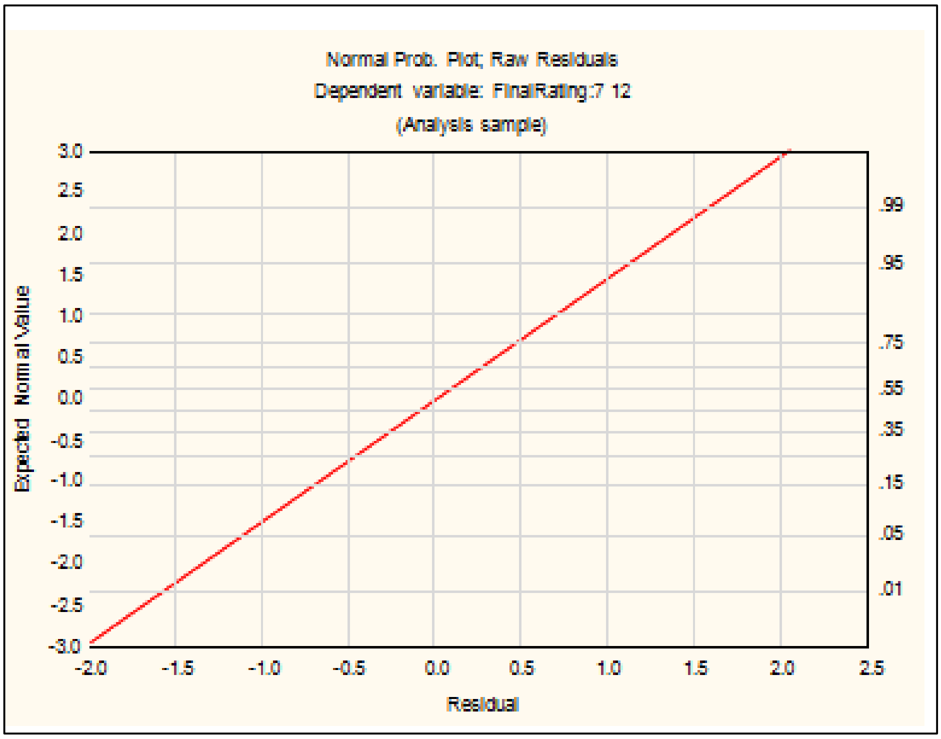
Normal prob. plot of raw residuals Final rating **(t_{-6-1})**



Normal prob. plot of raw residuals Final rating **(t_0)**



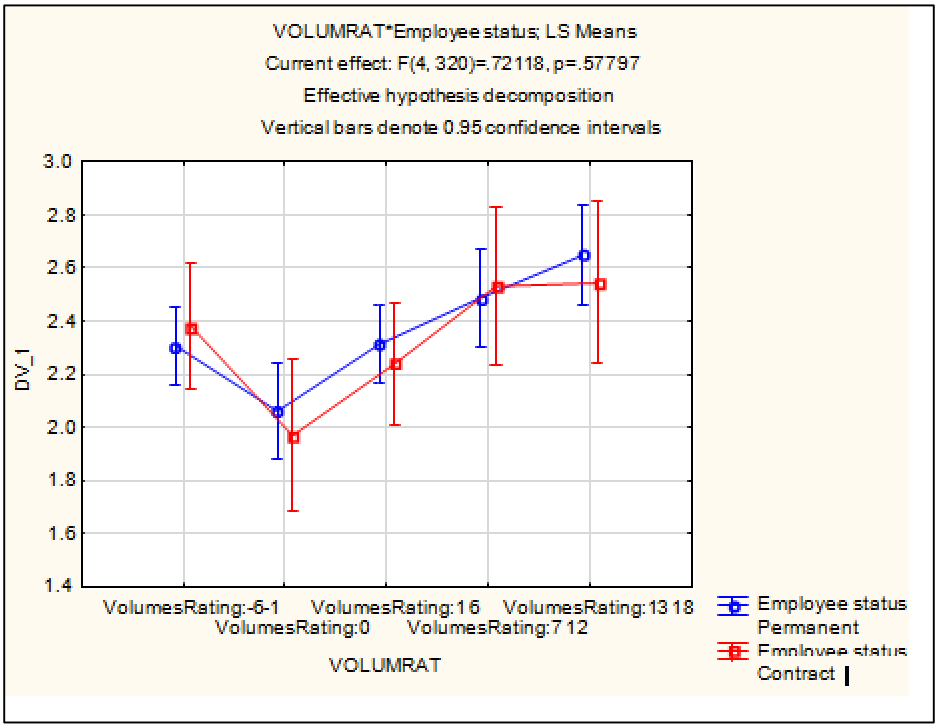
Normal prob. plot of raw residuals Final rating **($t_{1\text{-}6}$)**



Normal prob. plot of raw residuals Final rating **($t_{7\text{-}12}$)**

APPENDIX R

VOLUMES



Volumes rating marginal means (5 buckets: **$t_{-6} \rightarrow t_{+18}$**)

APPENDIX S

Volume Rating ANOVA (5 buckets)

Effect	Repeated Measures Analysis of Variance with Effect Sizes and Powers (1234 based on means for 3of5 no zeros 2) Sigma-restricted parameterization Effective hypothesis decomposition						
	SS	Degr. of Freedom	MS	F	p	Partial eta-squared	Non-centrality	Observed power (alpha=0.05)
Intercept	1824.227	1	1824.227	1190.624	0.000000	0.937039	1190.624	1.000000
Employee status	0.076	1	0.076	0.049	0.824586	0.000618	0.049	0.055549
Error	122.573	80	1.532					
VOLUMRAT	13.472	4	3.368	21.293	0.000000	0.210212	85.172	1.000000
VOLUMRAT*Employee status	0.456	4	0.114	0.721	0.577975	0.008934	2.885	0.232412
Error	50.614	320	0.158					

APPENDIX T

Volume Rating unweighted means (5 buckets)

Cell No.	VOLUMRAT*Employee status; Unweighted Means (1234 based on means for 3of5 no zeros 2) Current effect: F(4, 320)=.72118, p=.57797 Effective hypothesis decomposition						
	Employee status	VOLUMRAT	DV_1 Mean	DV_1 Std.Err.	DV_1 -95.00%	DV_1 +95.00%	N
1	Permanent	VolumesRating:-6-1	2.306780	0.073844	2.159825	2.453735	59
2	Permanent	VolumesRating:0	2.060940	0.089812	1.882209	2.239670	59
3	Permanent	VolumesRating:1-6	2.311858	0.072786	2.167011	2.456706	59
4	Permanent	VolumesRating:7-12	2.487235	0.093369	2.301425	2.673046	59
5	Permanent	VolumesRating:13-18	2.647305	0.095695	2.456865	2.837744	59
6	Contract	VolumesRating:-6-1	2.380971	0.118271	2.145604	2.616339	23
7	Contract	VolumesRating:0	1.969011	0.143845	1.682751	2.255272	23
8	Contract	VolumesRating:1-6	2.237878	0.116575	2.005885	2.469870	23
9	Contract	VolumesRating:7-12	2.531425	0.149543	2.233826	2.829024	23
10	Contract	VolumesRating:13-18	2.543531	0.153268	2.238518	2.848544	23

APPENDIX U

Tukey unequal N HSD for Volumes rating (5 buckets)

Unequal N HSD; variable DV_1 (1234 based on means for 3of5 no zeros 2) Approximate Probabilities for Post Hoc Tests
Error: Between; Within; Pooled MSE = .43297, df = 153.18

Cell No.	Employee status	VOLUMRAT	{1} 2.3068	{2} 2.0609	{3} 2.3119	{4} 2.4872	{5} 2.6473	{6} 2.3810	{7} 1.9690	{8} 2.2379	{9} 2.5314	2
1	Permanent	VolumesRating:-6-1		0.027186	1.000000	0.287875	0.000151	0.999997	0.772097	0.999999	0.978430	0.
2	Permanent	VolumesRating:0	0.027186		0.021597	0.000013	0.000012	0.823627	0.999982	0.996146	0.310799	0.
3	Permanent	VolumesRating:1-6	1.000000	0.021597		0.328563	0.000206	0.999998	0.756208	0.999997	0.981552	0.
4	Permanent	VolumesRating:7-12	0.287875	0.000013	0.328563		0.466401	0.999938	0.185564	0.957176	1.000000	1.
5	Permanent	VolumesRating:13-18	0.000151	0.000012	0.000206	0.466401		0.935679	0.017074	0.520217	0.999871	0.
6	Contract	VolumesRating:-6-1	0.999997	0.823627	0.999998	0.999938	0.935679		0.016100	0.969368	0.957645	0.
7	Contract	VolumesRating:0	0.772097	0.999982	0.756208	0.185564	0.017074	0.016100		0.393709	0.000080	0.
8	Contract	VolumesRating:1-6	0.999999	0.996146	0.999997	0.957176	0.520217	0.969368	0.393709		0.266555	0.
9	Contract	VolumesRating:7-12	0.978430	0.310799	0.981552	1.000000	0.999871	0.957645	0.000080	0.266555		1.
10	Contract	VolumesRating:13-18	0.969366	0.275216	0.973462	1.000000	0.999949	0.931796	0.000052	0.214431	1.000000	

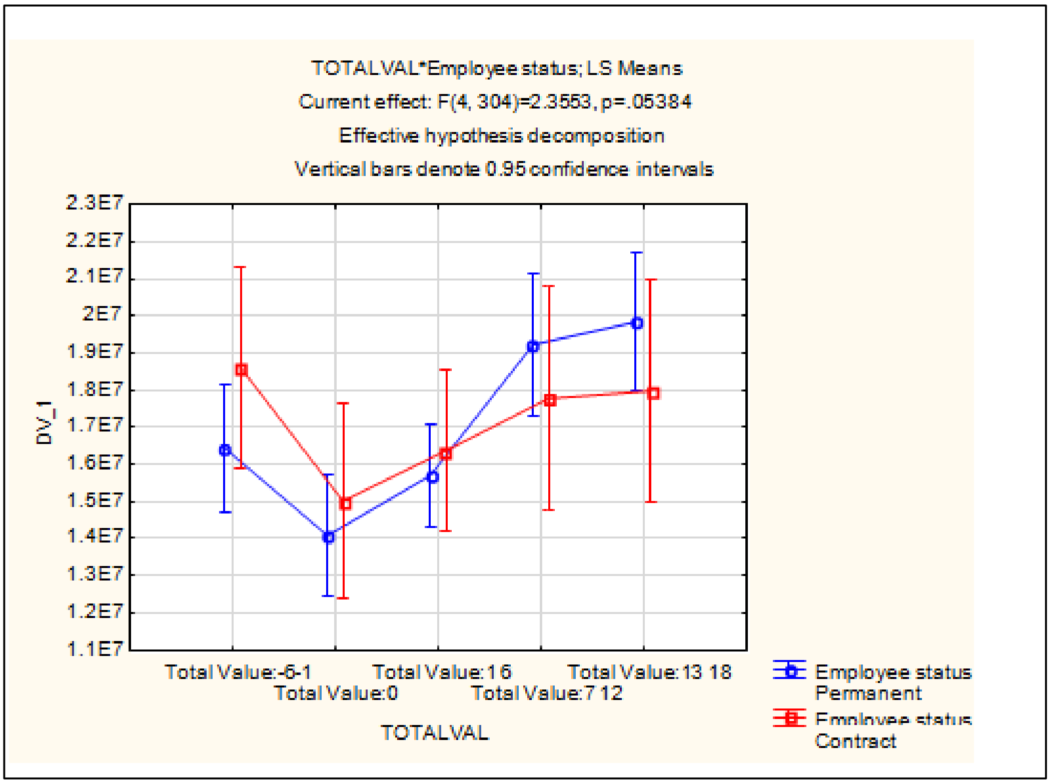
APPENDIX V

Levene's test for Volumes rating (5 buckets)

	Levene's Test for Homogeneity of Variances (1234 based or means for 3of5 no zeros 2) Effect: "Employee status" Degrees of freedom for all F's: 1, 80			
	MS Effect	MS Error	F	p
VolumesRating:-6-1	0.002510	0.091229	0.027519	0.868664
VolumesRating:0	0.075507	0.276400	0.273180	0.602651
VolumesRating:1 6	0.000008	0.103481	0.000076	0.993082
VolumesRating:7 12	0.006430	0.120855	0.053207	0.818163
VolumesRating:13 18	0.033501	0.114998	0.291320	0.590875

APPENDIX W

TOTAL VALUE PROCESSED



Total value processed Marginal means

APPENDIX X

Total value processed rANOVA

Effect	Repeated Measures Analysis of Variance with Effect Sizes and Powers (1234 based on means for 3of5 no zeros) Sigma-restricted parameterization Effective hypothesis decomposition							
	SS	Degr. of Freedom	MS	F	p	Partial eta-squared	Non-centrality	Observed power (alpha=0.05)
Intercept	9.241780E+16	1	9.241780E+16	716.9488	0.000000	0.904155	716.9488	1.000000
Employee status	6.365762E+11	1	6.365762E+11	0.0049	0.944161	0.000065	0.0049	0.050552
Error	9.796729E+15	76	1.289043E+14					
TOTALVAL	8.258517E+14	4	2.064629E+14	10.6285	0.000000	0.122691	42.5141	0.999901
TOTALVAL*Employee status	1.830076E+14	4	4.575191E+13	2.3553	0.053836	0.030059	9.4211	0.678575
Error	5.905310E+15	304	1.942536E+13					

APPENDIX Y

Total value processed unweighted means

Cell No.	TOTALVAL*Employee status; Unweighted Means (1234 based on means for 3of5 no zeros) Current effect: F(4, 304)=2.3553, p=.05384 Effective hypothesis decomposition						
	Employee status	TOTALVAL	DV_1 Mean	DV_1 Std.Err.	DV_1 -95.00%	DV_1 +95.00%	N
1	Permanent	Total Value:-6-1	16438112	857708	14729838	18146385	56
2	Permanent	Total Value:0	14083904	830613	12429595	15738214	56
3	Permanent	Total Value:1-6	15706426	692660	14326874	17085978	56
4	Permanent	Total Value:7-12	19226726	951564	17331522	21121929	56
5	Permanent	Total Value:13-18	19841776	937313	17974955	21708596	56
6	Contract	Total Value:-6-1	18617138	1368429	15891676	21342600	22
7	Contract	Total Value:0	15006676	1325200	12367311	17646041	22
8	Contract	Total Value:1-6	16371630	1105103	14170627	18572634	22
9	Contract	Total Value:7-12	17767397	1518171	14743697	20791096	22
10	Contract	Total Value:13-18	17983005	1495434	15004590	20961420	22

APPENDIX Z

Levene's test for Total value processed

	Levene's Test for Homogeneity of Variances (1234 based on means for 3of5 no zeros) Effect "Employee status" Degrees of freedom for all F's: 1, 76			
	MS Effect	MS Error	F	p
Total Value:-6-1	1.469710E+14	1.778337E+13	8.264521	0.005241
Total Value:0	1.003114E+13	1.633184E+13	0.614208	0.435644
Total Value:1 6	1.037158E+13	1.202570E+13	0.862451	0.355994
Total Value:7 12	1.086452E+10	1.920945E+13	0.000566	0.981089
Total Value:13 18	3.098441E+11	1.697771E+13	0.018250	0.892896

APPENDIX AA

Tukey unequal N HSD for Total value processed (5 buckets)

Cell No.	Unequal N HSD; variable DV_1 (1234 based on means for 3of5 no zeros) Approximate Probabilities for Post Hoc Tests Error: Between; Within; Pooled MSE = 413E11, df = 178.98											
	Employee status	TOTALVAL	{1} 1644E4	{2} 1408E4	{3} 1571E4	{4} 1923E4	{5} 1984E4	{6} 1862E4	{7} 1501E4	{8} 1637E4	{9} 1777E4	{10 1798
1	Permanent	Total Value:-6-1		0.127494	0.997102	0.028037	0.001805	0.982358	0.999261	1.000000	0.999595	0.998
2	Permanent	Total Value:0	0.127494		0.635844	0.000012	0.000012	0.363570	0.999981	0.975422	0.668815	0.590
3	Permanent	Total Value:1-6	0.997102	0.635844		0.001009	0.000041	0.891949	0.999998	0.999999	0.988062	0.976
4	Permanent	Total Value:7-12	0.028037	0.000012	0.001009		0.999262	0.999999	0.472498	0.902957	0.999137	0.999
5	Permanent	Total Value:13-18	0.001805	0.000012	0.000041	0.999262		0.999794	0.271085	0.741558	0.987499	0.994
6	Contract	Total Value:-6-1	0.982358	0.363570	0.891949	0.999999	0.999794		0.166680	0.801649	0.999772	0.999
7	Contract	Total Value:0	0.999261	0.999981	0.999998	0.472498	0.271085	0.166680		0.990689	0.543562	0.429
8	Contract	Total Value:1-6	1.000000	0.975422	0.999999	0.902957	0.741558	0.801649	0.990689		0.989067	0.970
9	Contract	Total Value:7-12	0.999595	0.668815	0.988062	0.999137	0.987499	0.999772	0.543562	0.989067		1.000
10	Contract	Total Value:13-18	0.998641	0.590641	0.976216	0.999766	0.994371	0.999981	0.429258	0.970597	1.000000	

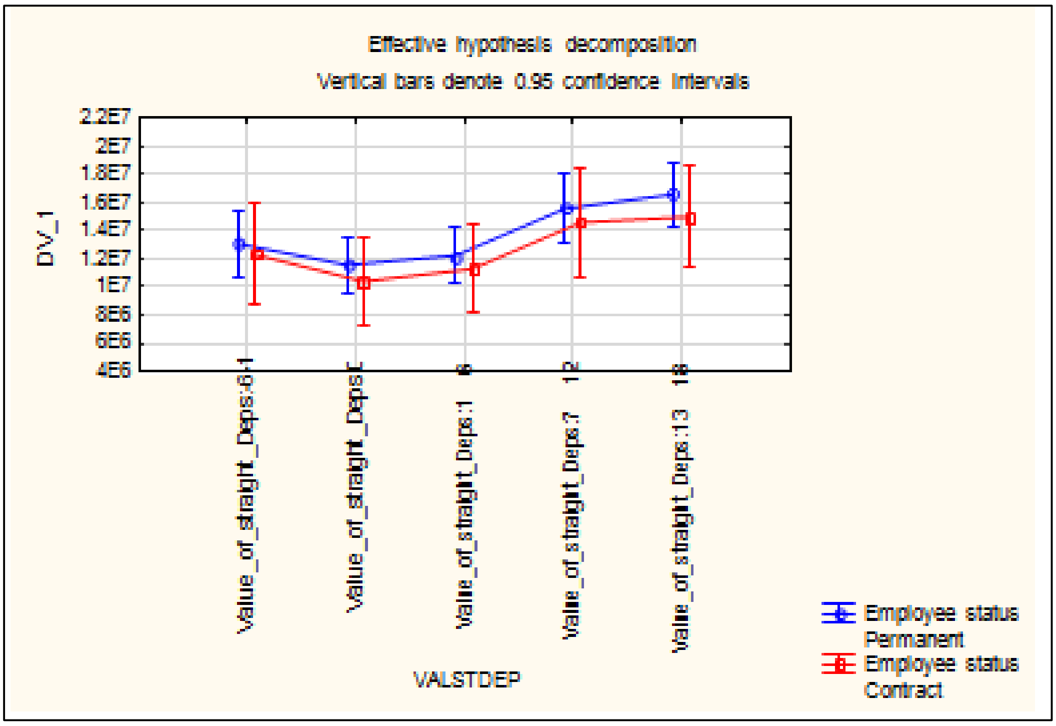
APPENDIX AB

Mauchly test for Total value processed (5 buckets)

Effect	Mauchly Sphericity Test (1234 based on means for Sigma-restricted parameterization Effective hypothesis decomposition			
	W	Chi-Sqr.	df	p
TOTALVAL	0.543096	45.42915	9	0.000001

APPENDIX AC

VALUES OF DEPOSITS STRAIGHT PROCESSED



Value of deposits straight-processed marginal means

APPENDIX AD

Value of deposits straight-processed unweighted means

Cell No.	VALSTDEP*Employee status; Unweighted Means (1234 based on means for 3of5 no zeros) Current effect: F(4, 300)=.11216, p=.97820 Effective hypothesis decomposition						
	Employee status	VALSTDEP	DV_1 Mean	DV_1 Std.Err.	DV_1 -95.00%	DV_1 +95.00%	N
1	Permanent	Value_of_straight_Deps:-6-1	13041650	1148129	10754460	15328841	55
2	Permanent	Value_of_straight_Deps:0	11558549	1023314	9520004	13597094	55
3	Permanent	Value_of_straight_Deps:1- 6	12250252	981710	10294585	14205918	55
4	Permanent	Value_of_straight_Deps:7- 12	15551710	1225349	13110689	17992731	55
5	Permanent	Value_of_straight_Deps:13- 18	16602714	1156077	14299690	18905737	55
6	Contract	Value_of_straight_Deps:-6-1	12312309	1815351	8695944	15928675	22
7	Contract	Value_of_straight_Deps:0	10379105	1618001	7155882	13602328	22
8	Contract	Value_of_straight_Deps:1- 6	11280332	1552220	8188152	14372512	22
9	Contract	Value_of_straight_Deps:7- 12	14578926	1937447	10719333	18438519	22
10	Contract	Value_of_straight_Deps:13- 18	14991024	1827918	11349624	18632423	22

APPENDIX AE

Value of deposits straight-processed ANOVA with ES

Effect	Repeated Measures Analysis of Variance with Effect Sizes and Powers (1234 based on means for 3of5 no zeros) Sigma-restricted parameterization Effective hypothesis decomposition							
	SS	Degr. of Freedom	MS	F	P	Partial eta-squared	Non-centrality	Observed power (alpha=0.05)
Intercept	5.521558E+16	1	5.521558E+16	198.7763	0.000000	0.726054	198.7763	1.000000
Employee status	9.380274E+13	1	9.380274E+13	0.3377	0.562908	0.004482	0.3377	0.088477
Error	2.083331E+16	75	2.777775E+14					
VALSTDEP	1.101149E+15	4	2.752871E+14	17.9299	0.000000	0.192940	71.7196	1.000000
VALSTDEP*Employee status	6.888509E+12	4	1.722127E+12	0.1122	0.978199	0.001493	0.4487	0.072967
Error	4.606059E+15	300	1.535353E+13					

APPENDIX AF

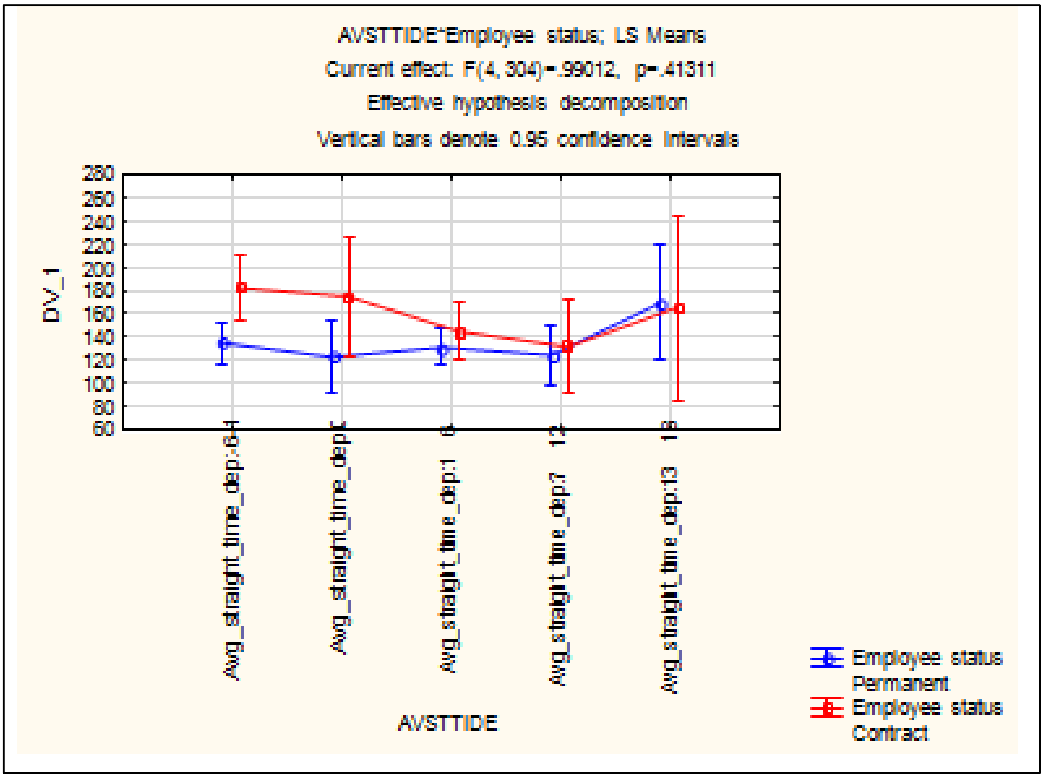
Tukey unequal N HSD for Value of deposits straight-processed

Unequal N HSD; variable DV_1 (1234 based on means for 3of5 no zeros)
Approximate Probabilities for Post Hoc Tests
Error: Between; Within; Pooled MSE = 678E11, df = 110.48

Cell No	Employee status	VALSTDEP	{1} 1304E4	{2} 1156E4	{3} 1225E4	{4} 1555E4	{5} 1660E4	{6} 1231E4	{7} 1038E4	{8} 1128E4	{9} 1458E4	1
1	Permanent	Value_of_straight_Deps:-6-1		0.609787	0.988394	0.027020	0.000091	1.000000	0.986459	0.999452	0.999820	0.
2	Permanent	Value_of_straight_Deps:0	0.609787		0.995681	0.000016	0.000012	1.000000	0.999981	1.000000	0.968324	0.
3	Permanent	Value_of_straight_Deps:1- 6	0.988394	0.995681		0.000451	0.000013	1.000000	0.999080	0.999996	0.994877	0.
4	Permanent	Value_of_straight_Deps:7- 12	0.027020	0.000016	0.000451		0.925613	0.950696	0.543429	0.781860	0.999996	1.
5	Permanent	Value_of_straight_Deps:13- 18	0.000091	0.000012	0.000013	0.925613		0.777436	0.276985	0.501784	0.998271	0.
6	Contract	Value_of_straight_Deps:-6-1	1.000000	1.000000	1.000000	0.950696	0.777436		0.830427	0.997225	0.656382	0.
7	Contract	Value_of_straight_Deps:0	0.986459	0.999981	0.999080	0.543429	0.276985	0.830427		0.999042	0.013895	0.
8	Contract	Value_of_straight_Deps:1- 6	0.999452	1.000000	0.999996	0.781860	0.501784	0.997225	0.999042		0.138961	0.
9	Contract	Value_of_straight_Deps:7- 12	0.999820	0.968324	0.994877	0.999996	0.998271	0.656382	0.013895	0.138961		0.
10	Contract	Value_of_straight_Deps:13- 18	0.998717	0.930235	0.983455	1.000000	0.999734	0.410530	0.003768	0.053545	0.999999	

APPENDIX AG

TIME TAKEN IN STRAIGHT PROCESSING OF DEPOSITS



Average time per deposit straight-processed marginal means

APPENDIX AH

Average time per deposit straight-processed ANOVA with ES

Effect	Repeated Measures Analysis of Variance with Effect Sizes and Powers (1234 based on means for 3of5 no zero Sigma-restricted parameterization Effective hypothesis decomposition							
	SS	Degr. Of Freedom	MS	F	p	Partial eta-squared	Non-centrality	Observed power (alpha=0.05)
Intercept	6921502	1	6921502	253.4402	0.000000	0.769306	253.4402	1.000000
Employee status	43302	1	43302	1.5856	0.211813	0.020436	1.5856	0.237475
Error	2075575	76	27310					
AVSTTIDE	64174	4	16044	1.5864	0.177775	0.020447	6.3456	0.487843
AVSTTIDE*Employee status	40053	4	10013	0.9901	0.413113	0.012860	3.9605	0.312381
Error	3074382	304	10113					

APPENDIX AI

Average time per deposit straight-processed unweighted means

Cell No.	AVSTTIDE*Employee status; Unweighted Means (1234 based on means for 3of5 no zeros 2) Current effect: F(4, 304)=.99012, p=.41311 Effective hypothesis decomposition						
	Employee status	AVSTTIDE	DV_1 Mean	DV_1 Std.Err.	DV_1 -95.00%	DV_1 +95.00%	N
1	Permanent	Avg_straight_time_dep:-6-1	134.8565	9.05511	116.8217	152.8914	56
2	Permanent	Avg_straight_time_dep:0	122.3750	16.14921	90.2111	154.5389	56
3	Permanent	Avg_straight_time_dep:1- 6	130.8610	7.92958	115.0679	146.6541	56
4	Permanent	Avg_straight_time_dep:7- 12	123.8729	12.88899	98.2023	149.5436	56
5	Permanent	Avg_straight_time_dep:13- 18	169.6060	25.26361	119.2891	219.9228	56
6	Contract	Avg_straight_time_dep:-6-1	182.4977	14.44696	153.7241	211.2713	22
7	Contract	Avg_straight_time_dep:0	174.7273	25.76522	123.4114	226.0432	22
8	Contract	Avg_straight_time_dep:1- 6	144.8280	12.65123	119.6309	170.0251	22
9	Contract	Avg_straight_time_dep:7- 12	131.2197	20.56372	90.2635	172.1759	22
10	Contract	Avg_straight_time_dep:13- 18	165.3788	40.30678	85.1009	245.6567	22

APPENDIX AJ

Tukey unequal N HSD test for Average time per deposit straight-processed

Cell No.	Employee status	AVSTTIDE	{1} 134.86	{2} 122.38	{3} 130.86	{4} 123.87	{5} 169.61	{6} 182.50	{7} 174.73	{8} 144.83	{9 131
	Unequal N HSD; variable DV_1 (1234 based on means for 3of5 no zeros 2) Approximate Probabilities for Post Hoc Tests Error: Between; Within; Pooled MSE = 13553., df = 302.16										
1	Permanent	Avg_straight_time_dep:-6-1		0.999716	1.000000	0.999902	0.717137	0.939898	0.981063	1.000000	1.00
2	Permanent	Avg_straight_time_dep:0	0.999716		0.999989	1.000000	0.276280	0.788502	0.895984	0.999772	1.00
3	Permanent	Avg_straight_time_dep:1- 6	1.000000	0.999989		0.999998	0.571364	0.903691	0.964187	0.999996	1.00
4	Permanent	Avg_straight_time_dep:7- 12	0.999902	1.000000	0.999998		0.321735	0.812457	0.911686	0.999872	1.00
5	Permanent	Avg_straight_time_dep:13- 18	0.717137	0.276280	0.571364	0.321735		0.999998	1.000000	0.999487	0.98
6	Contract	Avg_straight_time_dep:-6-1	0.939898	0.788502	0.903691	0.812457	0.999998		1.000000	0.965534	0.80
7	Contract	Avg_straight_time_dep:0	0.981063	0.895984	0.964187	0.911686	1.000000	1.000000		0.993085	0.91
8	Contract	Avg_straight_time_dep:1- 6	1.000000	0.999772	0.999996	0.999872	0.999487	0.965534	0.993085		0.99
9	Contract	Avg_straight_time_dep:7- 12	1.000000	1.000000	1.000000	1.000000	0.985447	0.800866	0.916455	0.999989	
10	Contract	Avg_straight_time_dep:13- 18	0.997320	0.968530	0.993223	0.975123	1.000000	0.999920	1.000000	0.999632	0.98

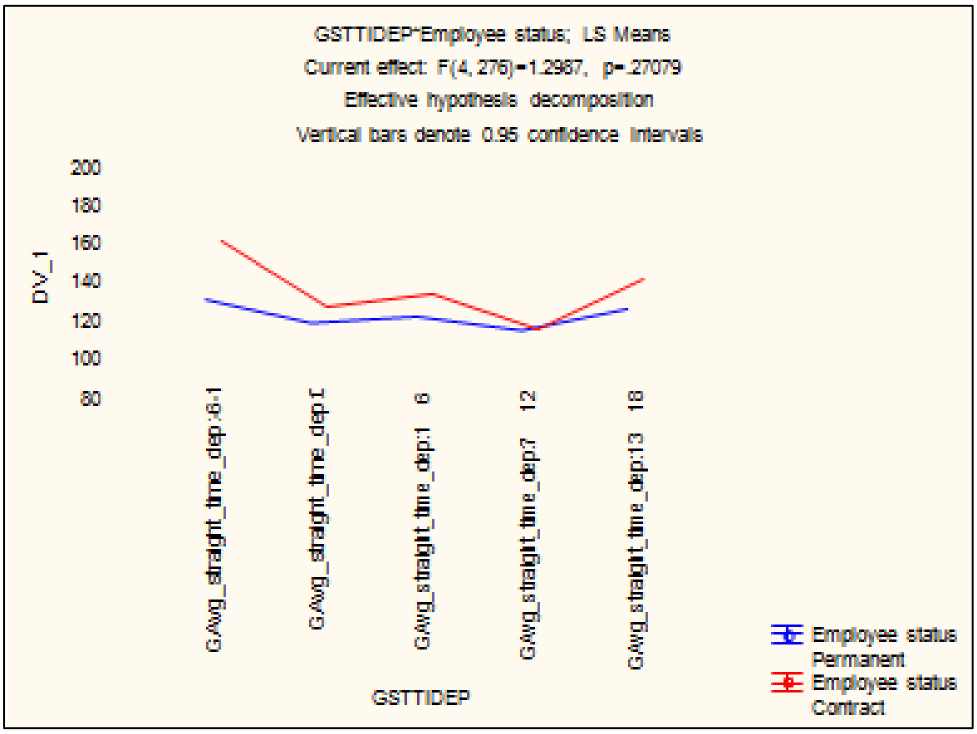
APPENDIX AK

Descriptive statistics for straight-time per deposit

Variable	Descriptive Statistics (1234 based on means for 3of5 no zeros 2)										
	Valid N	Mean	Confidence -95.000%	Confidence 95.000%	Median	Minimum	Maximum	Lower Quartile	Upper Quartile	Std.Dev.	Sk
Avg_straight_time_dep:-12-7	67	179.1619	134.3889	223.9350	147.2500	50.000	1551.667	104.6667	199.7500	183.5569	6
Avg_straight_time_dep:-6-1	82	148.4573	133.2751	163.6395	130.8750	63.167	556.600	109.2000	171.0000	69.0967	2
Avg_straight_time_dep:0	78	137.1410	109.5483	164.7337	115.5000	16.000	1112.000	95.0000	155.0000	122.3812	6
Avg_straight_time_dep:1- 6	82	137.2512	123.7520	150.7504	116.8000	58.500	326.667	95.0000	173.6667	61.4369	1
Avg_straight_time_dep:7- 12	82	126.3965	105.7150	147.0780	110.4000	-214.200	569.000	91.5000	145.0000	94.1249	1
Avg_straight_time_dep:13- 18	82	167.0931	126.7900	207.3962	124.4167	65.667	1533.400	105.0000	162.8000	183.4259	5
Avg_straight_time_dep:19- 24	66	142.8111	124.8020	160.8202	129.0000	58.000	607.500	108.0000	160.8333	73.2583	4
Avg_straight_time_dep:25- 30	55	128.8821	115.7611	142.0032	118.2000	69.667	341.000	96.0000	156.5000	48.5357	2
Avg_straight_time_dep:31- 35	41	141.8780	117.5083	166.2478	119.5000	65.000	403.333	92.0000	154.0000	77.2076	1

APPENDIX AL

GRUBBED AVERAGE STRAIGHT-TIME PROCESSING OF DEPOSITS



"Grubbed" average time per deposit straight-processed marginal means

APPENDIX AM

"Grubbed" average time per deposit straight-processed ANOVA with ES

Repeated Measures Analysis of Variance with Effect Sizes and Powers (1234 based on means for 3of5 n
Sigma-restricted parameterization
Effective hypothesis decomposition

Effect	SS	Degr. of Freedom	MS	F	P	Partial eta-squared	Non-centrality	Observed power (alpha=0.05)
Intercept	4824876	1	4824876	756.7918	0.000000	0.916444	756.7918	1.000000
Employee status	13262	1	13262	2.0801	0.153755	0.029264	2.0801	0.295732
Error	439905	69	6375					
GSTTIDEP	32516	4	8129	5.9545	0.000131	0.079441	23.8180	0.984168
GSTTIDEP*Employee status	7092	4	1773	1.2987	0.270787	0.018473	5.1946	0.404193
Error	376792	276	1365					

317

APPENDIX AN

"Grubbed" average time per deposit straight-processed unweighted means

Cell No.	GSTTIDEP*Employee status; Unweighted Means (1234 based on means for 3of5 no zeros 2) Current effect: F(4, 276)=1.2987, p=.27079 Effective hypothesis decomposition						
	Employee status	GSTTIDEP	DV_1 Mean	DV_1 Std.Err.	DV_1 -95.00%	DV_1 +95.00%	N
1	Permanent	GAvg_straight_time_dep:-6-1	131.3781	6.96585	117.4816	145.2746	51
2	Permanent	GAvg_straight_time_dep:0	118.9020	6.60288	105.7296	132.0743	51
3	Permanent	GAvg_straight_time_dep:1- 6	122.3190	6.97487	108.4045	136.2334	51
4	Permanent	GAvg_straight_time_dep:7- 12	114.8987	7.19939	100.5363	129.2611	51
5	Permanent	GAvg_straight_time_dep:13- 18	126.4621	6.28340	113.9271	138.9971	51
6	Contract	GAvg_straight_time_dep:-6-1	162.1508	11.12357	139.9599	184.3418	20
7	Contract	GAvg_straight_time_dep:0	127.5500	10.54395	106.5154	148.5846	20
8	Contract	GAvg_straight_time_dep:1- 6	134.2942	11.13797	112.0745	156.5138	20
9	Contract	GAvg_straight_time_dep:7- 12	115.5942	11.49650	92.6593	138.5291	20
10	Contract	GAvg_straight_time_dep:13- 18	142.3083	10.03378	122.2915	162.3252	20

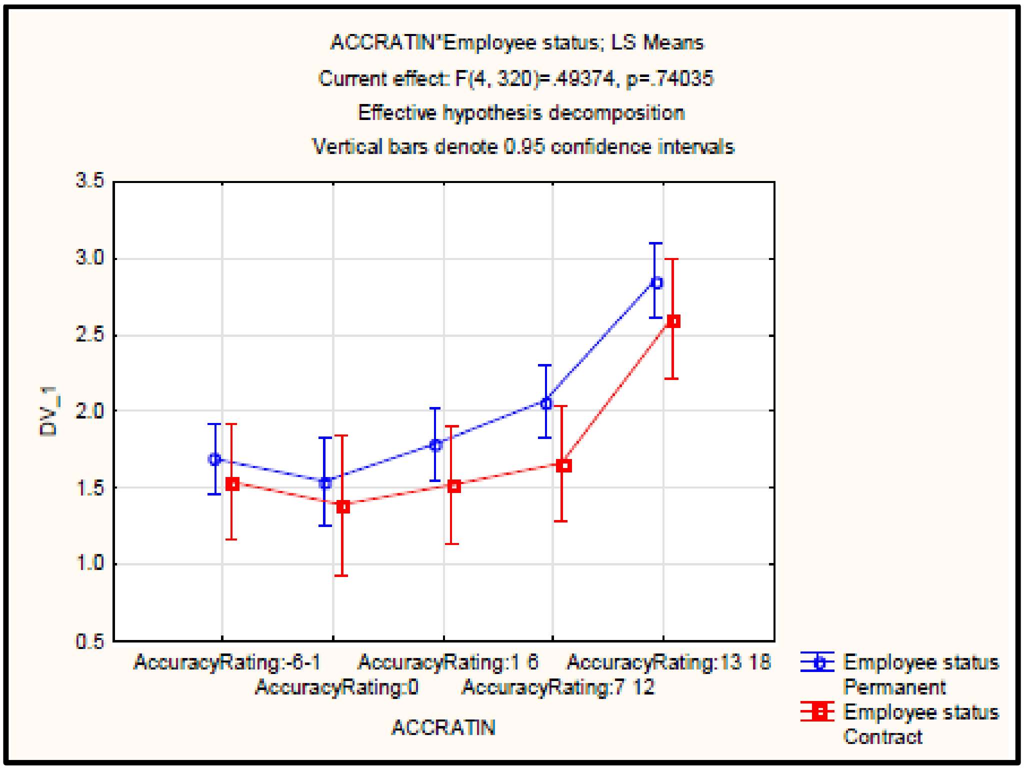
APPENDIX AO

Tukey unequal N HSD for "Grubbed" average time per deposit straight-processed

Cell No.	Unequal N HSD; variable DV_1 (1234 based on means for 3of5 no zeros 2) Approximate Probabilities for Post Hoc Tests Error: Between; Within; Pooled MSE = 2367.2, df = 200.96										
	Employee status	GSTTIDEP	{1} 131.38	{2} 118.90	{3} 122.32	{4} 114.90	{5} 126.46	{6} 162.15	{7} 127.55	{8} 134.29	11
1	Permanent	GAvg_straight_time_dep:-6-1		0.792960	0.966292	0.420730	0.999658	0.598977	1.000000	1.000000	0.9
2	Permanent	GAvg_straight_time_dep:0	0.792960		0.999984	0.999938	0.990282	0.132562	0.999923	0.992313	1.0
3	Permanent	GAvg_straight_time_dep:1- 6	0.966292	0.999984		0.991511	0.999918	0.222702	0.999999	0.998875	0.9
4	Permanent	GAvg_straight_time_dep:7- 12	0.420730	0.999938	0.991511		0.857973	0.065704	0.998265	0.962130	1.0
5	Permanent	GAvg_straight_time_dep:13- 18	0.999658	0.990282	0.999918	0.857973		0.376023	1.000000	0.999967	0.9
6	Contract	GAvg_straight_time_dep:-6-1	0.598977	0.132562	0.222702	0.065704	0.376023		0.089418	0.335250	0.0
7	Contract	GAvg_straight_time_dep:0	1.000000	0.999923	0.999999	0.998265	1.000000	0.089418		0.999903	0.9
8	Contract	GAvg_straight_time_dep:1- 6	1.000000	0.992313	0.998875	0.962130	0.999967	0.335250	0.999903		0.8
9	Contract	GAvg_straight_time_dep:7- 12	0.990771	1.000000	0.999991	1.000000	0.999485	0.002731	0.990941	0.848397	
10	Contract	GAvg_straight_time_dep:13- 18	0.999460	0.884039	0.954127	0.747178	0.990505	0.796873	0.961644	0.999595	0.3

APPENDIX AP

ACCURACY



Accuracy rating marginal means

APPENDIX AQ

Accuracy rating ANOVA with ES

Effect	Repeated Measures Analysis of Variance with Effect Sizes and Powers (1234 based on means for 3 of 5 no zeros 2) Sigma-restricted parameterization Effective hypothesis decomposition							
	SS	Degr. of Freedom	MS	F	p	Partial eta-squared	Non-centrality	Observed power (alpha=0.05)
Intercept	1152.642	1	1152.642	372.3198	0.000000	0.823134	372.3198	1.000000
Employee status	4.970	1	4.970	1.6053	0.208826	0.019672	1.6053	0.240091
Error	247.667	80	3.096					
ACCRATIN	67.232	4	16.808	44.6197	0.000000	0.358047	178.4790	1.000000
ACCRATIN*Employee status	0.744	4	0.186	0.4937	0.740351	0.006134	1.9750	0.167700
Error	120.542	320	0.377					

APPENDIX AR

Tukey unequal N HSD for Accuracy ratings

Cell No.	Unequal N HSD; variable DV_1 (1234 based on means for 3of5 no zeros 2) Approximate Probabilities for Post Hoc Tests Error: Between; Within; Pooled MSE = .92052, df = 166.94											
	Employee status	ACCRATIN	{1} 1.6898	{2} 1.5424	{3} 1.7859	{4} 2.0686	{5} 2.8568	{6} 1.5406	{7} 1.3913	{8} 1.5203	{9} 1.6609	
1	Permanent	AccuracyRating:-6-1		0.952846	0.997754	0.027644	0.000012	0.999955	0.98870	0.999867	1.000000	0
2	Permanent	AccuracyRating:0	0.952846		0.488344	0.000147	0.000012	1.000000	0.99995	1.000000	0.999994	0
3	Permanent	AccuracyRating:1-6	0.997754	0.488344		0.266924	0.000012	0.997380	0.92927	0.995204	0.999990	0
4	Permanent	AccuracyRating:7-12	0.027644	0.000147	0.266924		0.000012	0.691948	0.32918	0.642713	0.914285	0
5	Permanent	AccuracyRating:13-18	0.000012	0.000012	0.000012	0.000012		0.000150	0.00002	0.000109	0.001006	0
6	Contract	AccuracyRating:-6-1	0.999955	1.000000	0.997380	0.691948	0.000150		0.99822	1.000000	0.999687	0
7	Contract	AccuracyRating:0	0.988703	0.999950	0.929271	0.329181	0.000021	0.998223		0.999446	0.896784	0
8	Contract	AccuracyRating:1-6	0.999867	1.000000	0.995204	0.642713	0.000109	1.000000	0.99944		0.998893	0
9	Contract	AccuracyRating:7-12	1.000000	0.999994	0.999990	0.914285	0.001006	0.999687	0.89678	0.998893		0
10	Contract	AccuracyRating:13-18	0.040195	0.006656	0.106686	0.671890	0.996806	0.000013	0.00001	0.000013	0.000020	

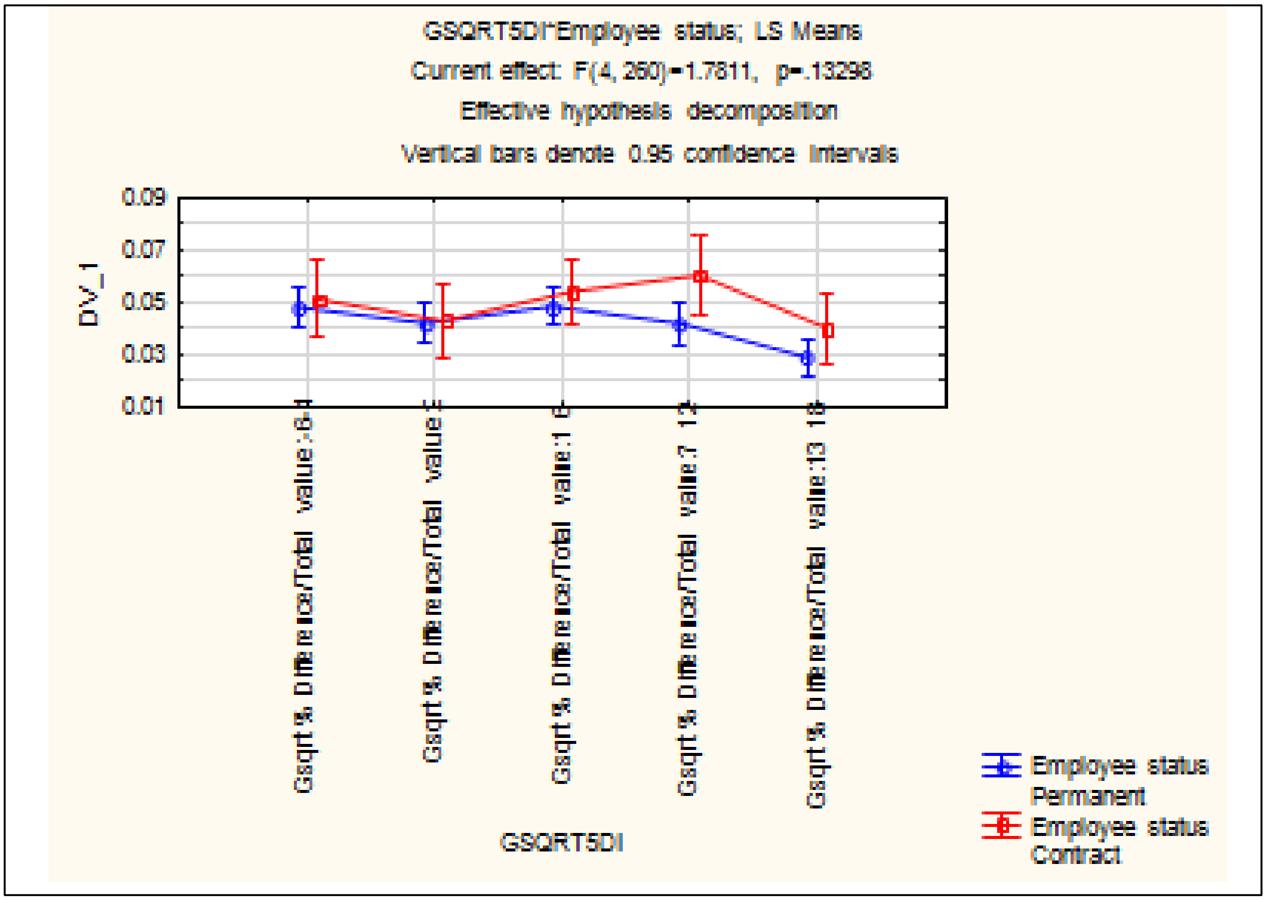
APPENDIX AS

Accuracy ratings unweighted means

Cell No.	ACCRATIN*Employee status; Unweighted Means (1234 based on means for 3 of 5 no zeros 2) Current effect: F(4, 320)=.49374, p=.74035 Effective hypothesis decomposition						
	Employee status	ACCRATIN	DV_1 Mean	DV_1 Std.Err.	DV_1 -95.00%	DV_1 +95.00%	N
1	Permanent	Acc. Rating: -6-1	1.689831	0.116373	1.458242	1.921419	59
2	Permanent	Acc. Rating: 0	1.542373	0.144183	1.255440	1.829305	59
3	Permanent	Acc. Rating: 1- 6	1.785876	0.120648	1.545778	2.025973	59
4	Permanent	Acc. Rating: 7- 12	2.068644	0.119440	1.830950	2.306338	59
5	Permanent	Acc. Rating: 13- 18	2.856780	0.121890	2.614211	3.099349	59
6	Contract	Acc. Rating: -6-1	1.540580	0.186386	1.169660	1.911499	23
7	Contract	Acc. Rating: 0	1.391304	0.230927	0.931745	1.850864	23
8	Contract	Acc. Rating: 1- 6	1.520290	0.193234	1.135742	1.904837	23
9	Contract	Acc. Rating: 7- 12	1.660870	0.191299	1.280172	2.041567	23
10	Contract	Acc. Rating: 13- 18	2.605072	0.195223	2.216567	2.993578	23

APPENDIX AT

ACCURACY (GRUBBED SQUAREROOT % OF DIFF /TOTAL VALUE PROCESSED)



"Grubbed" squareroot % Differences/Total value marginal means

APPENDIX AU

Effect	Repeated Measures Analysis of Variance with Effect Sizes and Powers (1234 based on means for 3of5 no zeros 2) Sigma-restricted parameterization Effective hypothesis decomposition							
	SS	Degr. of Freedom	MS	F	P	Partial eta-squared	Non-centrality	Observed power (alpha=0.05)
Intercept	0.482494	1	0.482494	195.2563	0.000000	0.750246	195.2563	1.000000
Employee status	0.003606	1	0.003606	1.4594	0.231404	0.021959	1.4594	0.221550
Error	0.160620	65	0.002471					
GSQRT5DI	0.009827	4	0.002457	7.6591	0.000008	0.105412	30.6365	0.997185
GSQRT5DI*Employee status	0.002285	4	0.000571	1.7811	0.132983	0.026671	7.1245	0.539748
Error	0.083400	260	0.000321					

"Grubbed" squareroot % Differences/Total value rANOVA with ES

APPENDIX AV

"Grubbed" squareroot % Differences/Total value unweighted means

Cell No.	GSQRT5DI*Employee status; Unweighted Means (1234 based on means for 3of5 no zeros 2) Current effect: F(4, 260)=1.7811, p=.13298 Effective hypothesis decomposition						
	Employee status	GSQRT5DI	DV_1 Mean	DV_1 Std.Err.	DV_1 -95.00%	DV_1 +95.00%	N
1	Permanent	Gsqrt % Difference/Total value:-6-1	0.047733	0.004035	0.039675	0.055790	52
2	Permanent	Gsqrt % Difference/Total value:0	0.041802	0.003895	0.034023	0.049580	52
3	Permanent	Gsqrt % Difference/Total value:1-6	0.048061	0.003393	0.041284	0.054838	52
4	Permanent	Gsqrt % Difference/Total value:7-12	0.041692	0.004056	0.033592	0.049792	52
5	Permanent	Gsqrt % Difference/Total value:13-18	0.028645	0.003575	0.021505	0.035786	52
6	Contract	Gsqrt % Difference/Total value:-6-1	0.051006	0.007512	0.036003	0.066008	15
7	Contract	Gsqrt % Difference/Total value:0	0.042632	0.007252	0.028149	0.057115	15
8	Contract	Gsqrt % Difference/Total value:1-6	0.053781	0.006318	0.041163	0.066399	15
9	Contract	Gsqrt % Difference/Total value:7-12	0.060055	0.007552	0.044973	0.075137	15
10	Contract	Gsqrt % Difference/Total value:13-18	0.039814	0.006657	0.026519	0.053109	15

APPENDIX AW

Tukey unequal N HSD for "Grubbed" squareroot % Differences/Total value

Cell	Employee status	GSQRT5DI	{1} .04773	{2} .04180	{3} .04806	{4} .04169	{5} .02865	{6} .05101	{7} .04263	{8} .05378	{9 .060
1	Permanent	Gsqrt % Difference/Total value:-6-1		0.802355	1.000000	0.784479	0.000015	0.999999	0.999966	0.999857	0.967
2	Permanent	Gsqrt % Difference/Total value:0	0.802355		0.746872	1.000000	0.006923	0.995883	1.000000	0.972966	0.719
3	Permanent	Gsqrt % Difference/Total value:1-6	1.000000	0.746872		0.726987	0.000014	1.000000	0.999943	0.999911	0.972
4	Permanent	Gsqrt % Difference/Total value:7-12	0.784479	1.000000	0.726987		0.007783	0.995497	1.000000	0.971277	0.712
5	Permanent	Gsqrt % Difference/Total value:13-18	0.000015	0.006923	0.000014	0.007783		0.432614	0.928286	0.261617	0.053
6	Contract	Gsqrt % Difference/Total value:-6-1	0.999999	0.995883	1.000000	0.995497	0.432614		0.958156	0.999993	0.932
7	Contract	Gsqrt % Difference/Total value:0	0.999966	1.000000	0.999943	1.000000	0.928286	0.958156		0.793091	0.188
8	Contract	Gsqrt % Difference/Total value:1-6	0.999857	0.972966	0.999911	0.971277	0.261617	0.999993	0.793091		0.994
9	Contract	Gsqrt % Difference/Total value:7-12	0.967439	0.719841	0.972748	0.712657	0.053802	0.932493	0.188387	0.994360	
10	Contract	Gsqrt % Difference/Total value:13-18	0.998716	1.000000	0.998232	1.000000	0.983211	0.789395	0.999992	0.501896	0.061

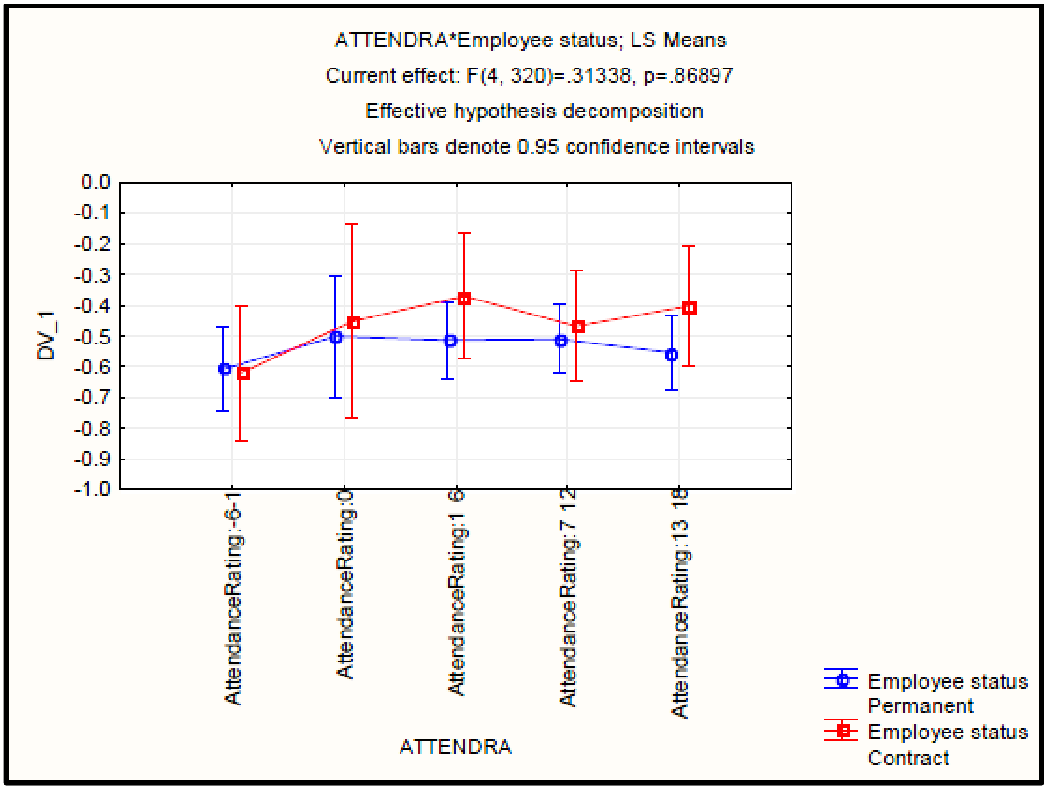
APPENDIX AX

Levene's test on "Grubbed" squareroot % Differences/Total value

	Levene's Test for Homogeneity of Variances (1234 based on means for 3of5 nc zeros 2) Effect: "Employee status" Degrees of freedom for all F's: 1, 65			
	MS Effect	MS Error	F	p
Gsqrt % Difference/Total value:-6-1	0.000004	0.000326	0.012436	0.911550
Gsqrt % Difference/Total value:0	0.000045	0.000328	0.137041	0.712444
Gsqrt % Difference/Total value:1 6	0.000094	0.000200	0.468577	0.496076
Gsqrt % Difference/Total value:7 12	0.000383	0.000327	1.168181	0.283769
Gsqrt % Difference/Total value:13 18	0.000017	0.000255	0.065358	0.799027

APPENDIX AY

ATTENDANCE



Attendance ratings marginal means

APPENDIX AZ

Attendance rating ANOVA with ES

Effect	Repeated Measures Analysis of Variance with Effect Sizes and Powers (1234 based on means for 3of5 no zeros 2) Sigma-restricted parameterization Effective hypothesis decomposition							
	SS	Degr. of Freedom	MS	F	P	Partial eta-squared	Non-centrality	Observed power (alpha=0.05)
Intercept	82.85809	1	82.85809	183.1026	0.000000	0.695936	183.1026	1.000000
Employee status	0.45837	1	0.45837	1.0129	0.317237	0.012503	1.0129	0.168696
Error	36.20183	80	0.45252					
ATTENDRA	1.15421	4	0.28855	1.0985	0.357301	0.013545	4.3940	0.345261
ATTENDRA*Employee status	0.32927	4	0.08232	0.3134	0.868969	0.003902	1.2535	0.120197
Error	84.05777	320	0.26268					

APPENDIX BA

Attendance rating unweighted means

Cell No.	ATTENDRA*Employee status; Unweighted Means (1234 based on means for 3of5 no zeros 2) Current effect: F(4, 320)=.31338, p=.86897 Effective hypothesis decomposition						
	Employee status	ATTENDRA	DV_1 Mean	DV_1 Std.Err.	DV_1 -95.00%	DV_1 +95.00%	N
1	Permanent	AttendanceRating:-6-1	-0.607232	0.068109	-0.742773	-0.471690	59
2	Permanent	AttendanceRating:0	-0.501695	0.099114	-0.698938	-0.304452	59
3	Permanent	AttendanceRating:1- 6	-0.514463	0.063794	-0.641417	-0.387510	59
4	Permanent	AttendanceRating:7- 12	-0.510847	0.056038	-0.622367	-0.399328	59
5	Permanent	AttendanceRating:13- 18	-0.553559	0.061696	-0.676338	-0.430780	59
6	Contract	AttendanceRating:-6-1	-0.621159	0.109086	-0.838247	-0.404072	23
7	Contract	AttendanceRating:0	-0.452174	0.158744	-0.768084	-0.136264	23
8	Contract	AttendanceRating:1- 6	-0.370725	0.102174	-0.574057	-0.167392	23
9	Contract	AttendanceRating:7- 12	-0.467826	0.089752	-0.646439	-0.289213	23
10	Contract	AttendanceRating:13- 18	-0.403768	0.098814	-0.600415	-0.207122	23

Levene's test for Attendance ratings

	Levene's Test for Homogeneity of Variances (1234 based on means for 3of5 no zeros 2 Effect: "Employee status" Degrees of freedom for all F's: 1, 80			
	MS Effect	MS Error	F	p
AttendanceRating:-6-1	0.114504	0.097712	1.171852	0.282273
AttendanceRating:0	0.000095	0.204253	0.000467	0.982817
AttendanceRating:1- 6	0.069206	0.101579	0.681299	0.411594
AttendanceRating:7- 12	0.011162	0.075574	0.147700	0.701763
AttendanceRating:13- 18	0.074264	0.103488	0.717614	0.399455

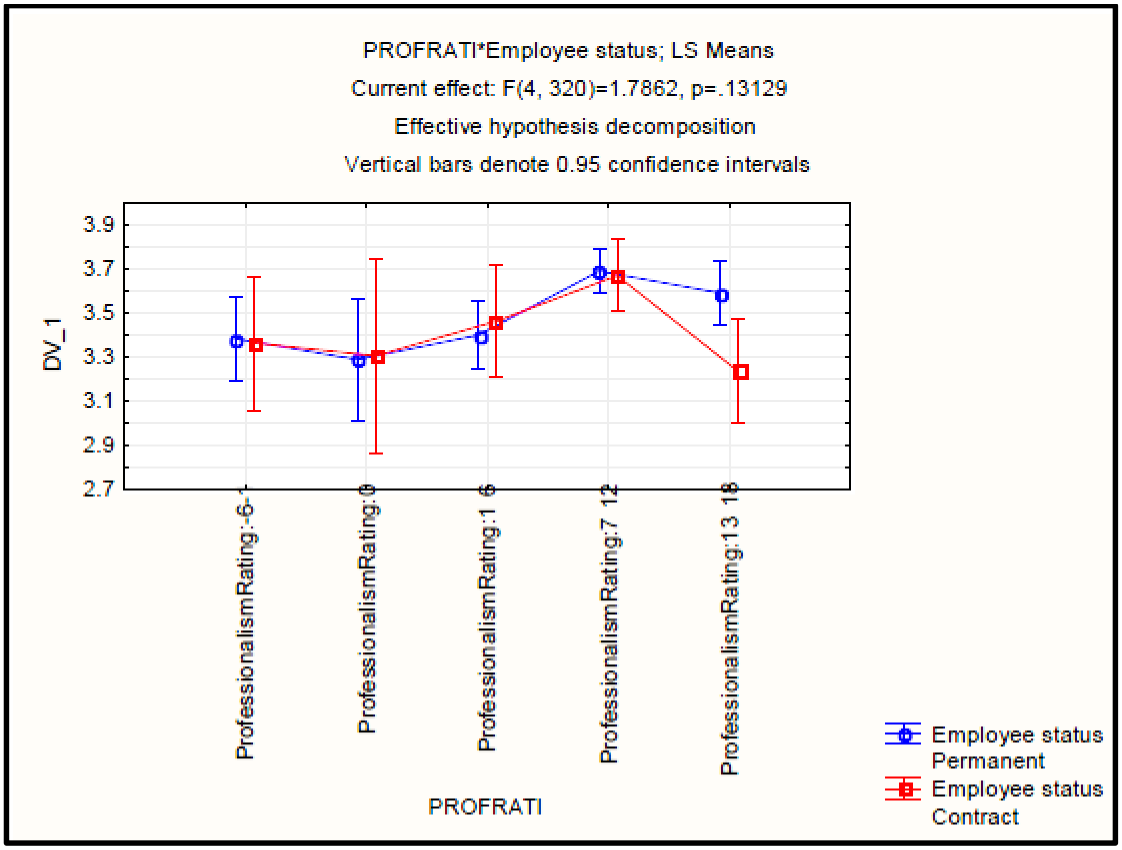
APPENDIX BB

Tukey unequal N HSD test for Attendance rating

Cell No.	Unequal N HSD; variable DV_1 (1234 based on means for 3of5 no zeros 2) Approximate Probabilities for Post Hoc Tests Error: Between; Within; Pooled MSE = .30065, df = 376.01										
	Employee status	ATTENDRA	{1} -.6072	{2} -.5017	{3} -.5145	{4} -.5108	{5} -.5536	{6} -.6212	{7} -.4522	{8} -.3707	{9} -.4678
1	Permanent	AttendanceRating:-6-1		0.982985	0.993238	0.991058	0.999914	1.000000	0.994374	0.906751	0.997491
2	Permanent	AttendanceRating:0	0.982985		1.000000	1.000000	0.999936	0.999258	1.000000	0.998458	1.000000
3	Permanent	AttendanceRating:1- 6	0.993238	1.000000		1.000000	0.999994	0.999705	0.999997	0.996825	1.000000
4	Permanent	AttendanceRating:7- 12	0.991058	1.000000	1.000000		0.999988	0.999612	0.999998	0.997389	1.000000
5	Permanent	AttendanceRating:13- 18	0.999914	0.999936	0.999994	0.999988		0.999994	0.999807	0.981643	0.999953
6	Contract	AttendanceRating:-6-1	1.000000	0.999258	0.999705	0.999612	0.999994		0.983017	0.819557	0.991485
7	Contract	AttendanceRating:0	0.994374	1.000000	0.999997	0.999998	0.999807	0.983017		0.999946	1.000000
8	Contract	AttendanceRating:1- 6	0.906751	0.998458	0.996825	0.997389	0.981643	0.819557	0.999946		0.999763
9	Contract	AttendanceRating:7- 12	0.997491	1.000000	1.000000	1.000000	0.999953	0.991485	1.000000	0.999763	
10	Contract	AttendanceRating:13- 18	0.962561	0.999855	0.999601	0.999696	0.995657	0.915273	0.999999	1.000000	0.999993

APPENDIX BC

PROFESSIONALISM



Professionalism ratings marginal means

APPENDIX BD

Professionalism rating ANOVA with ES

Effect	Repeated Measures Analysis of Variance with Effect Sizes and Powers (1234 based on means for 3of5 n Sigma-restricted parameterization Effective hypothesis decomposition							
	SS	Degr. of Freedom	MS	F	P	Partial eta-squared	Non-centrality	Observed power (alpha=0.05)
Intercept	3912.187	1	3912.187	2648.626	0.000000	0.970681	2648.626	1.000000
Employee status	0.332	1	0.332	0.225	0.636734	0.002802	0.225	0.075492
Error	118.165	80	1.477					
PROFRATI	5.528	4	1.382	5.311	0.000374	0.062255	21.244	0.971103
PROFRATI*Employee status	1.859	4	0.465	1.786	0.131292	0.021840	7.145	0.542717
Error	83.271	320	0.260					

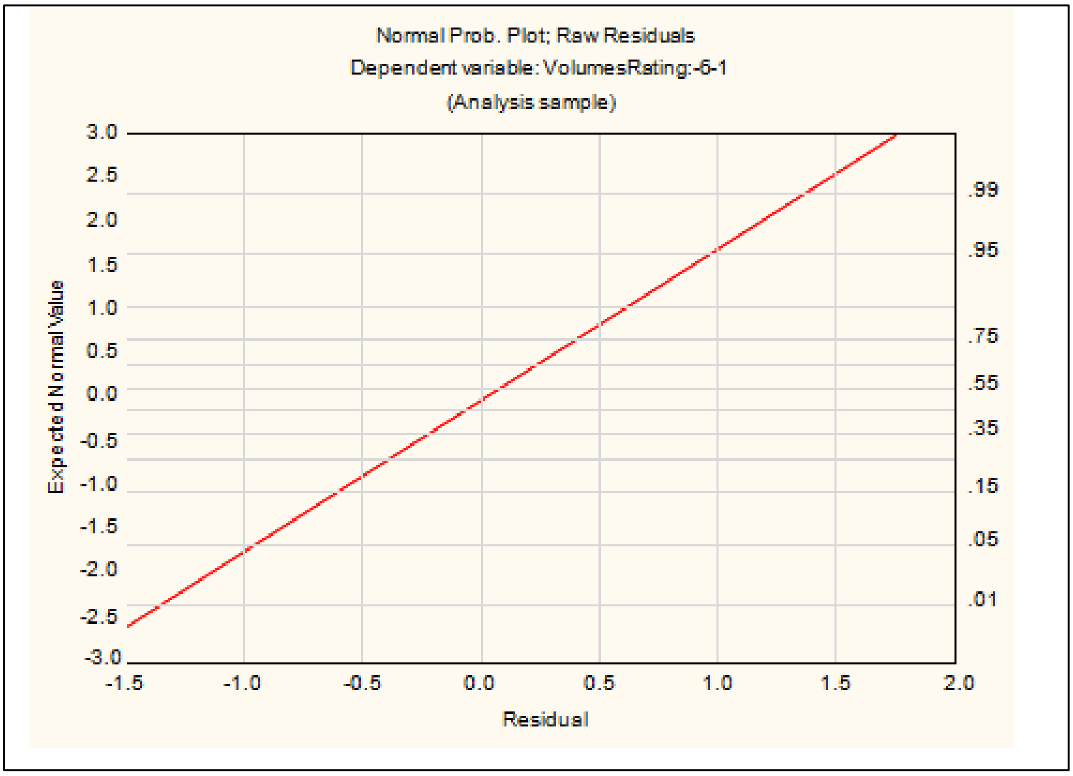
APPENDIX BE

Professionalism rating unweighted means

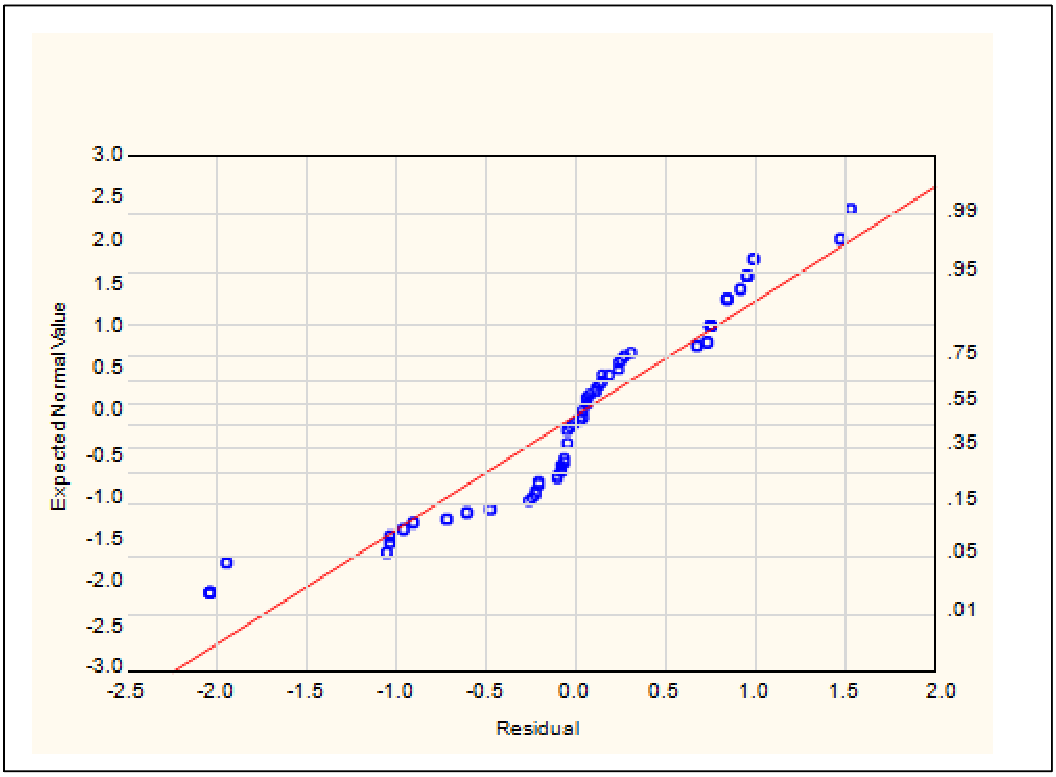
Cell No.	PROFRATI*Employee status; Unweighted Means (1234 based on means for 3of5 no zeros 2) Current effect: F(4, 320)=1.7862, p=.13129 Effective hypothesis decomposition						
	Employee status	PROFRATI	DV_1 Mean	DV_1 Std.Err.	DV_1 -95.00%	DV_1 +95.00%	N
1	Permanent	ProfessionalismRating:-6-1	3.382203	0.095395	3.192360	3.572046	59
2	Permanent	ProfessionalismRating:0	3.288136	0.138829	3.011856	3.564415	59
3	Permanent	ProfessionalismRating:1- 6	3.398588	0.078769	3.241833	3.555342	59
4	Permanent	ProfessionalismRating:7- 12	3.689548	0.050785	3.588482	3.790614	59
5	Permanent	ProfessionalismRating:13- 18	3.590113	0.074294	3.442264	3.737962	59
6	Contract	ProfessionalismRating:-6-1	3.362319	0.152788	3.058261	3.666377	23
7	Contract	ProfessionalismRating:0	3.304348	0.222353	2.861851	3.746845	23
8	Contract	ProfessionalismRating:1- 6	3.462319	0.126158	3.211256	3.713382	23
9	Contract	ProfessionalismRating:7- 12	3.669565	0.081339	3.507695	3.831436	23
10	Contract	ProfessionalismRating:13- 18	3.233333	0.118991	2.996534	3.470133	23

APPENDIX BF

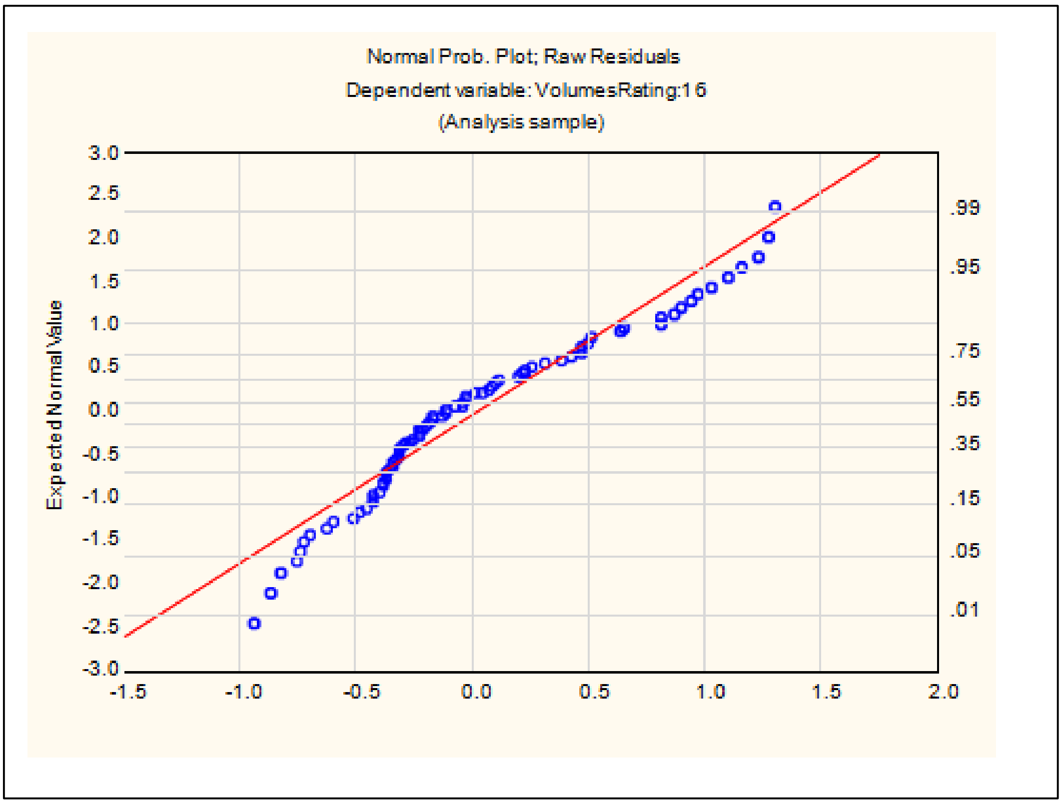
Probability plots Volumes data



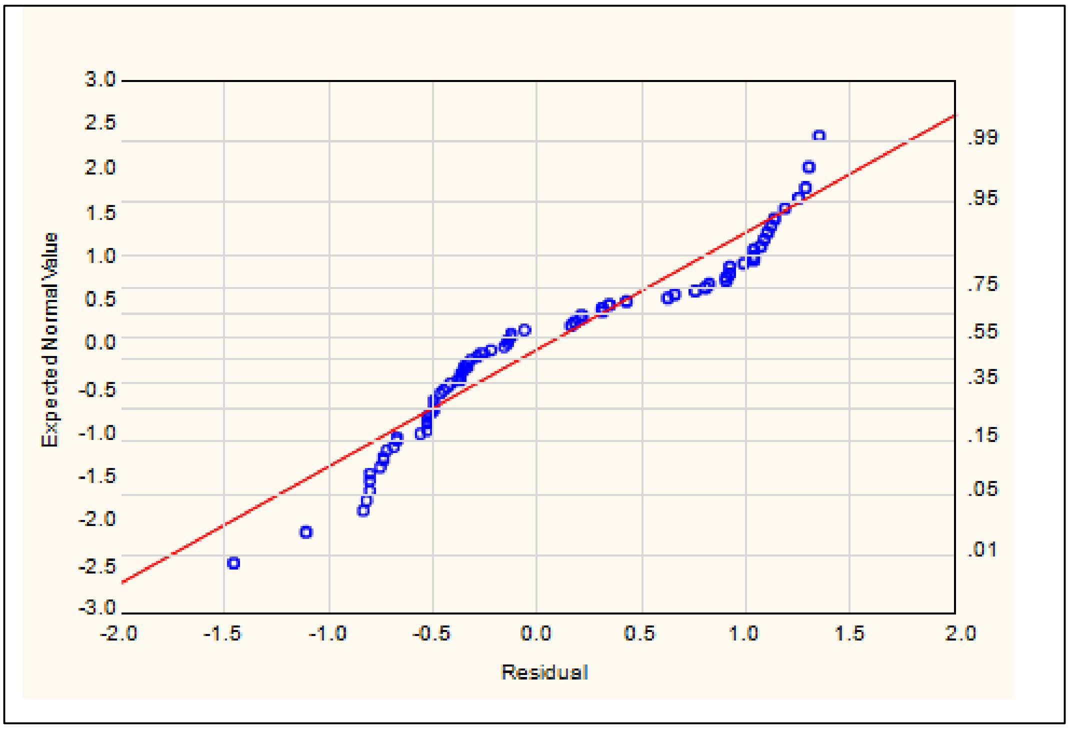
Normal prob. plot of raw residuals Volumes rating (t_{-6-1})



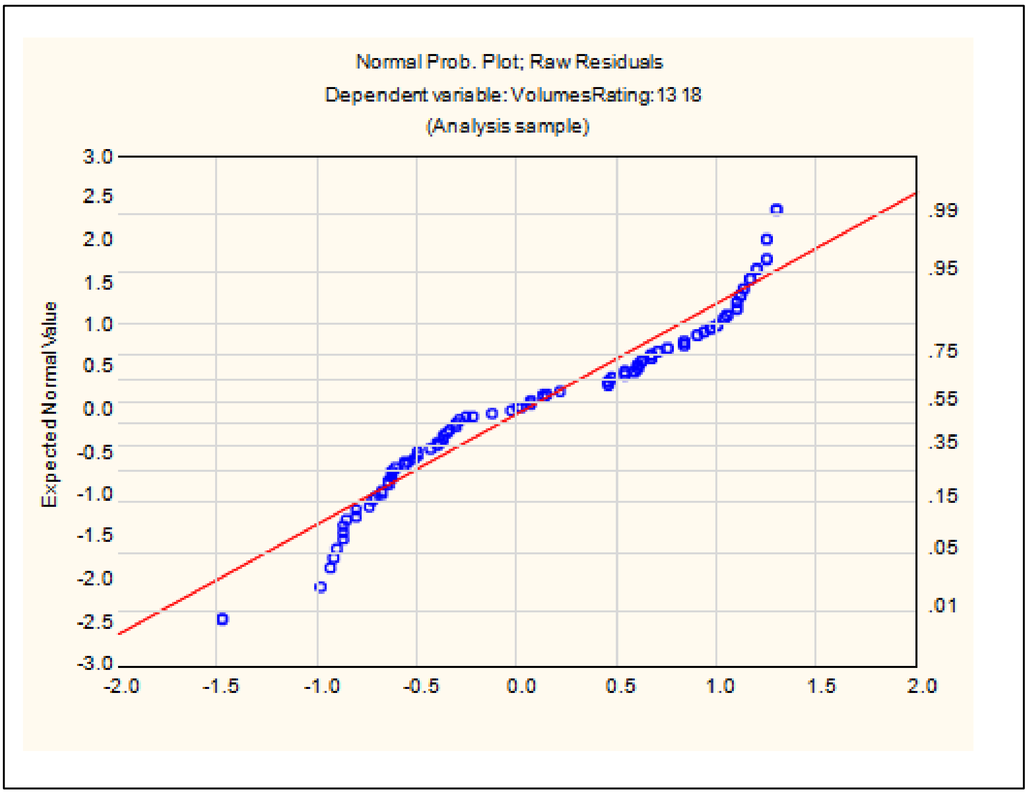
Normal prob. plot of raw residuals Volumes rating (t_0)



Normal prob. plot of raw residuals Volumes rating (t_{1-6})



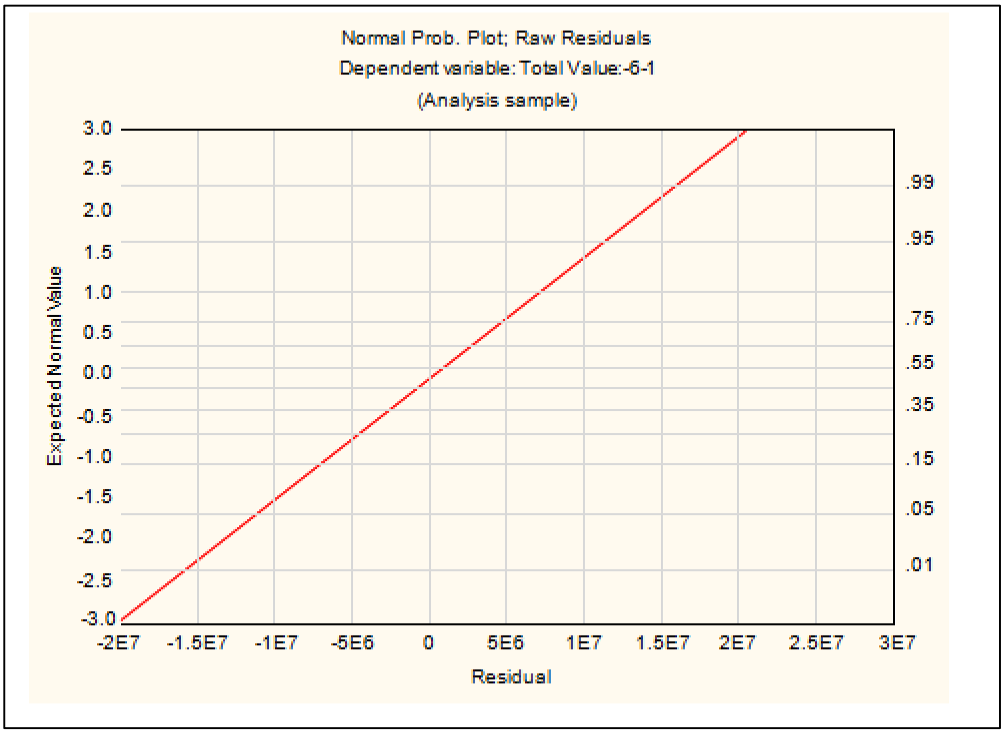
Normal prob. plot of raw residuals Volumes rating (t_{7-12})



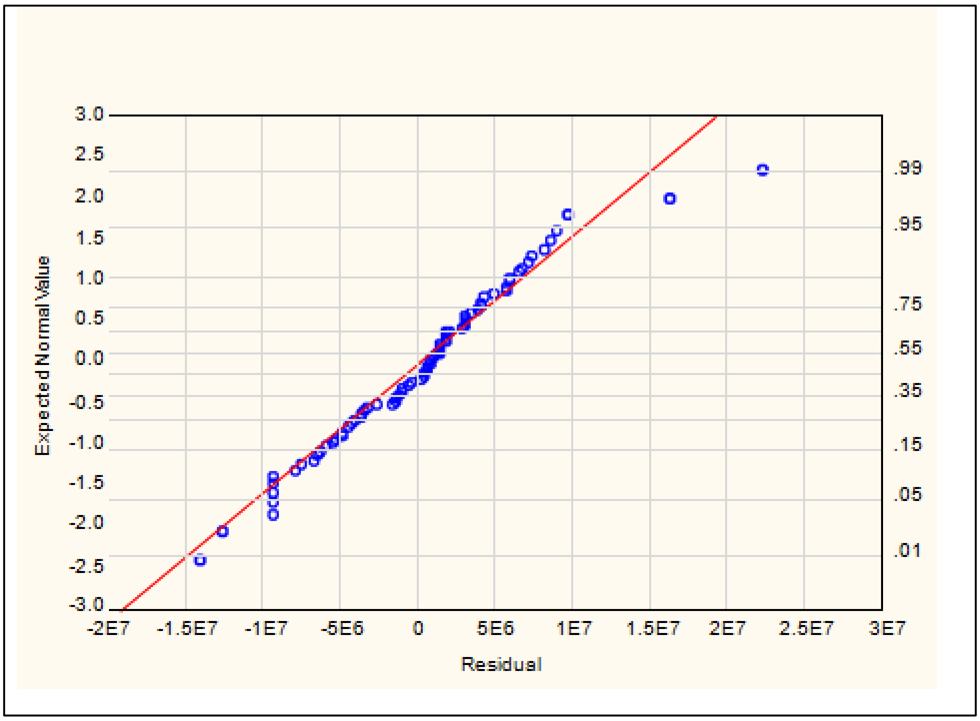
Normal prob. plot of raw residuals Volumes rating (t_{13-18})

APPENDIX BG

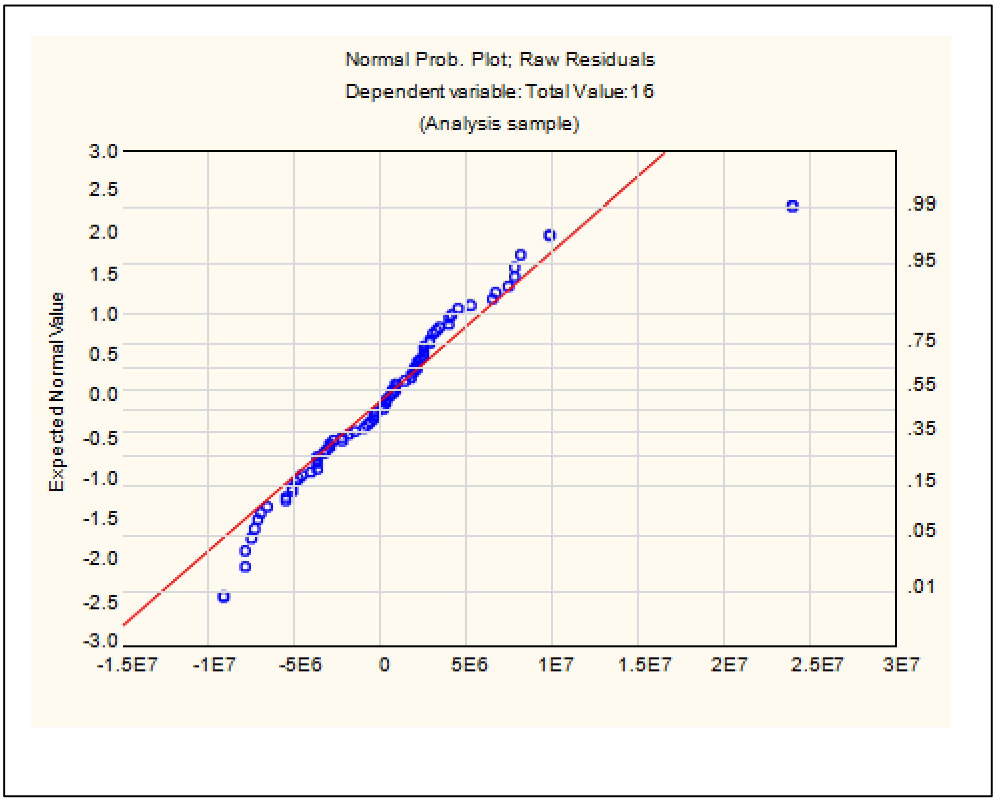
Probability plots Total value of deposits processed



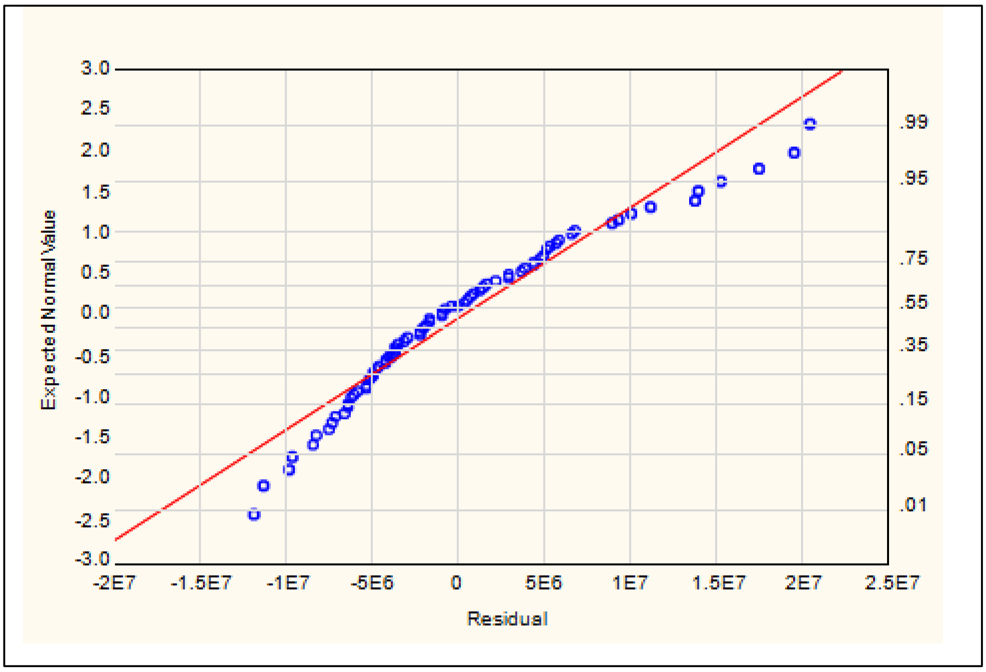
Normal prob. plot of raw residuals Total value processed (t_{-6-1})



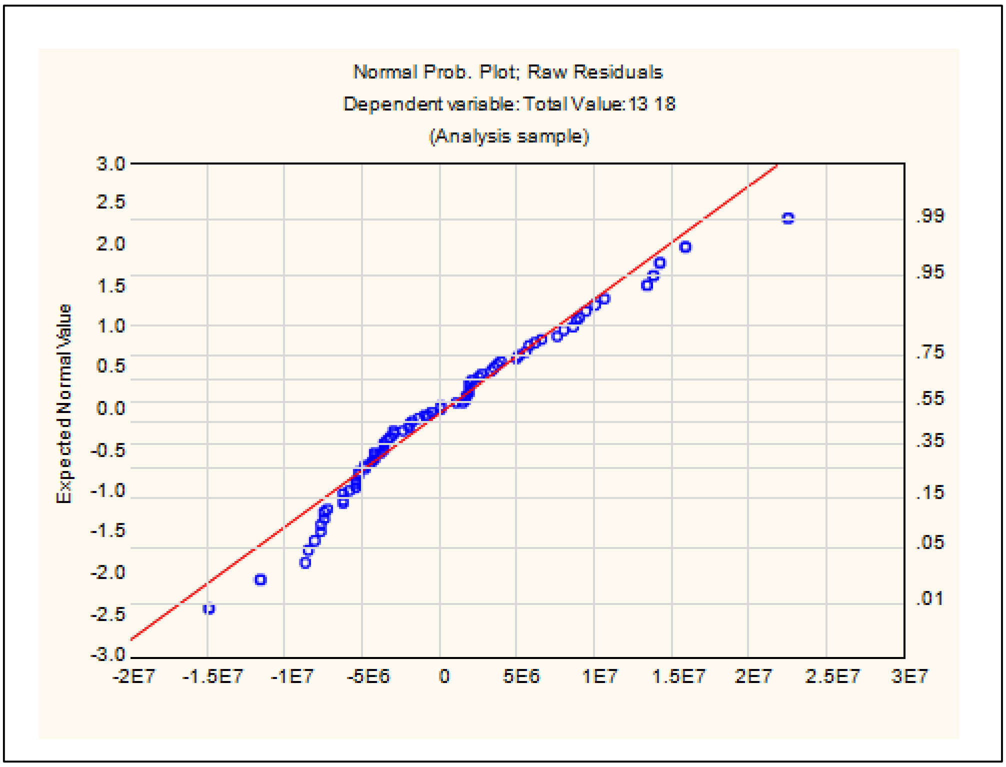
Normal prob. plot of raw residuals Total value processed (t_0)



Normal prob. plot of raw residuals Total value processed ($t_{1\text{-}6}$)



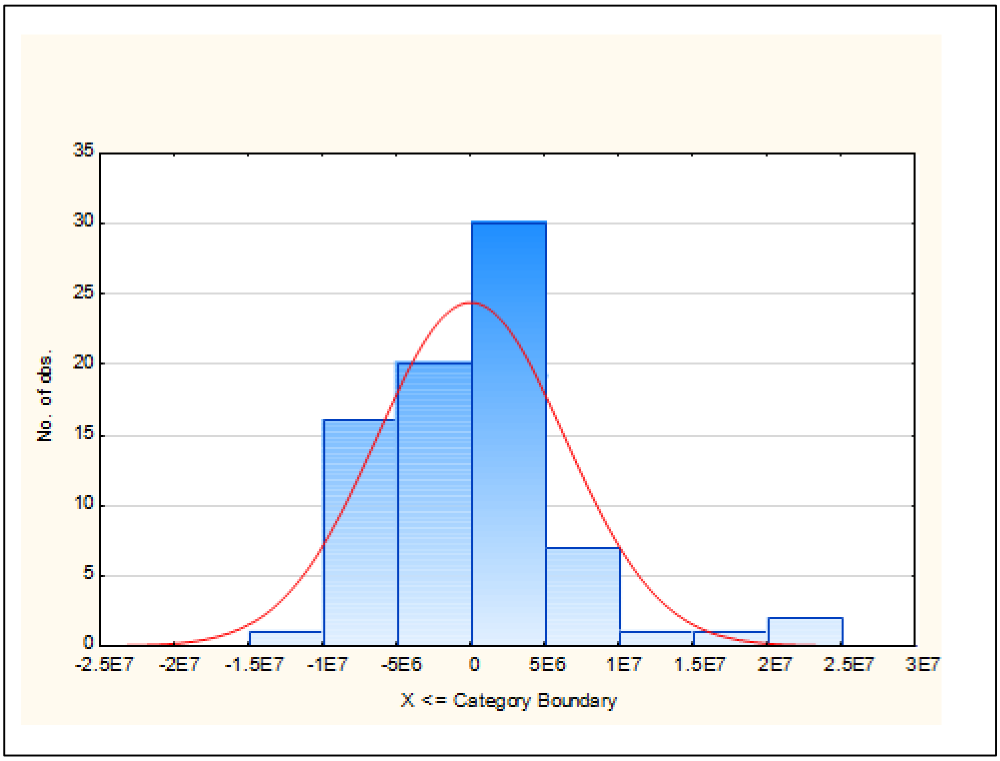
Normal prob. plot of raw residuals Total value processed ($t_{7\text{-}12}$)



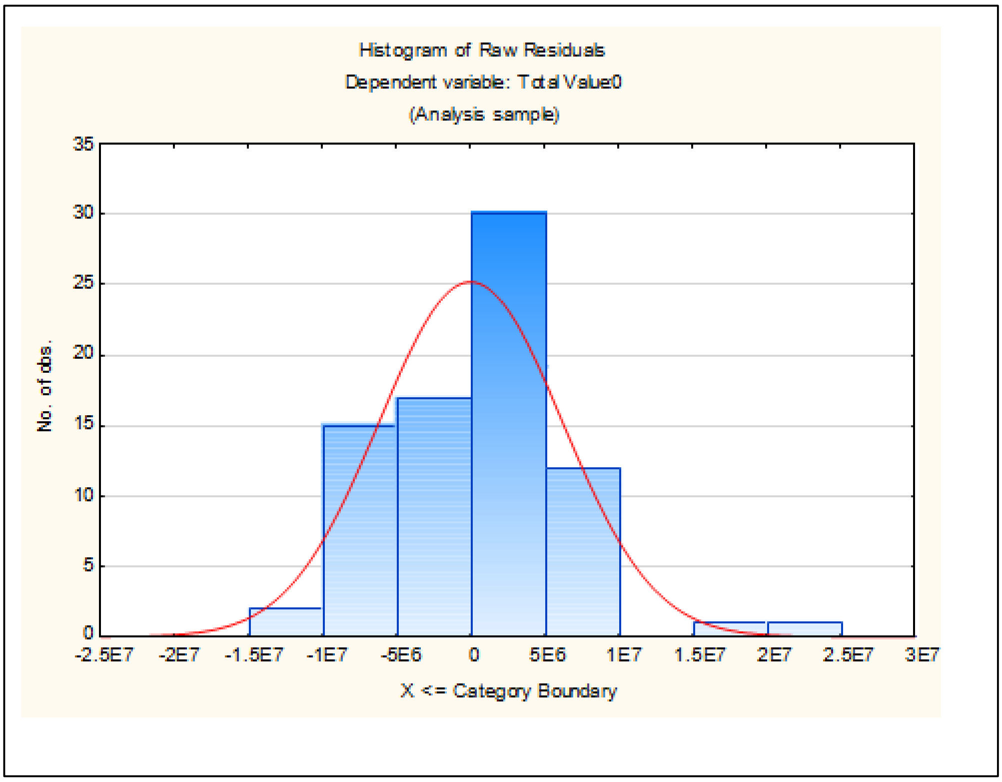
Normal prob. plot of raw residuals Total value processed ($t_{13\text{-}18}$)

APPENDIX BH

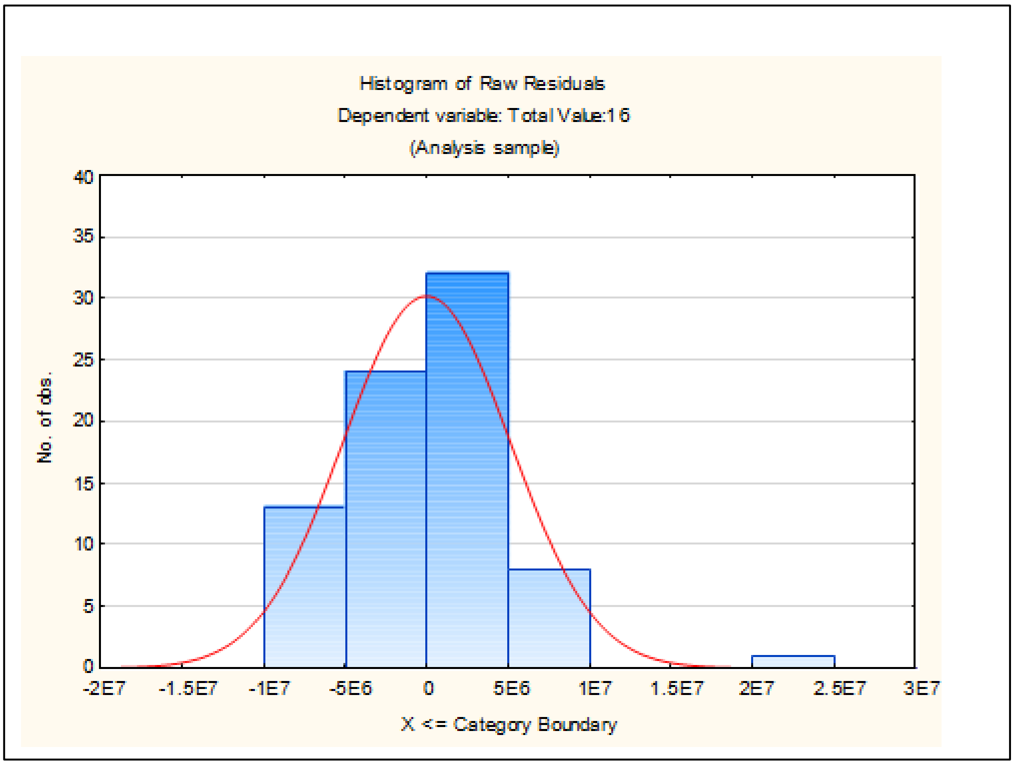
Histograms for Total value processed



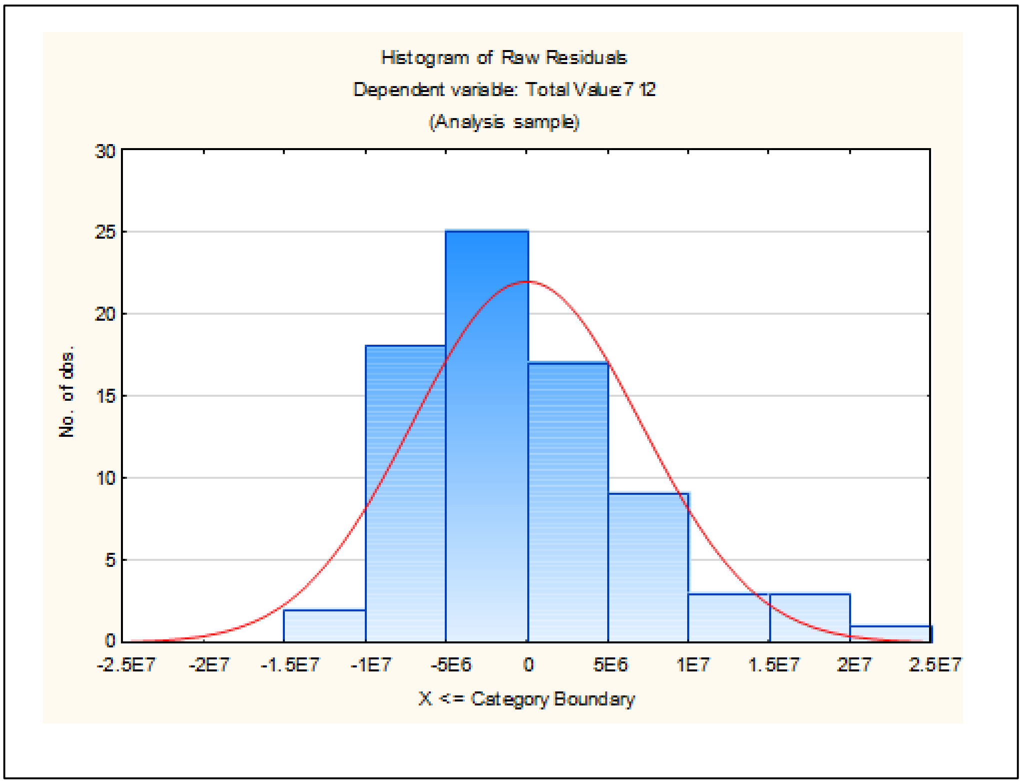
Histogram of raw residuals Total value processed (t_{-6-1})



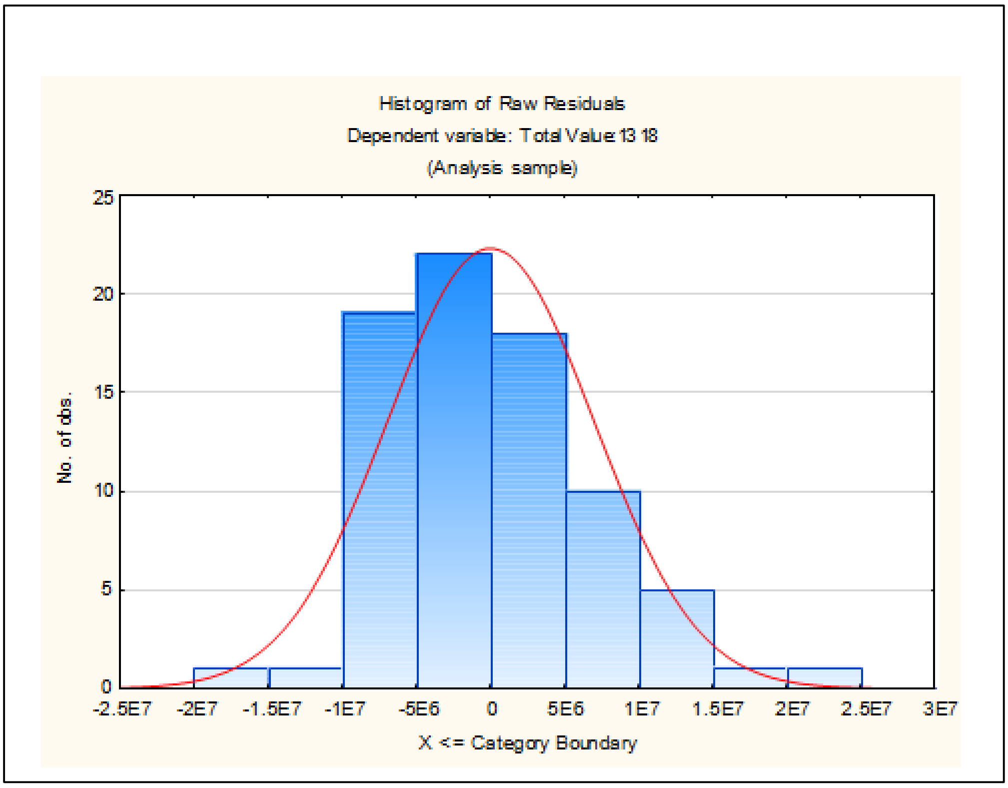
Histogram of raw residuals Total value processed (t_0)



Histogram of raw residuals Total value processed (t_{1-6})



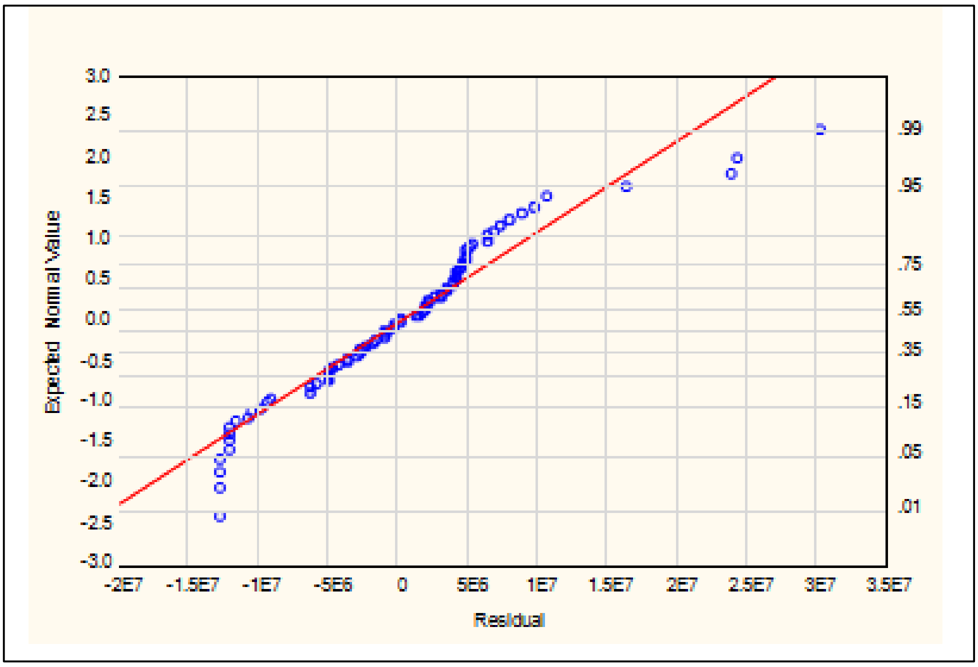
Histogram of raw residuals Total value processed (t_{7-12})



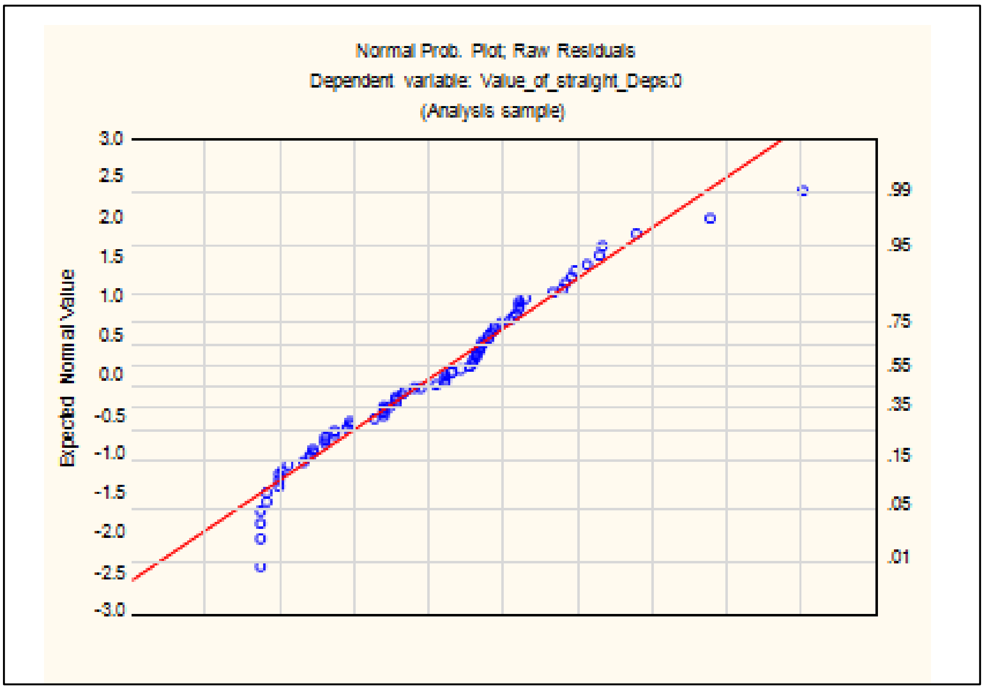
Histogram of raw residuals Total value processed (t_{13-18})

APPENDIX BI

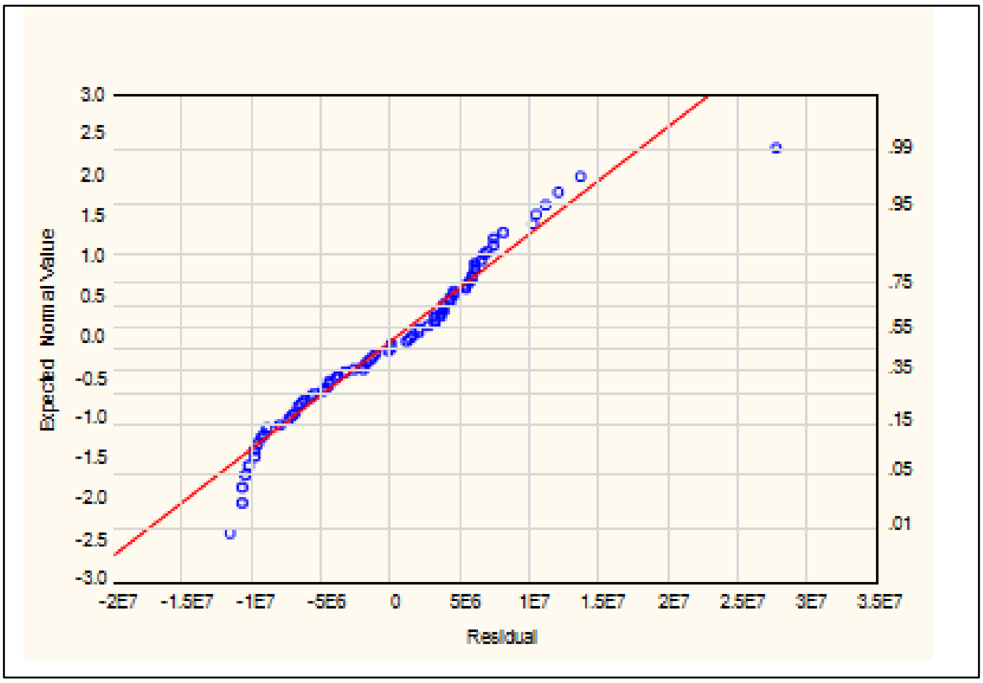
Probability plots Value of deposits per straight deposit



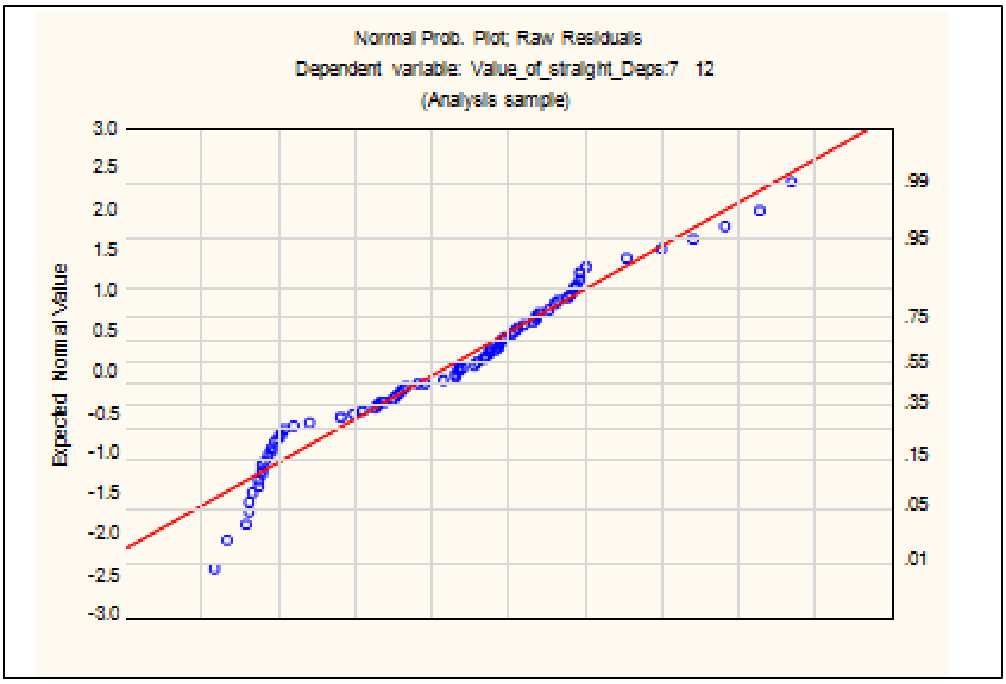
Normal prob. plot of raw residuals for Value of deposits-straight processed (t_{-6-1})



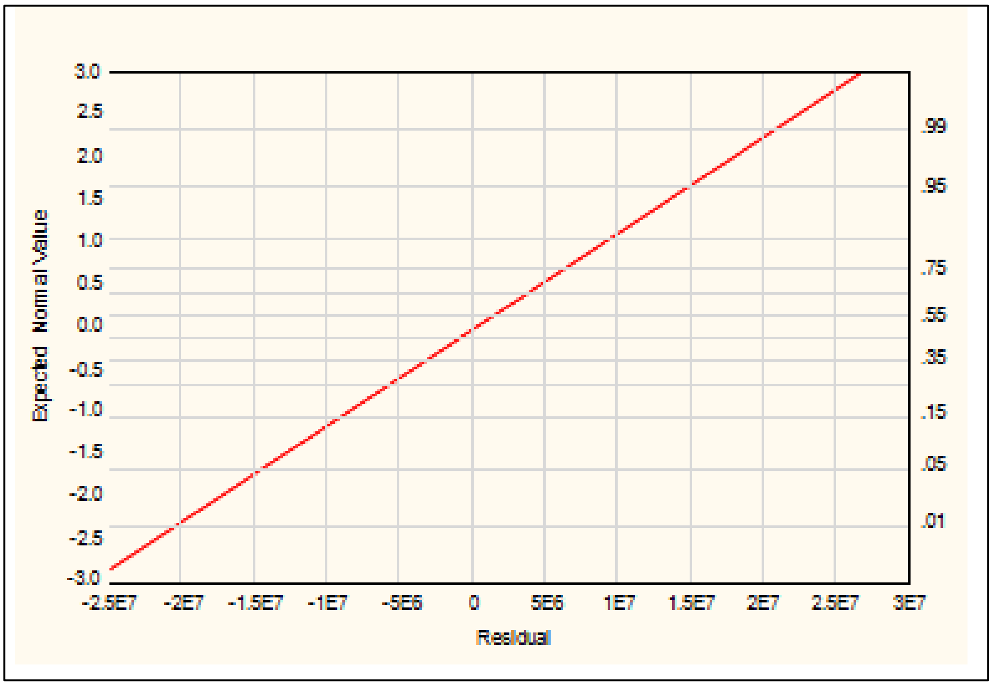
Normal prob. plot of raw residuals for Value of deposits-straight processed (t_0)



Normal prob. plot of raw residuals for Value of deposits-straight processed (t_{1-6})



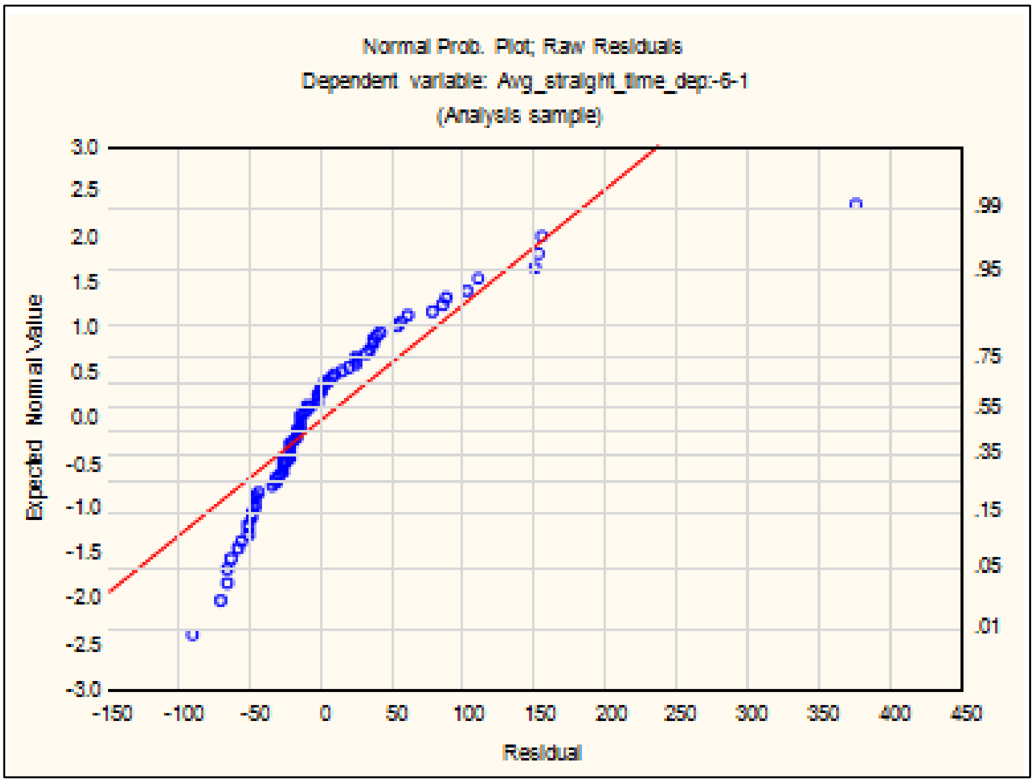
Normal prob. plot of raw residuals for Value of deposits-straight processed (t_{7-12})



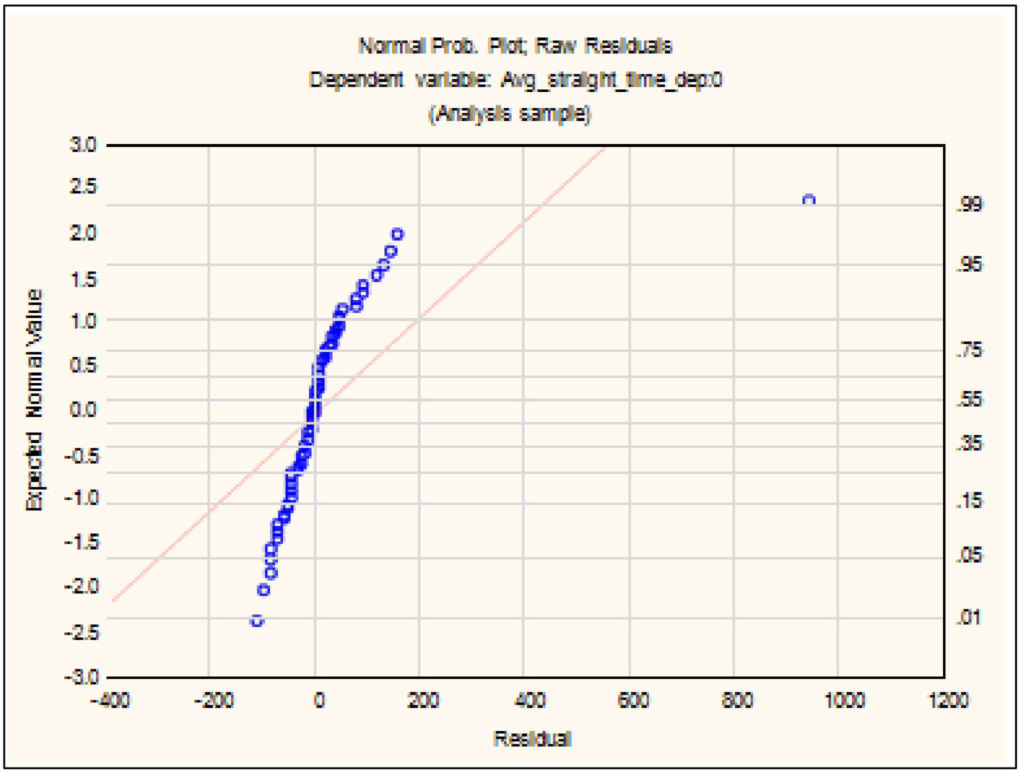
Normal prob. plot of raw residuals for Value of deposits-straight processed ($t_{13\text{-}18}$)

APPENDIX BJ

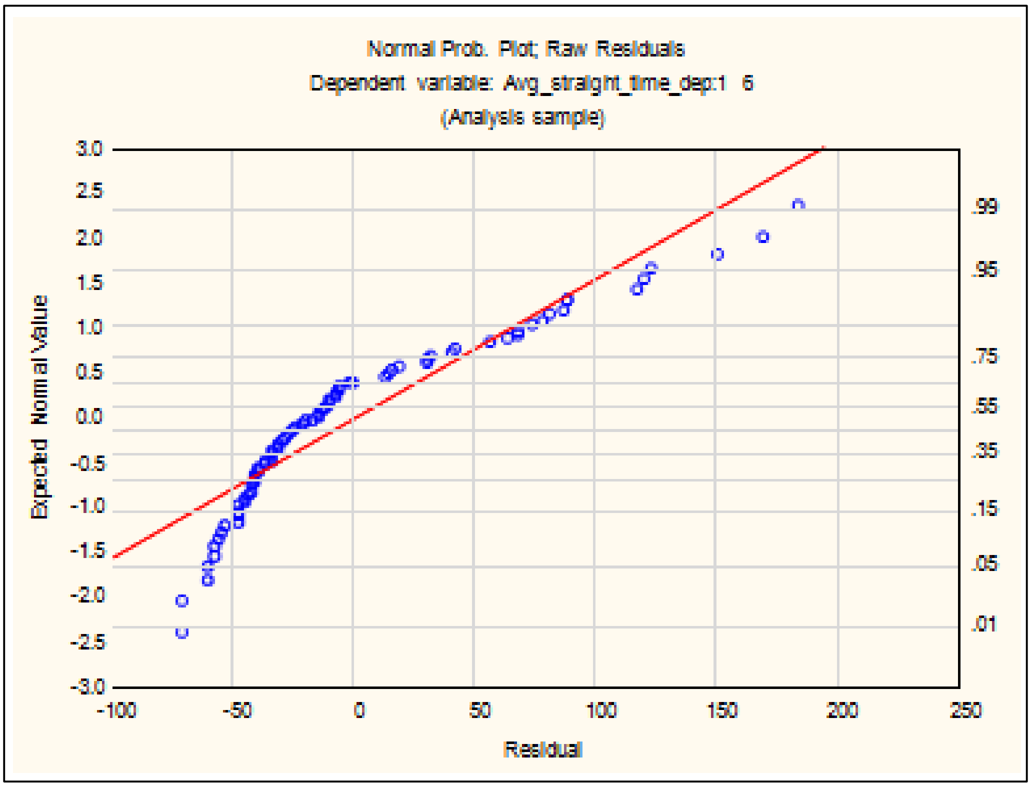
Probability plots Time taken per straight deposit



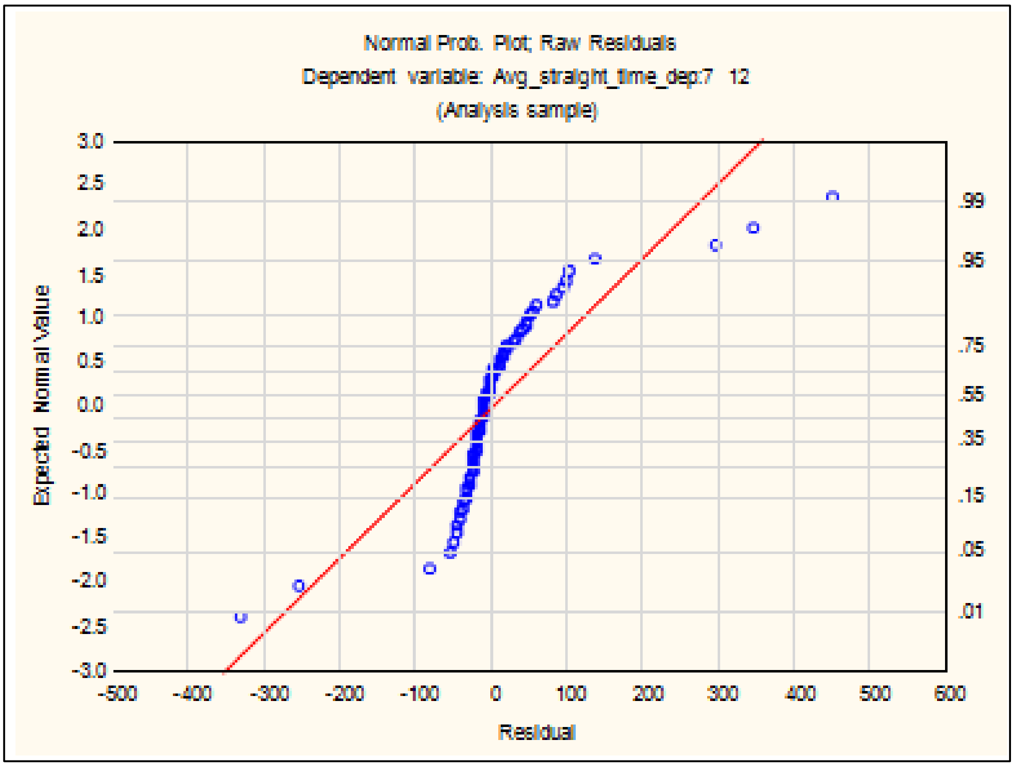
Normal prob. plot of raw residuals for average straight-time per deposit processed (t_{-6-1})



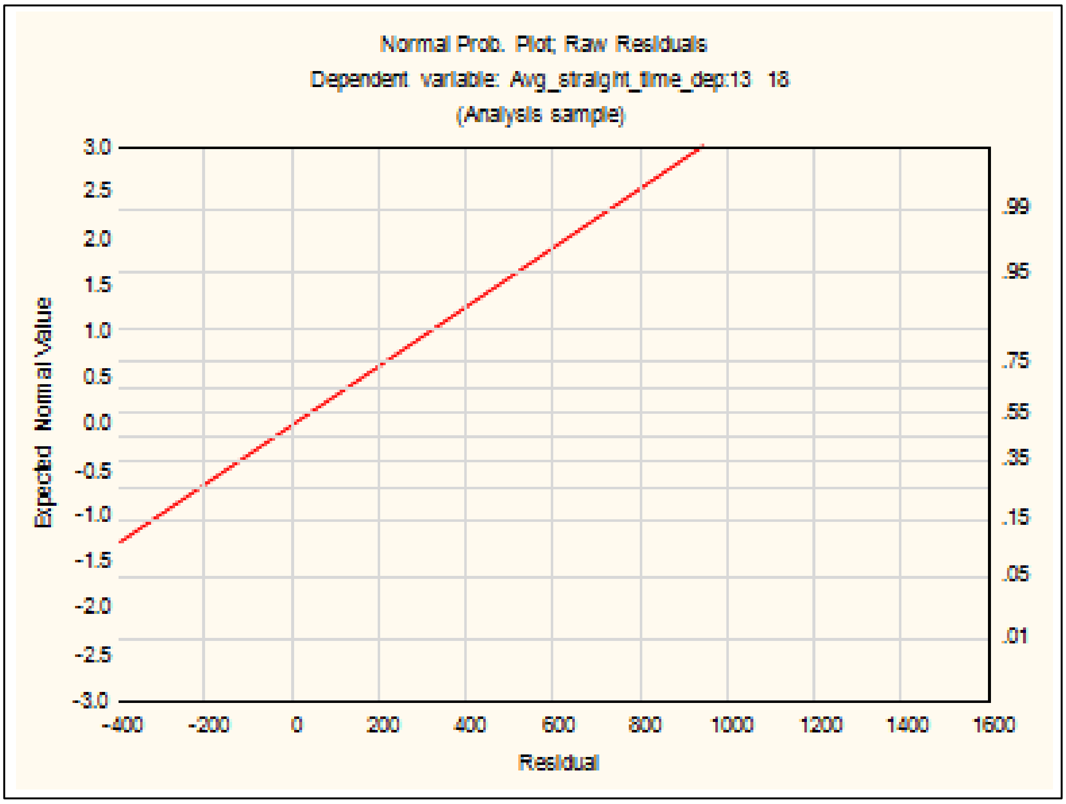
Normal prob. plot of raw residuals for average straight-time per deposit processed (t_0)



Normal prob. plot of raw residuals for average straight-time per deposit processed ($t_{1\text{-}6}$)



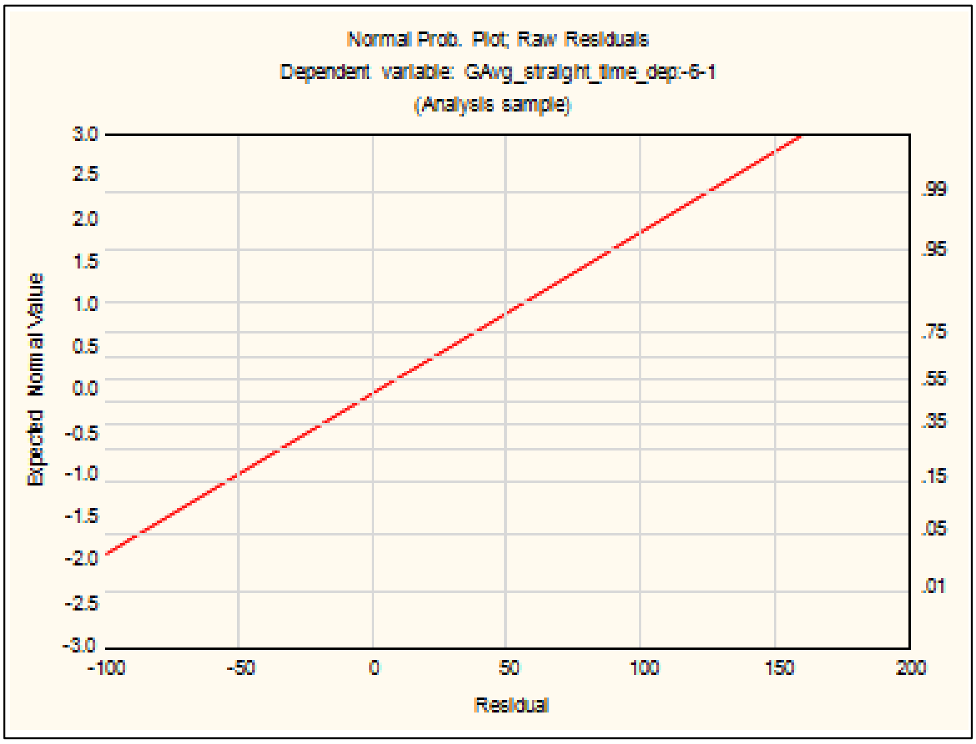
Normal prob. plot of raw residuals for average straight-time per deposit processed ($t_{7\text{-}12}$)



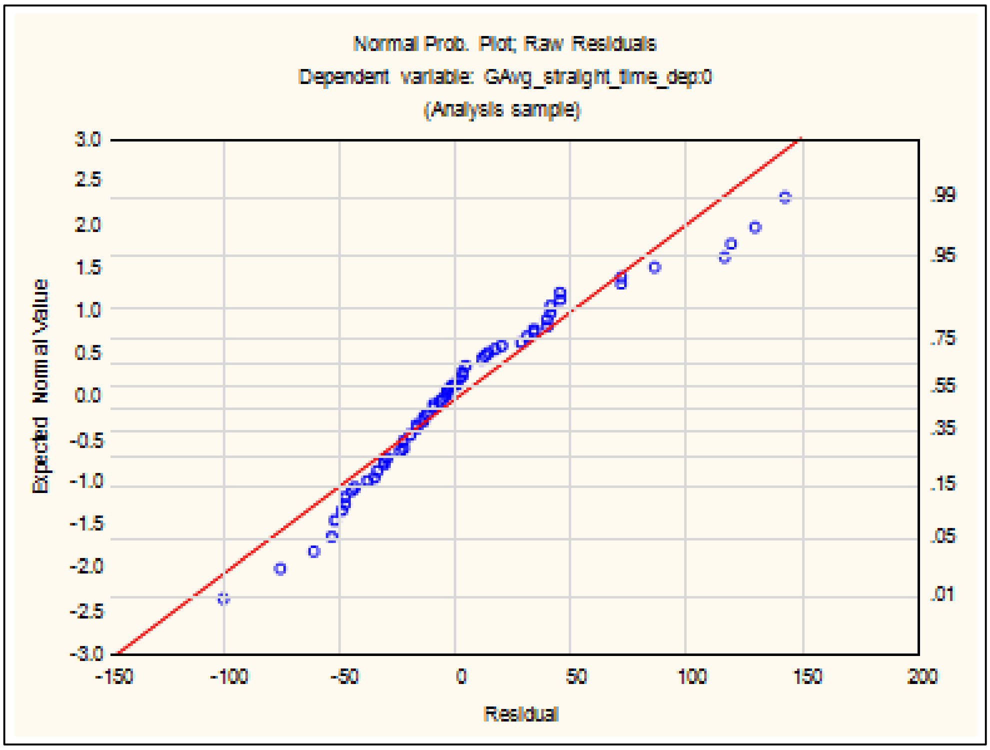
Normal prob. plot of raw residuals for average straight-time per deposit processed (t_{13-18})

APPENDIX BK

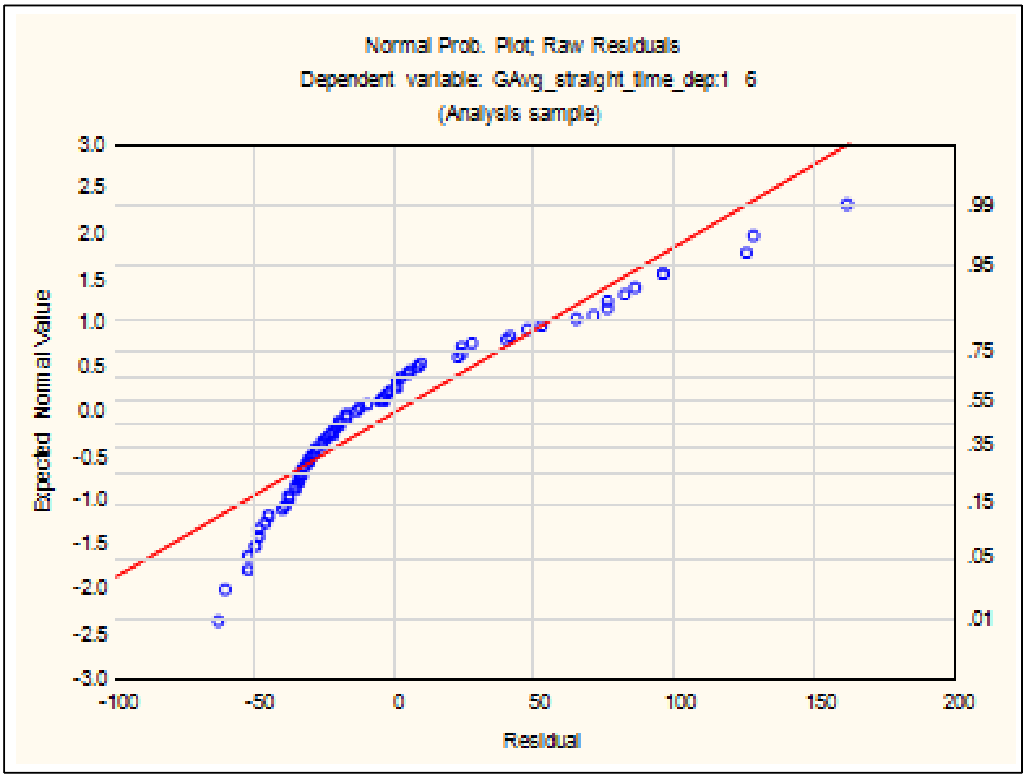
Probability plots for Grubbed average time per straight-deposit



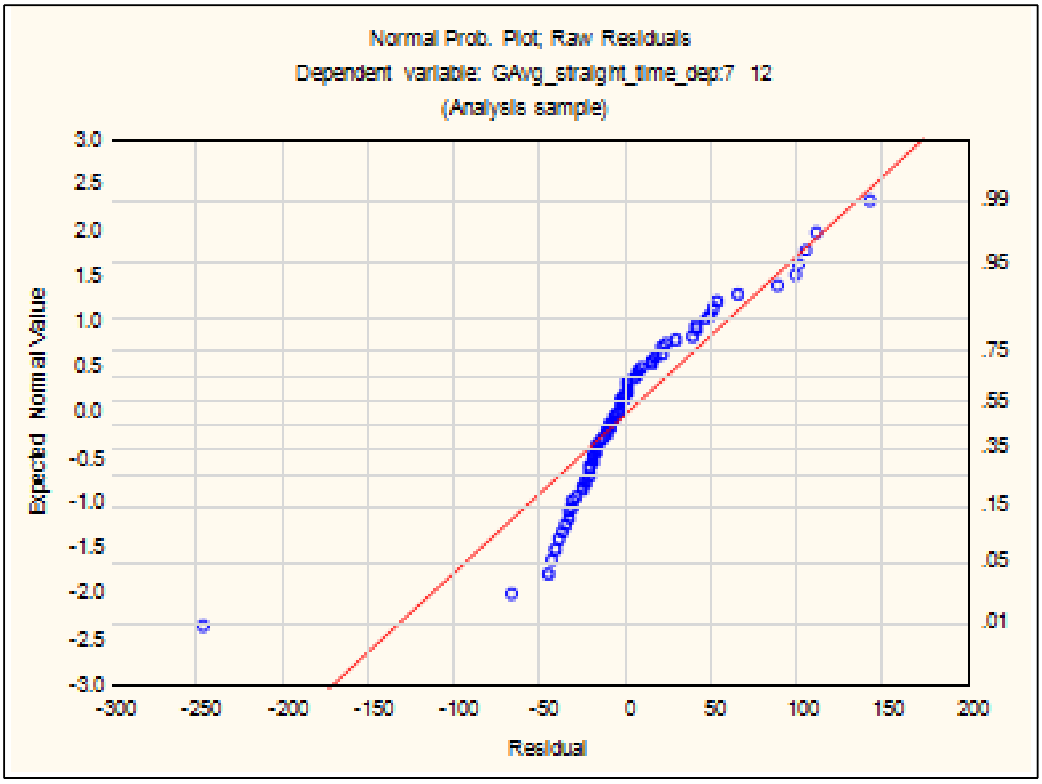
Normal prob. plot of raw residuals for "Grubbed" average straight-time (t_{-6-1})



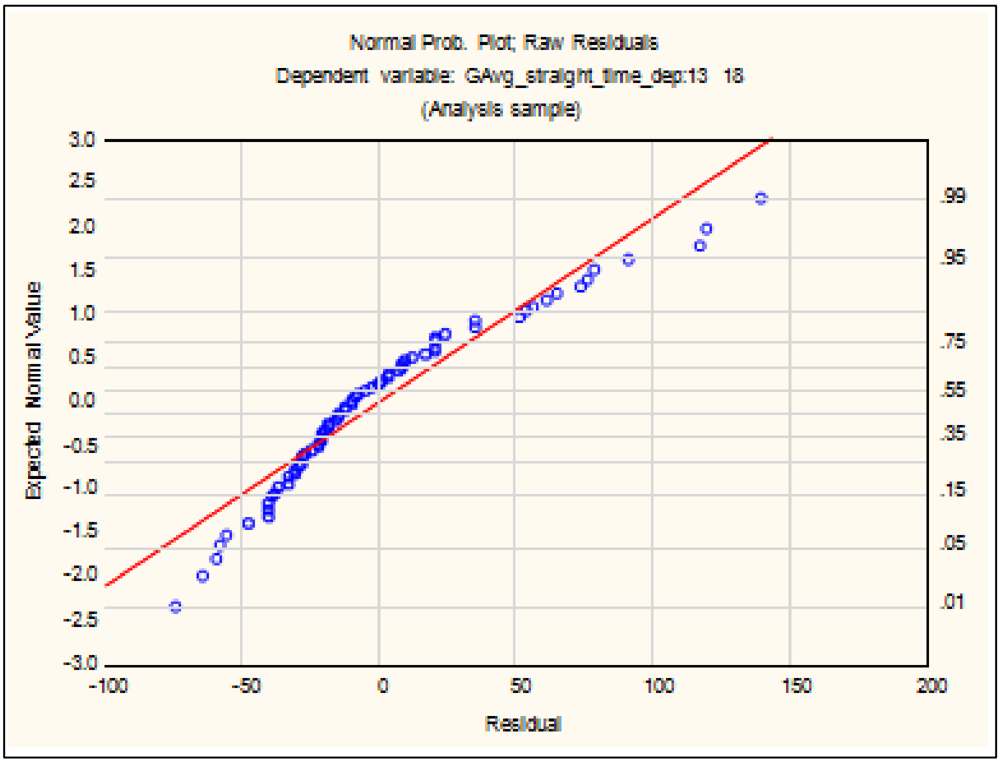
Normal prob. plot of raw residuals for "Grubbed" average straight-time (t_0)



Normal prob. plot of raw residuals for "Grubbed" average straight-time (t_{1-6})



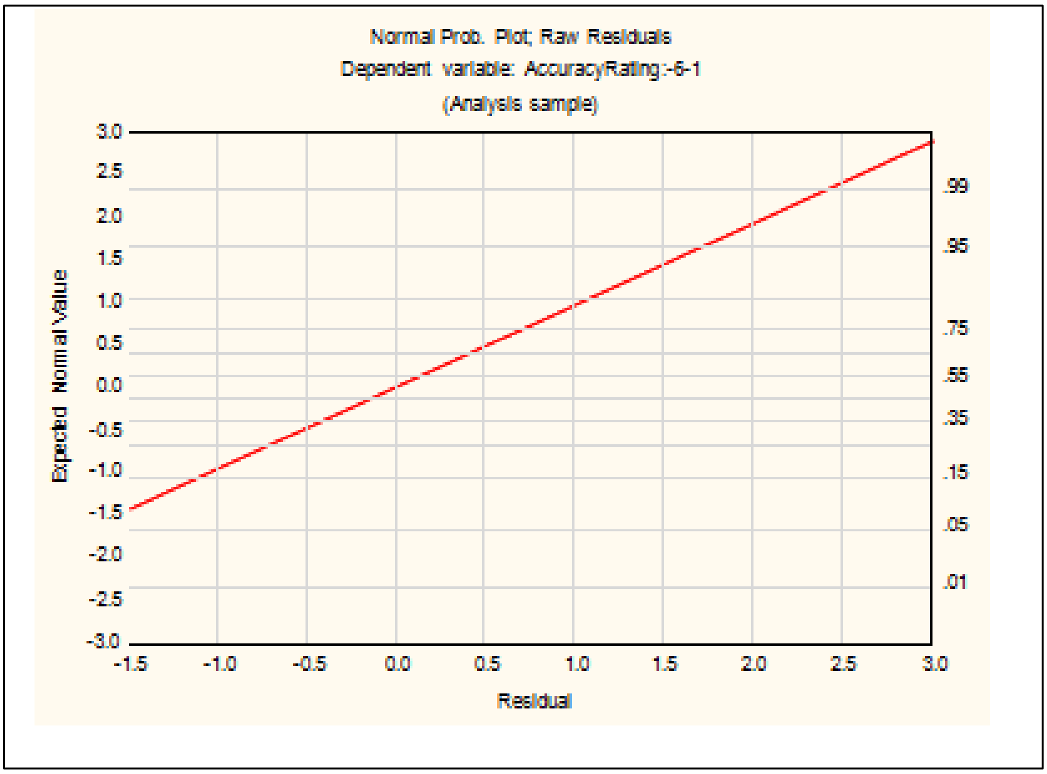
Normal prob. plot of raw residuals for "Grubbed" average straight-time (t_{7-12}



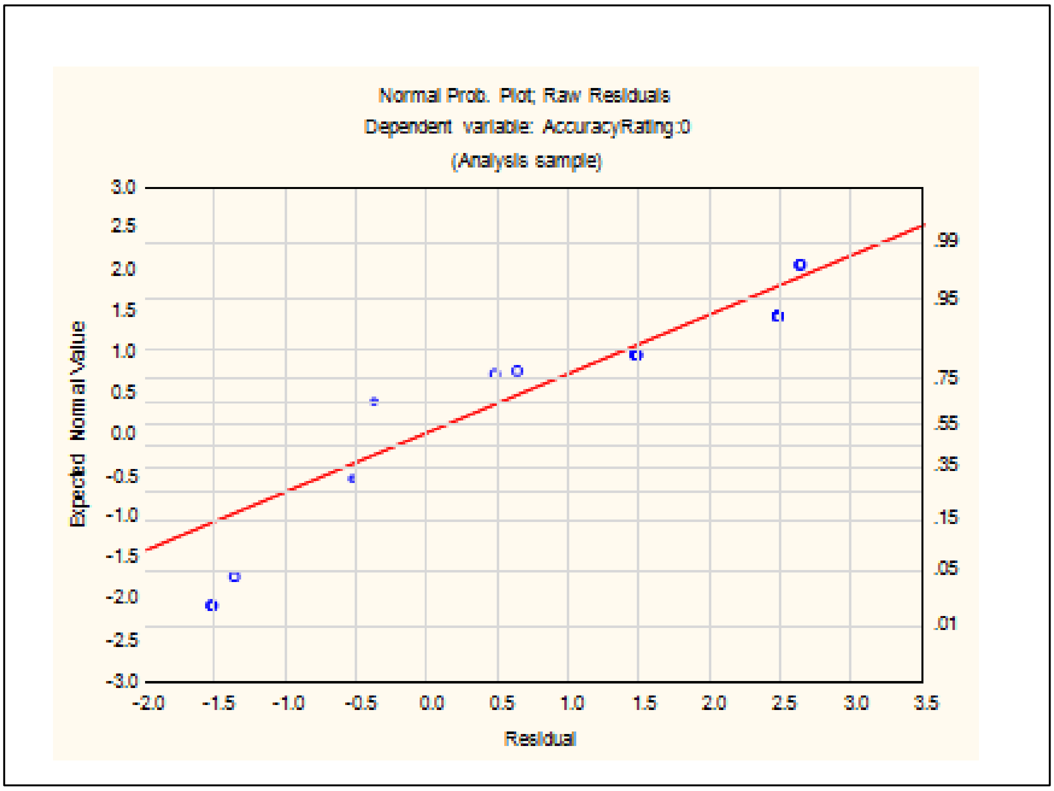
Normal prob. plot of raw residuals for "Grubbed" average straight-time ($t_{13\text{-}18}$)

APPENDIX BL

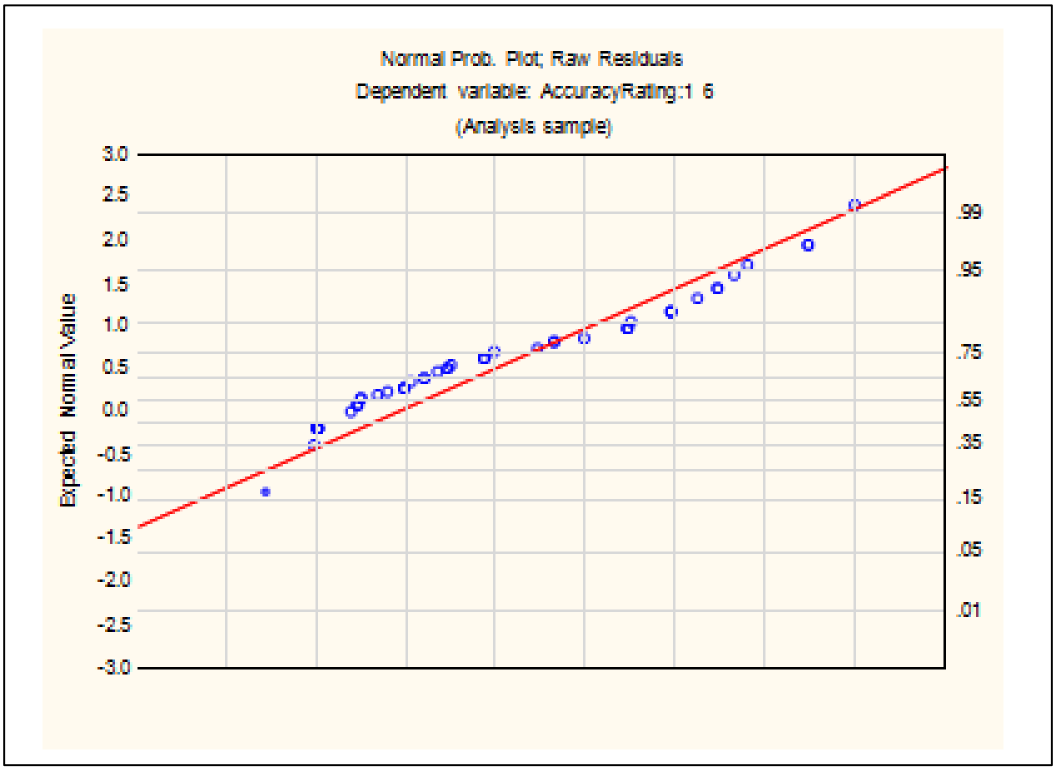
Probability plots Accuracy data



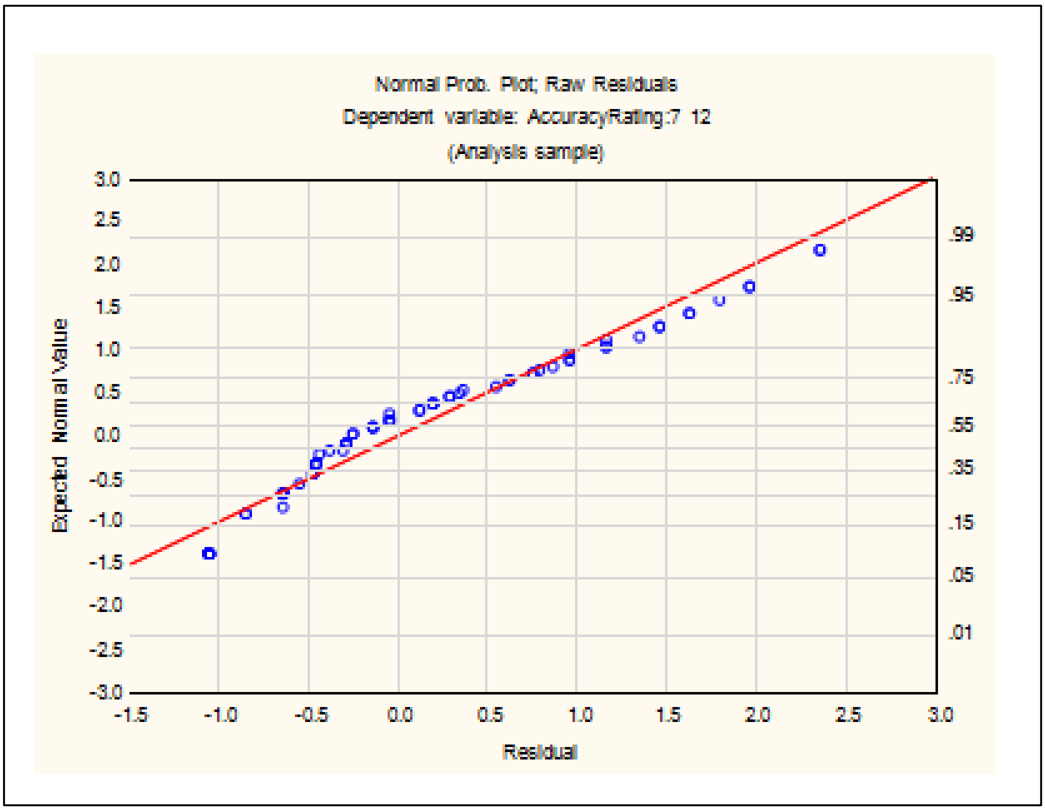
Normal prob. plot of raw residuals for Accuracy rating (t_{-6-1})



Normal prob. plot of raw residuals for Accuracy rating (t_0)



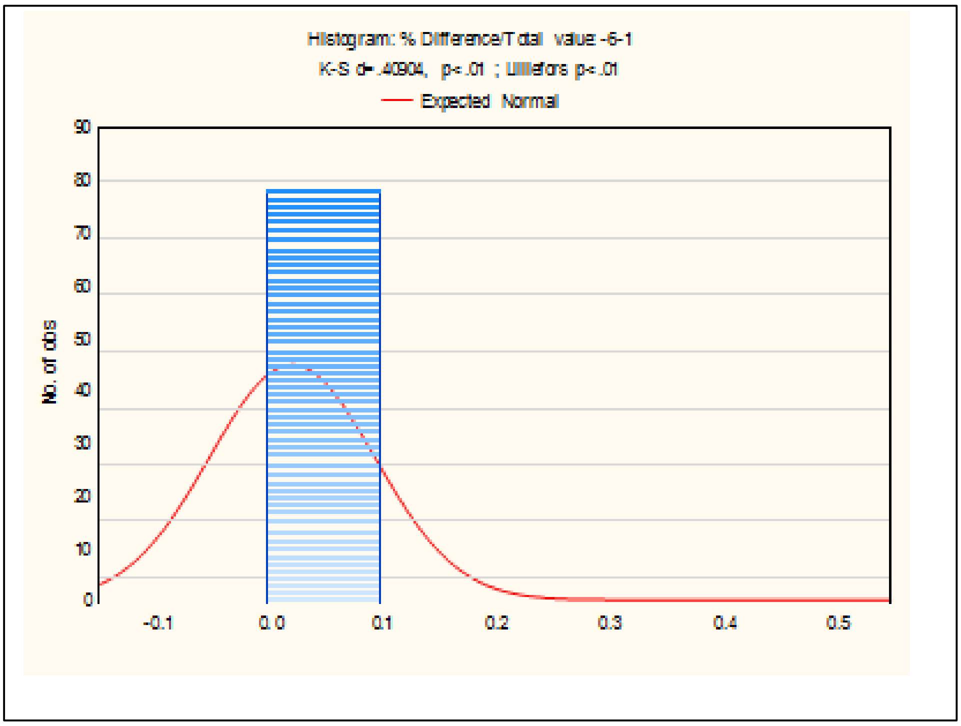
Normal prob. plot of raw residuals for Accuracy rating (**$t_{1\text{-}6}$**)



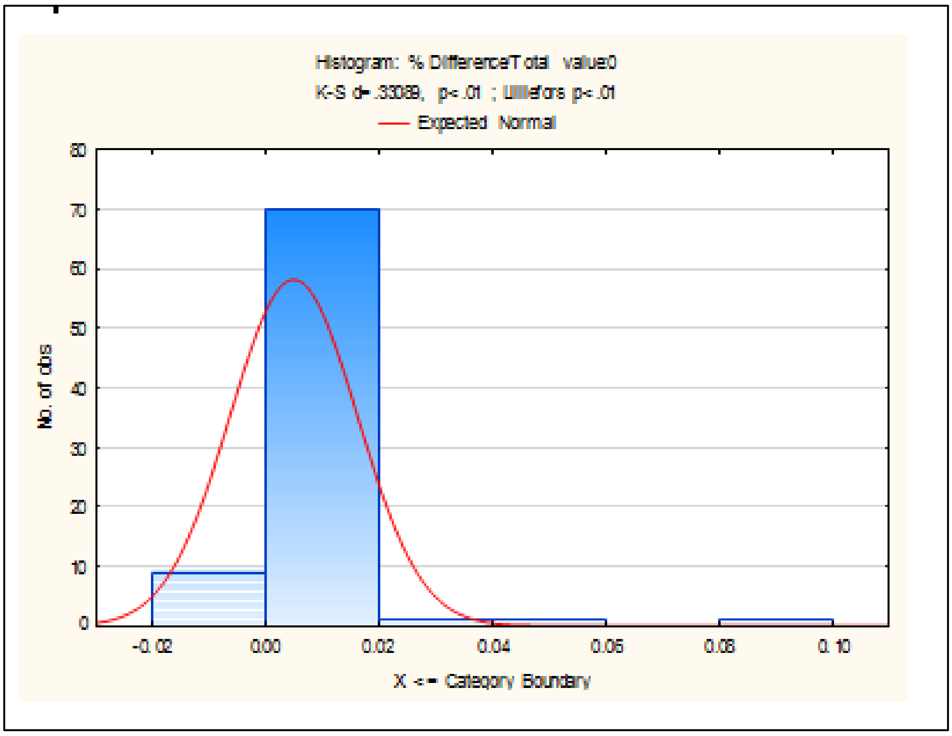
Normal prob. plot of raw residuals for Accuracy rating ($t_{7\text{-}12}$)

APPENDIX BM

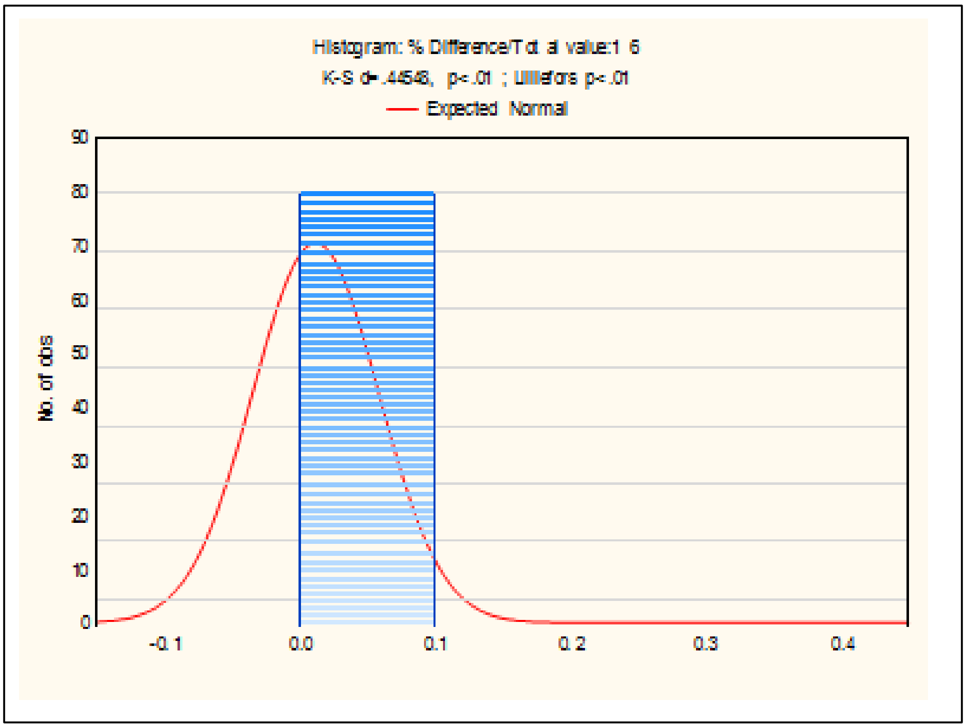
Histograms of % differences/total value processed



Histogram of values for % Differences/Total value (t_{-6-1})

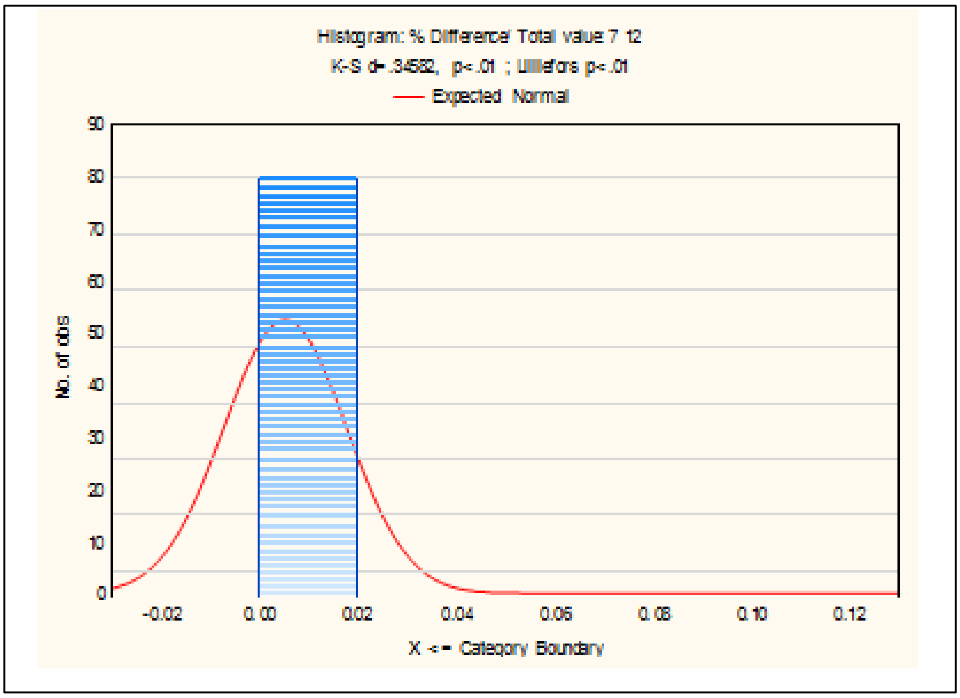


Histogram of values for % Differences/Total value (t_0)

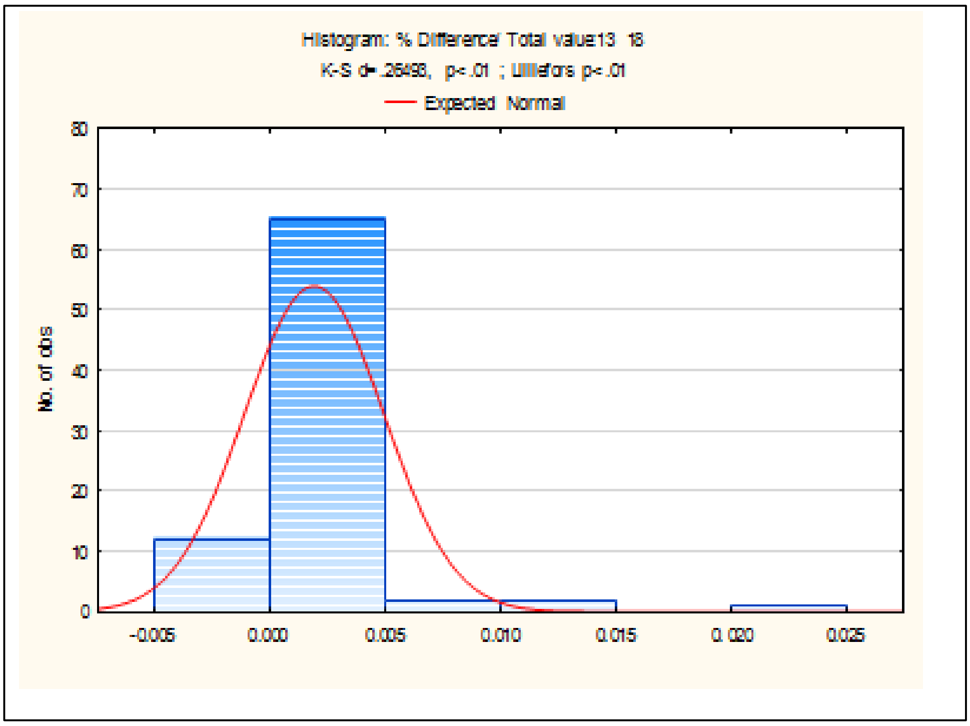


Histogram of values for % Differences/Total value (t_{1-6})

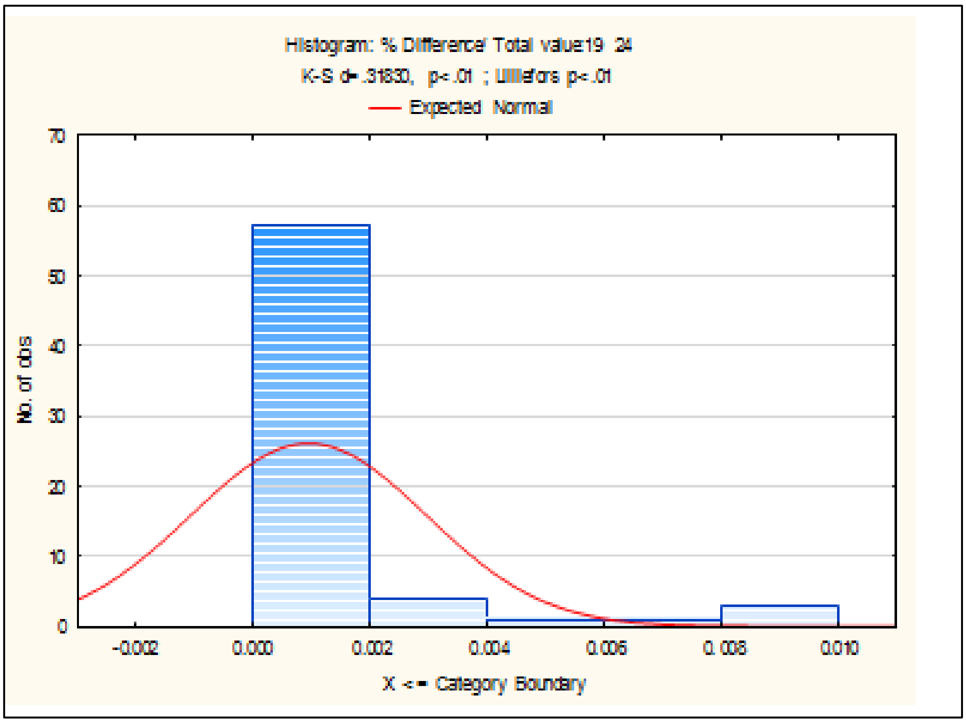
357



Histogram of values for % Differences/Total value (t_{7-12})



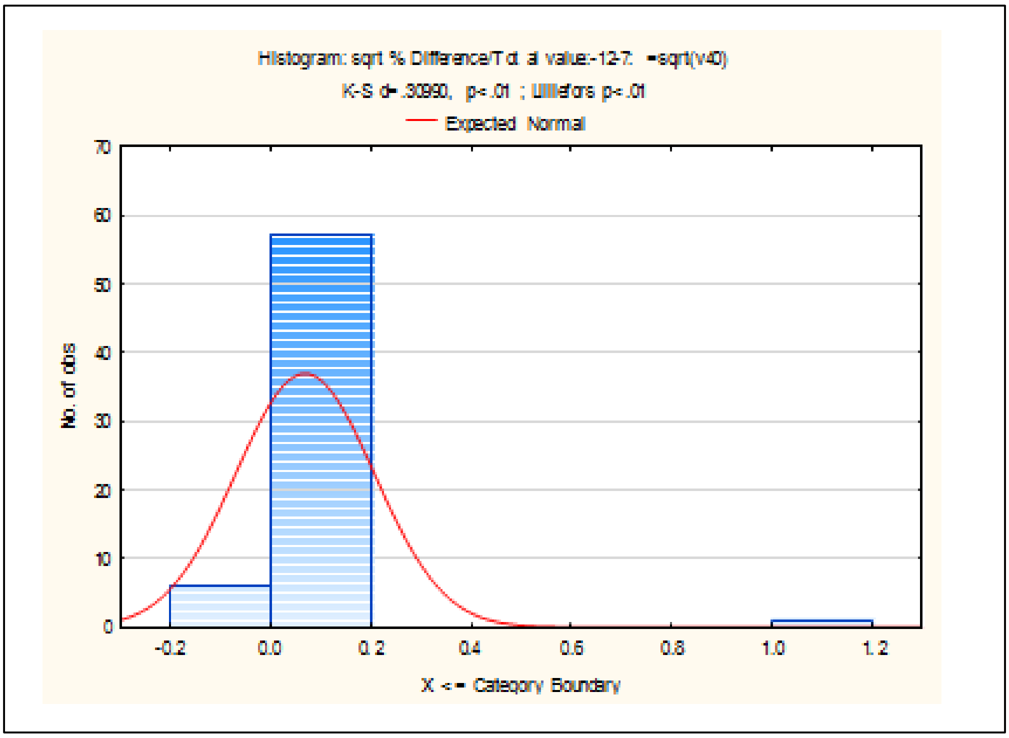
Histogram of values for % Differences/Total value (t_{13-18})



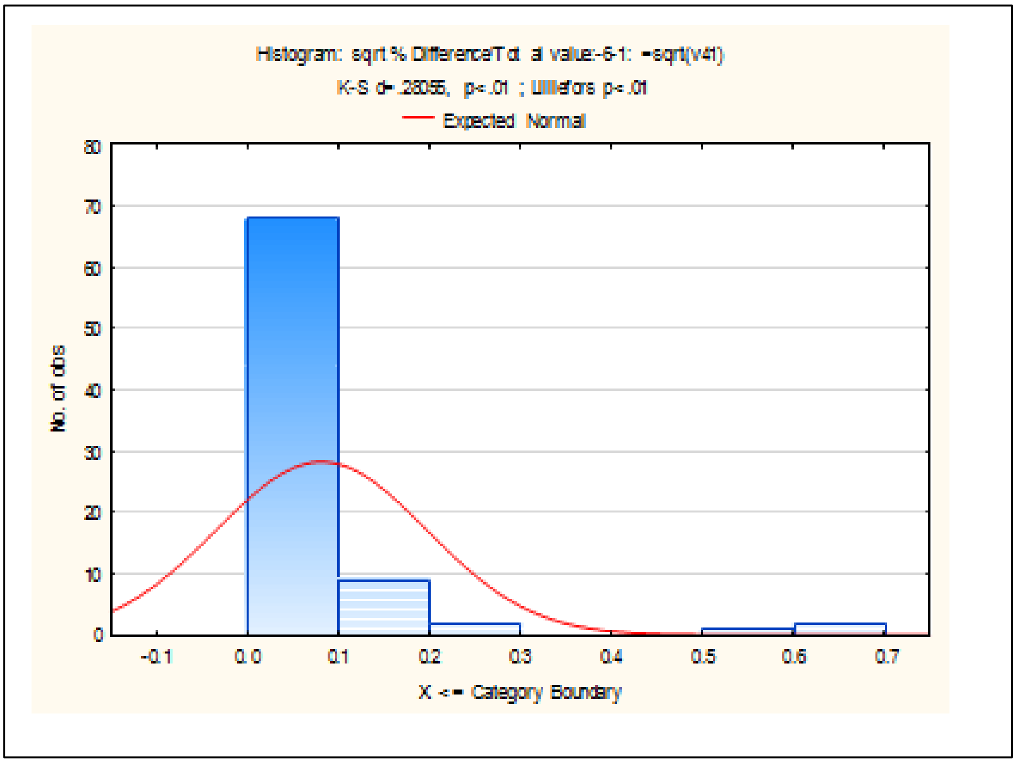
Histogram of values for % Differences/Total value (t_{19-24})

APPENDIX BN

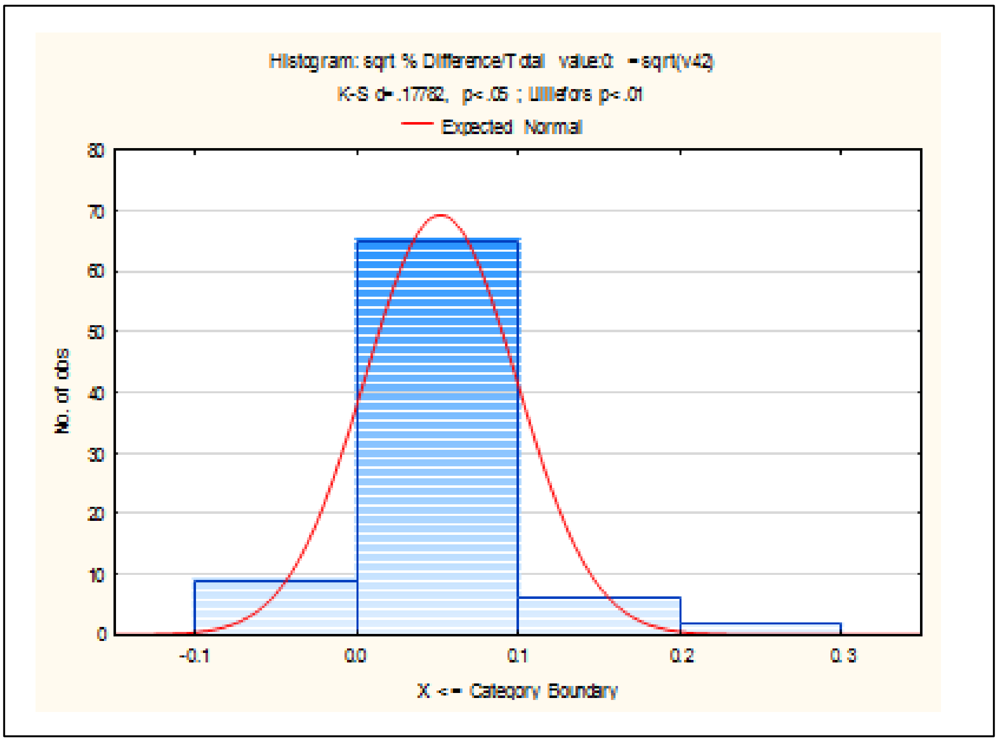
Histograms of Squareroot of % differences/total value processed



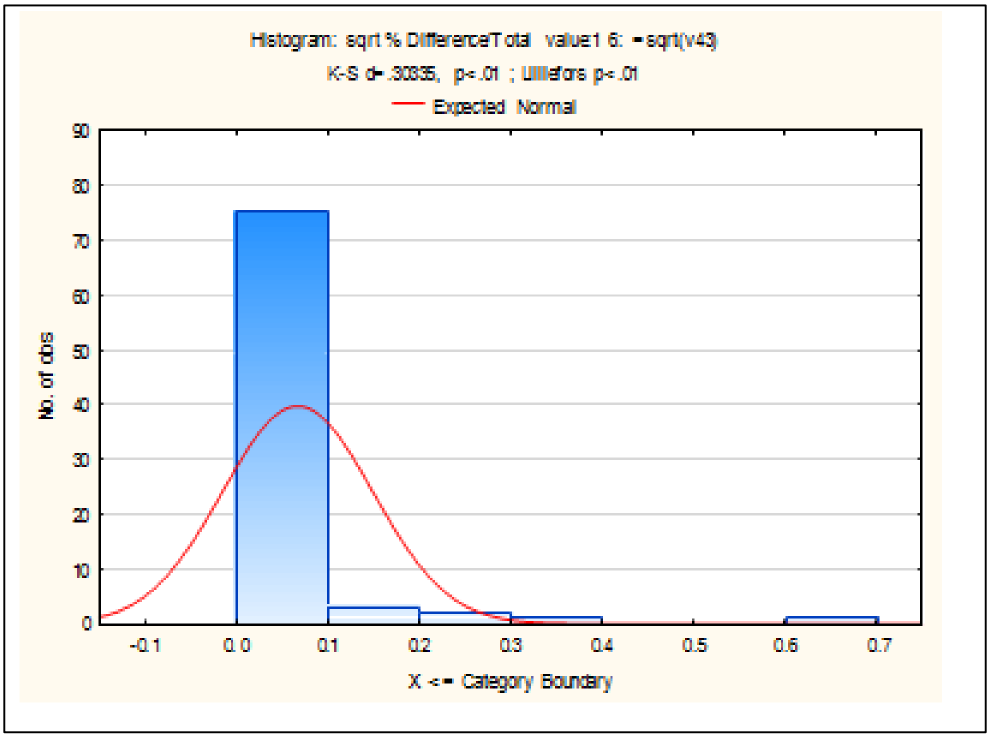
Histogram of values for squared % Differences/Total value (t-12-7)



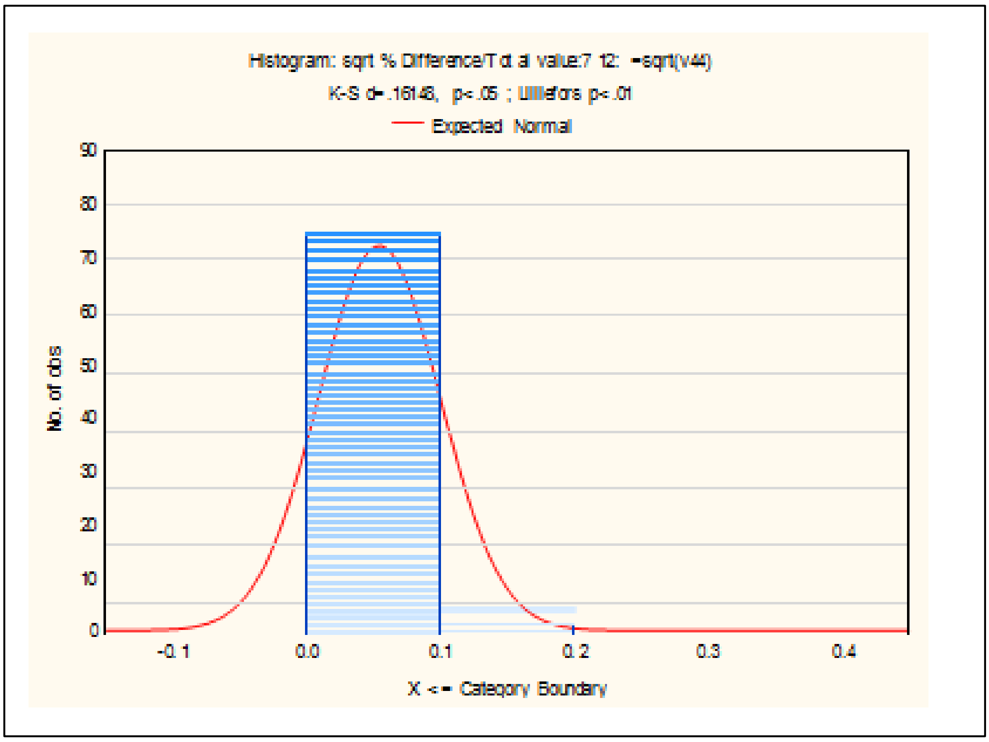
Histogram of values for squared % Differences/Total value (t-6-1)



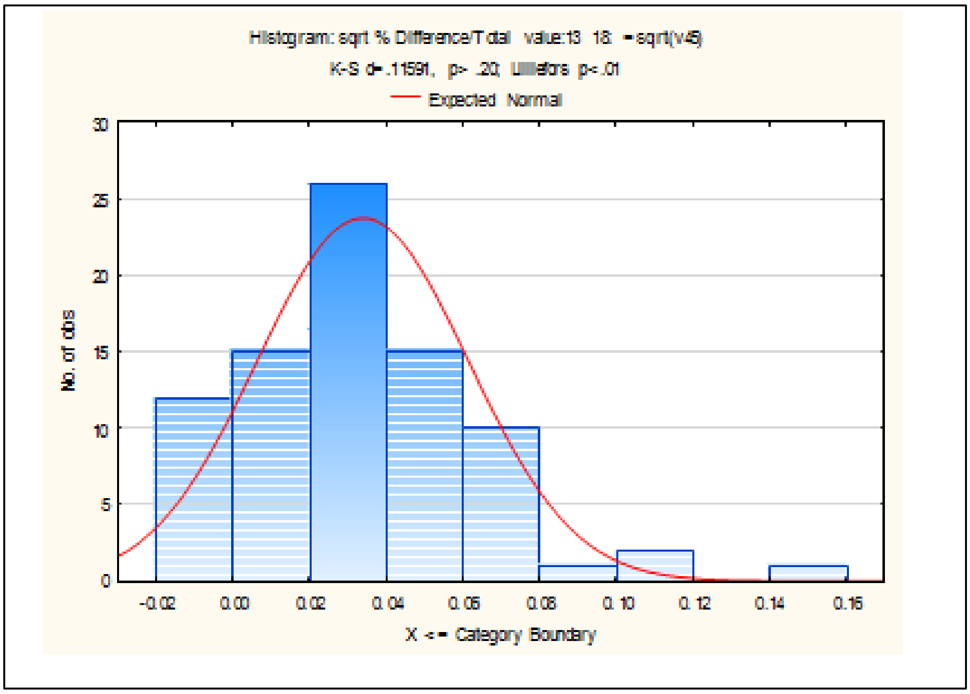
Histogram of values for squared % Differences/Total value (t_0)



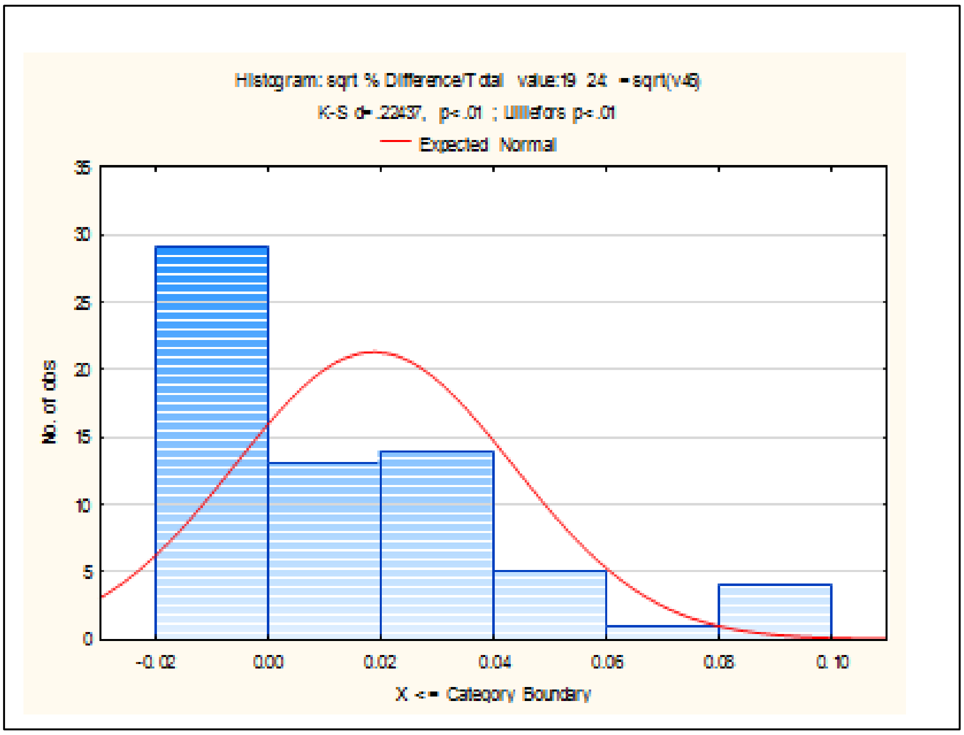
Histogram of values for squared % Differences/Total value (t_{1-6})



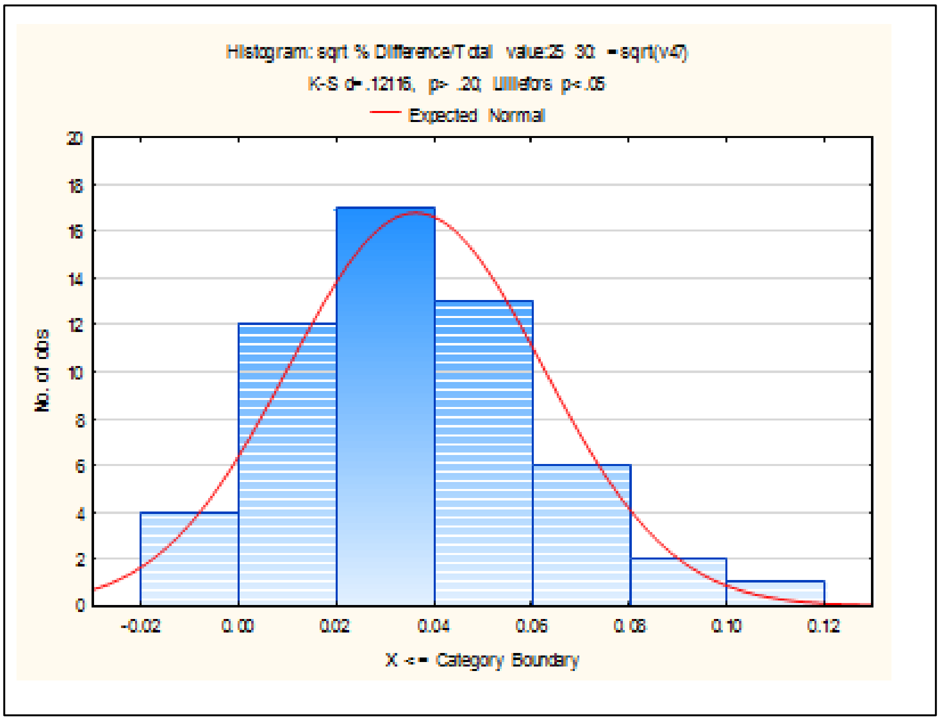
Histogram of values for squared % Differences/Total value (t_{7-12})



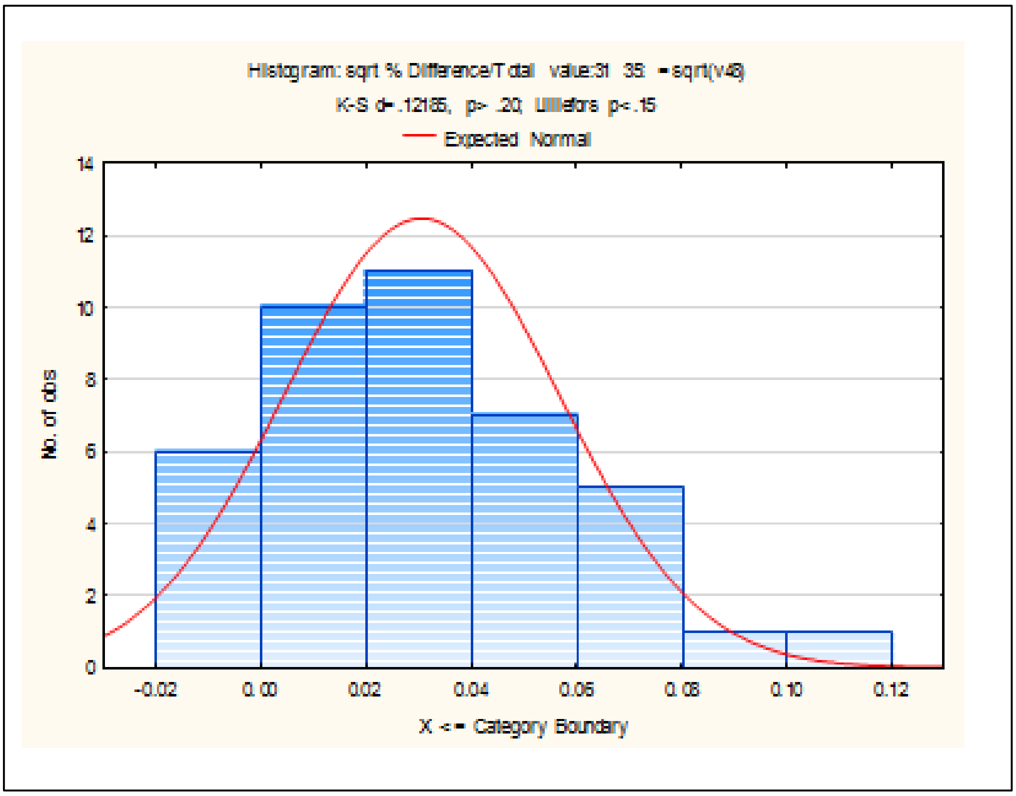
Histogram of values for squared % Differences/Total value (t_{13-18})



Histogram of values for squared % Differences/Total value (t_{19-24})



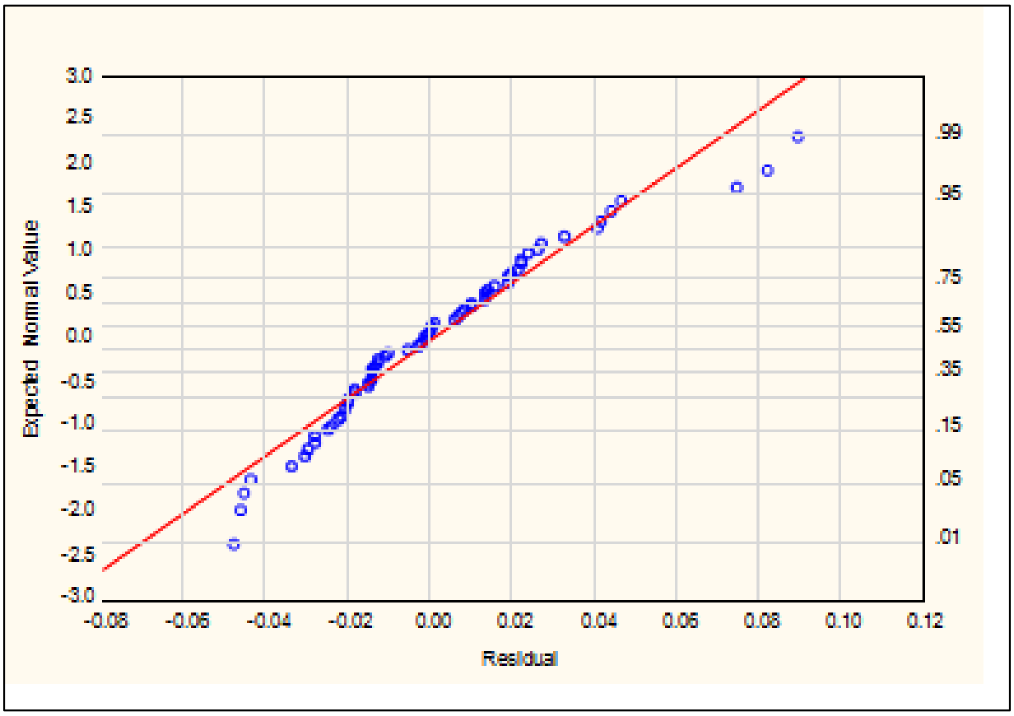
Histogram of values for squared % Differences/Total value (t_{25-30})



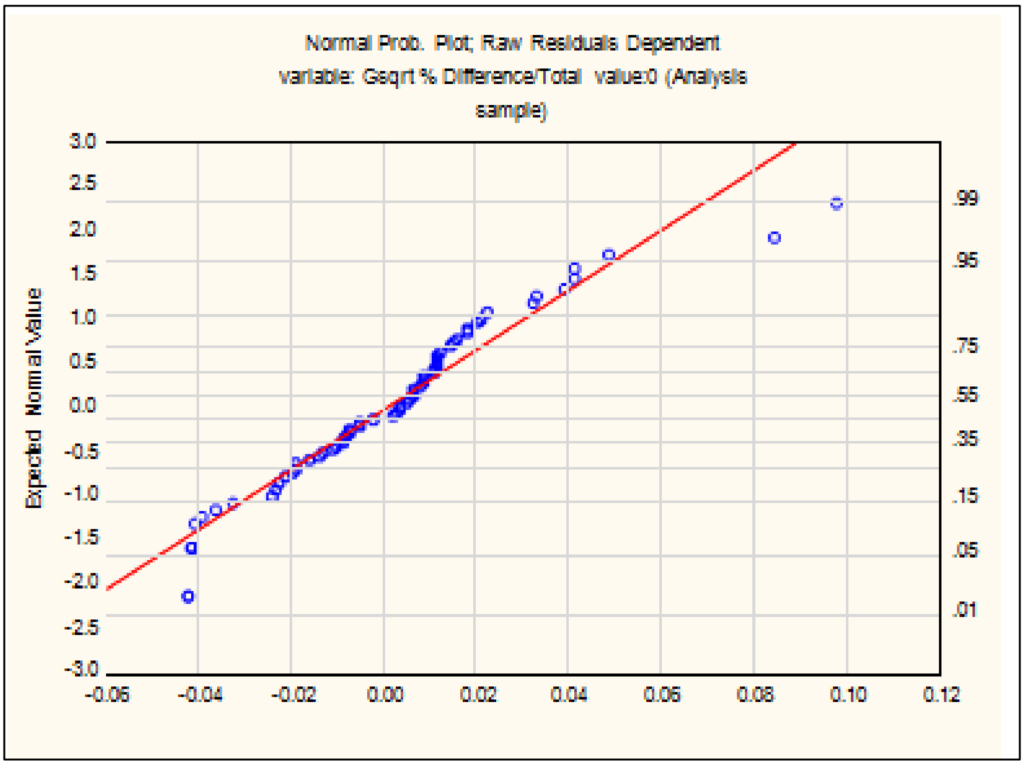
Histogram of values for squared % Differences/Total value (t_{31-35})

APPENDIX BO

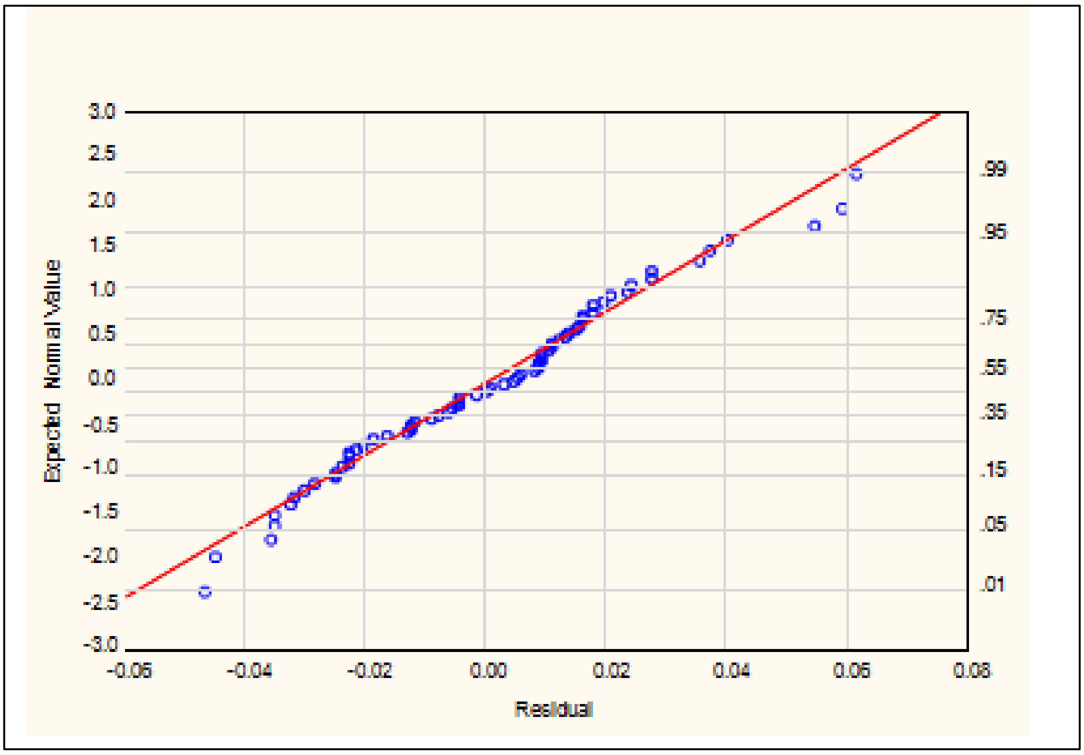
Probability plots Squareroot of Grubbed % differences/total value processed



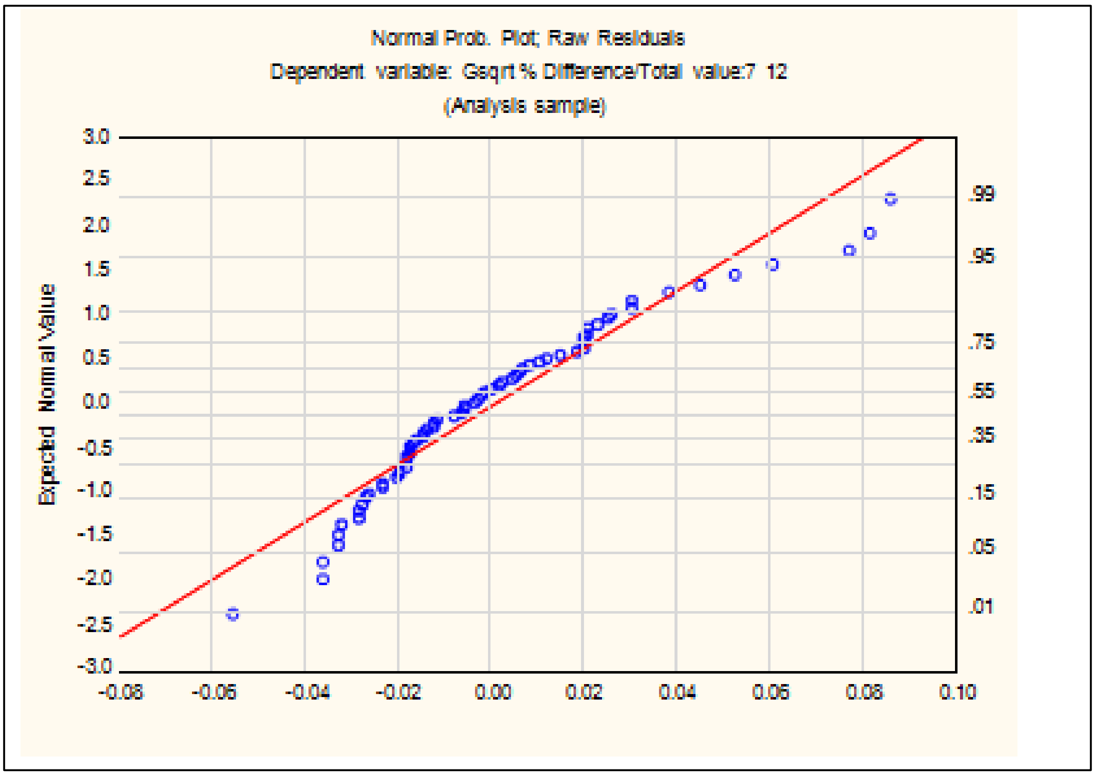
Normal prob. plot of raw residuals for "Grubbed" Squareroot % differences/total value (t_{-6-1})



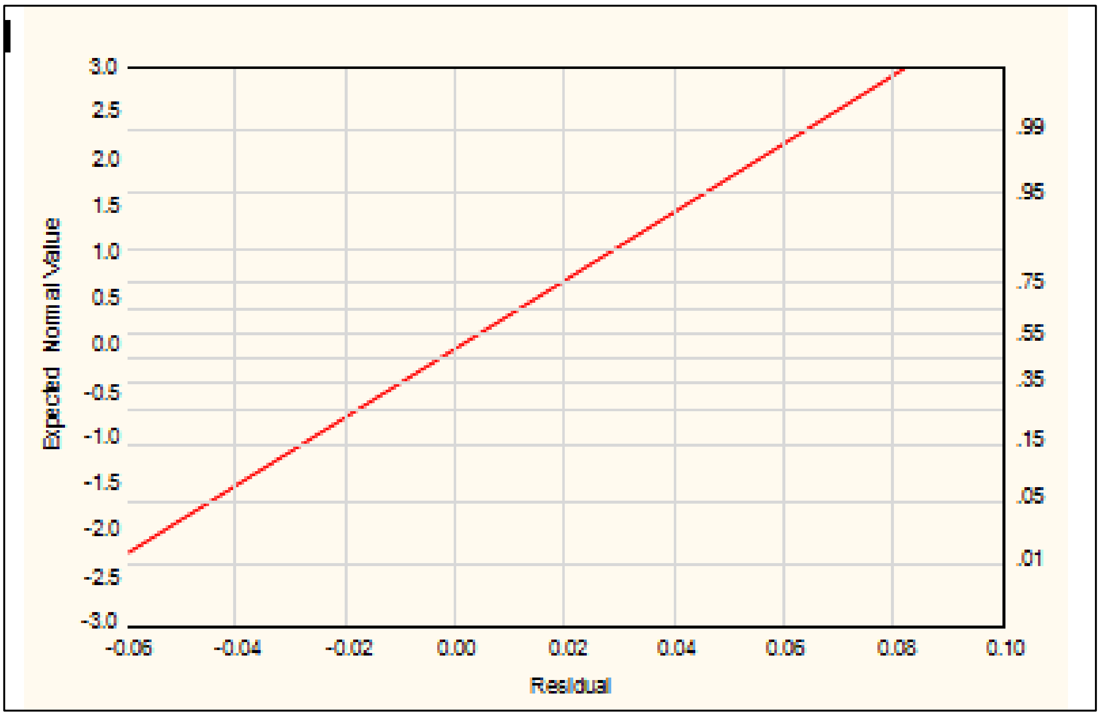
Normal prob. plot of raw residuals for "Grubbed" Squareroot % differences/total value (t_0)



Normal prob. plot of raw residuals for "Grubbed" Squareroot % differences/total value ($t_{1\text{-}6}$)



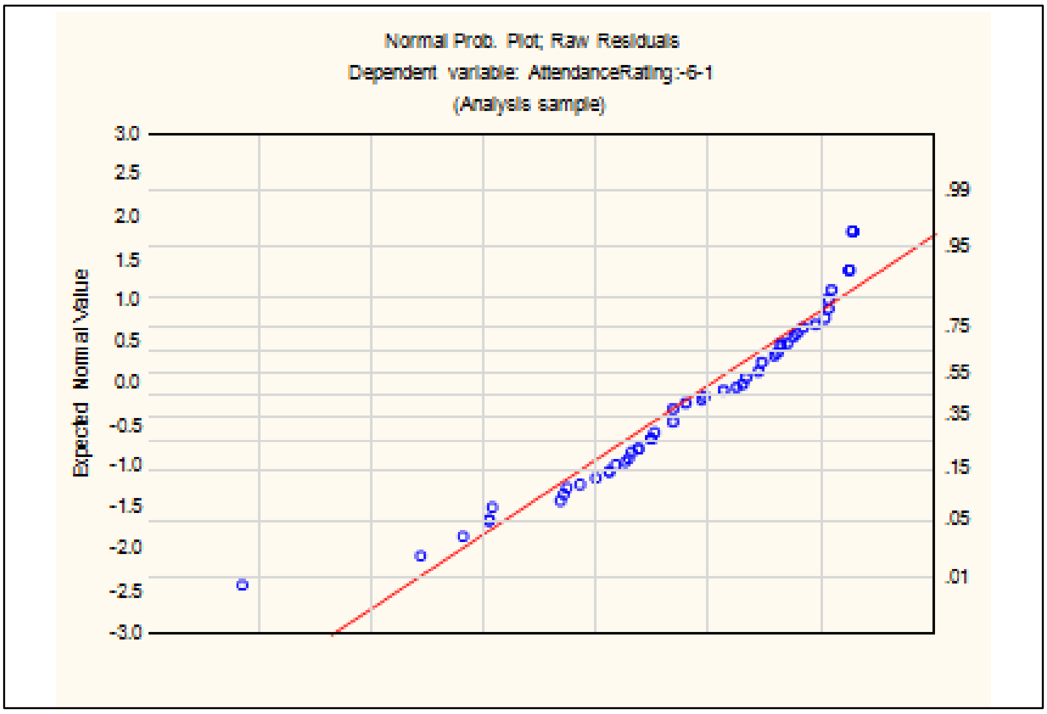
Normal prob. plot of raw residuals for "Grubbed" Squareroot % differences/total value ($t_{7\text{-}12}$)



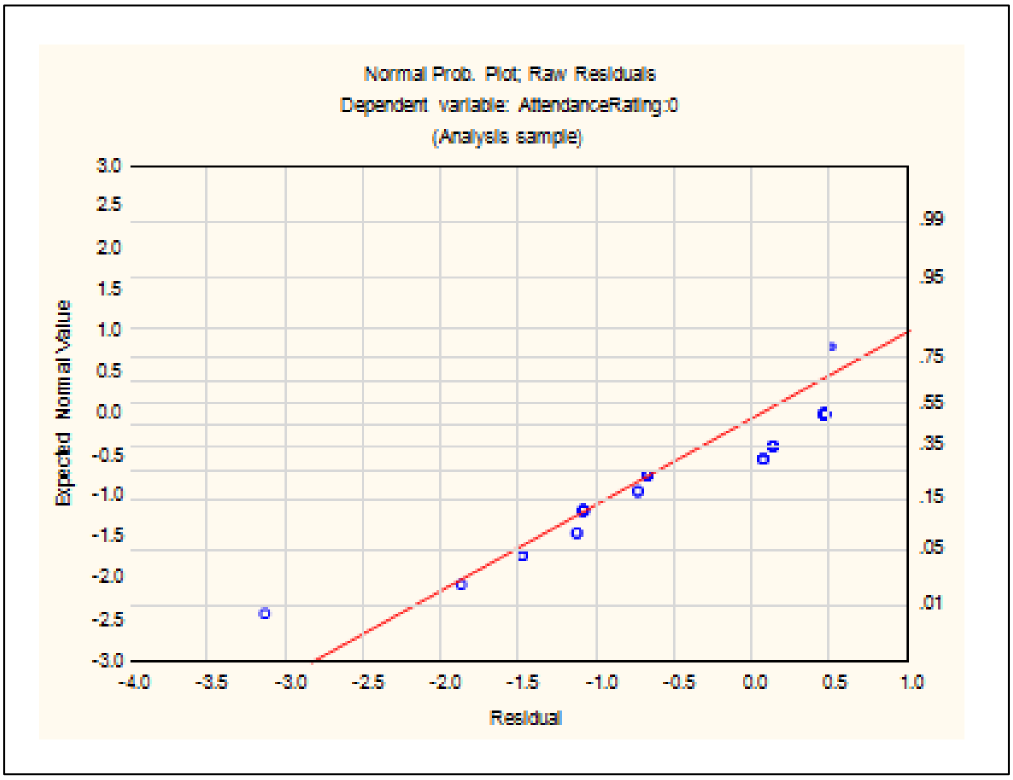
Normal prob. plot of raw residuals for "Grubbed" Squareroot % differences/total value (t_{13-18})

APPENDIX BP

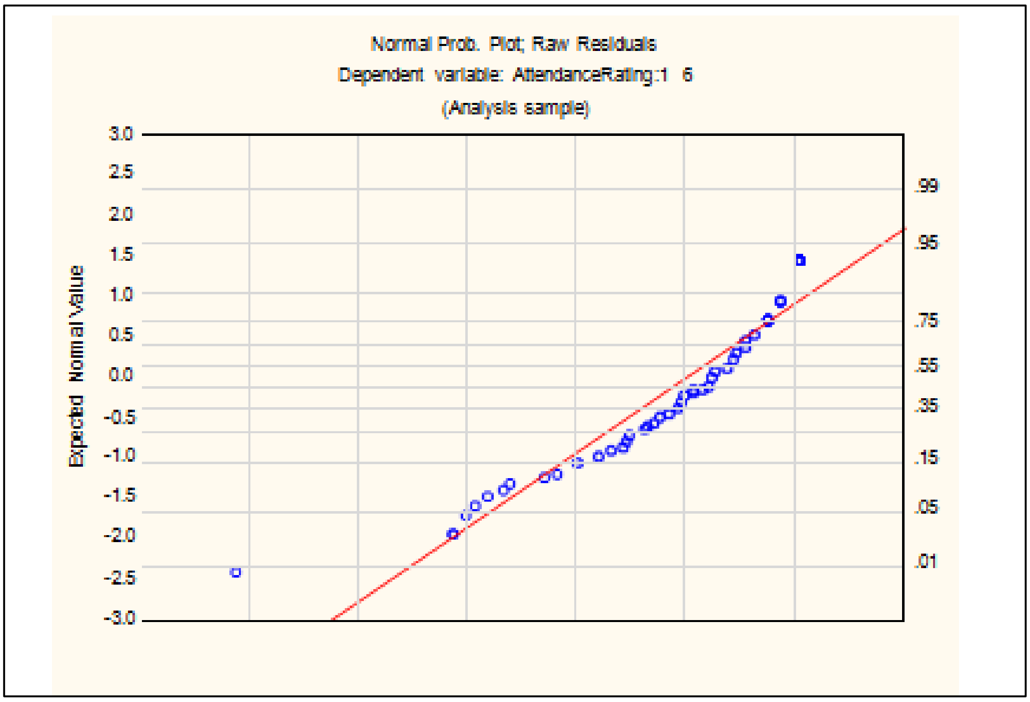
Probability plots Attendance rating data



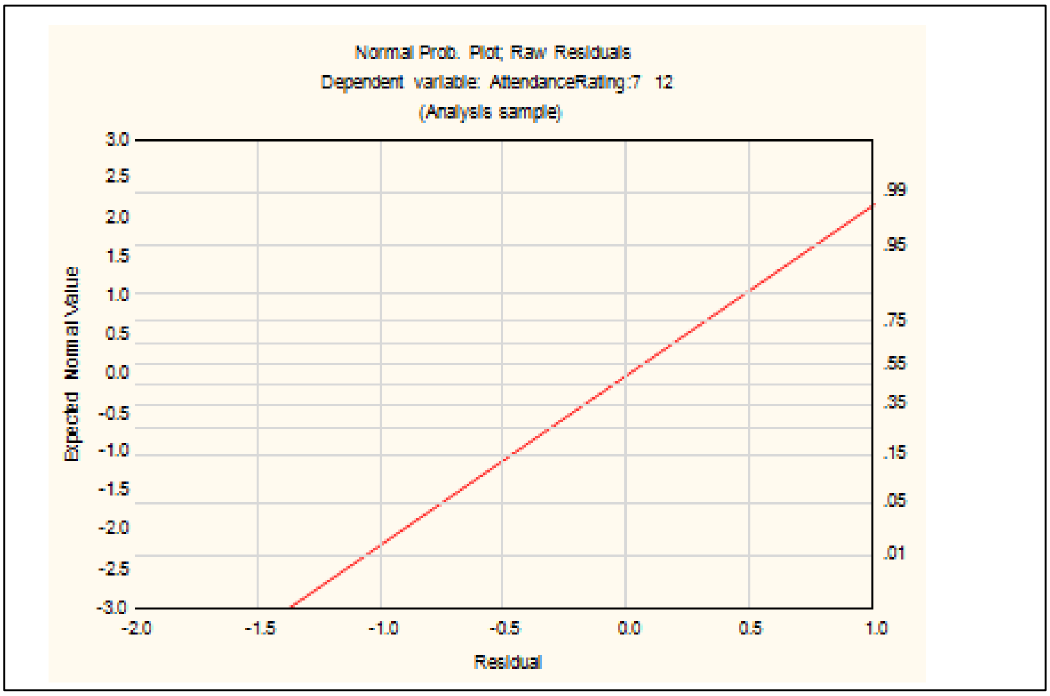
Normal prob. plot of raw residuals for Attendance ratings (t_{-6-1})



Normal prob. plot of raw residuals for Attendance ratings (t_0)



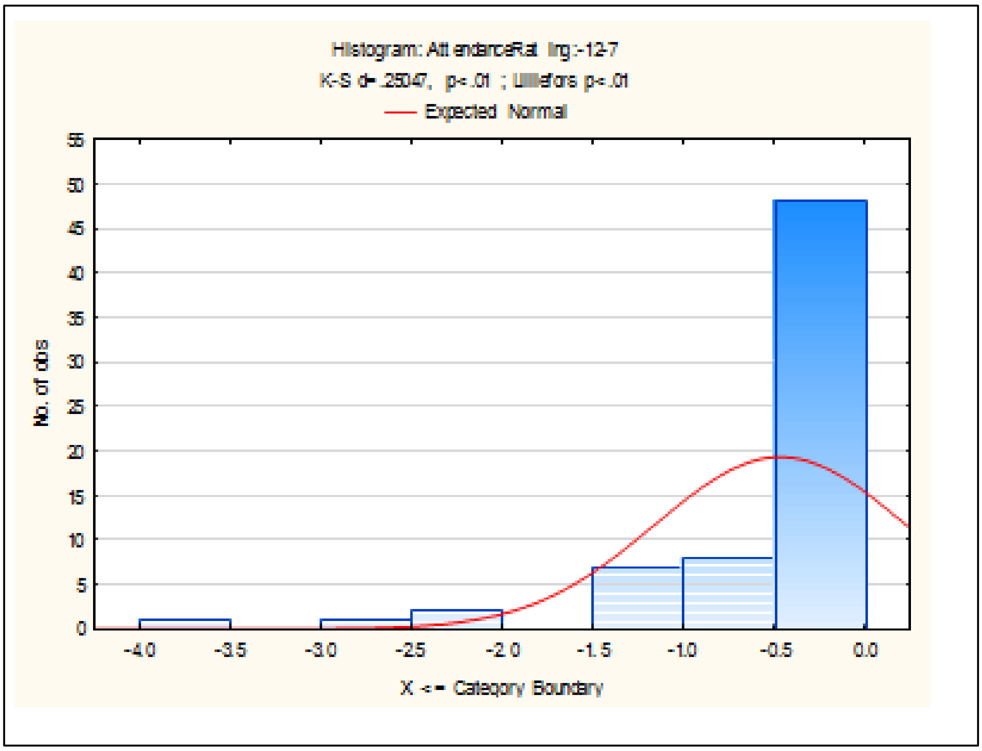
Normal prob. plot of raw residuals for Attendance ratings ($t_{1\text{-}6}$)



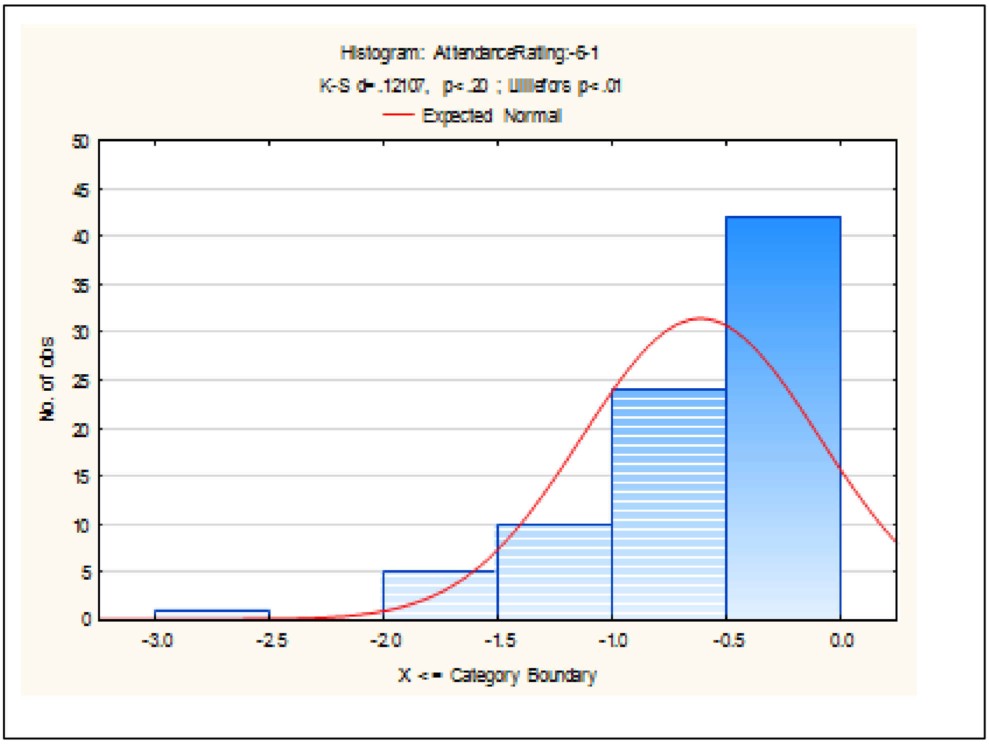
Normal prob. plot of raw residuals for Attendance ratings ($t_{7\text{-}12}$)

APPENDIX BQ

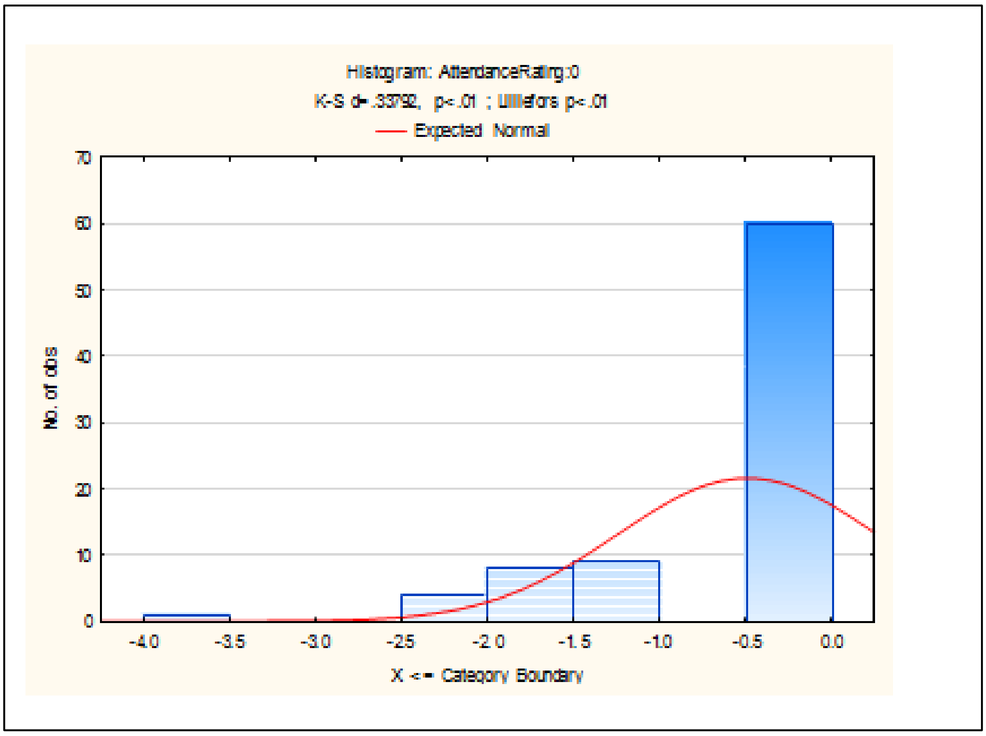
Histograms for Attendance rating data



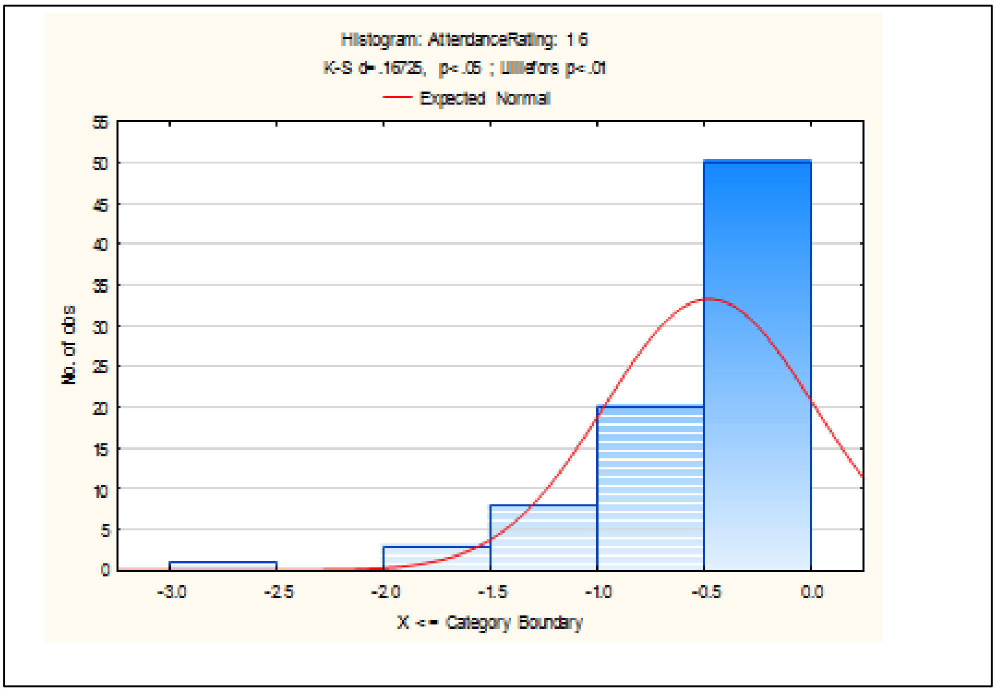
Histogram of values for Attendance ratings (t_{-12-7})



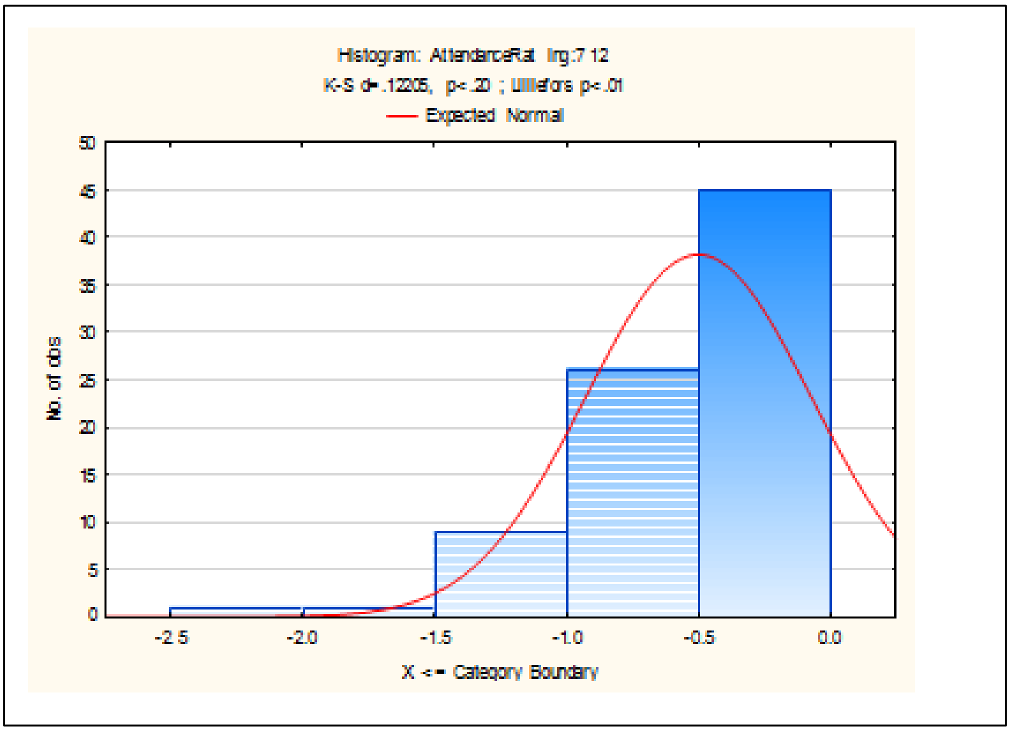
Histogram of values for Attendance ratings (t_{-6-1})



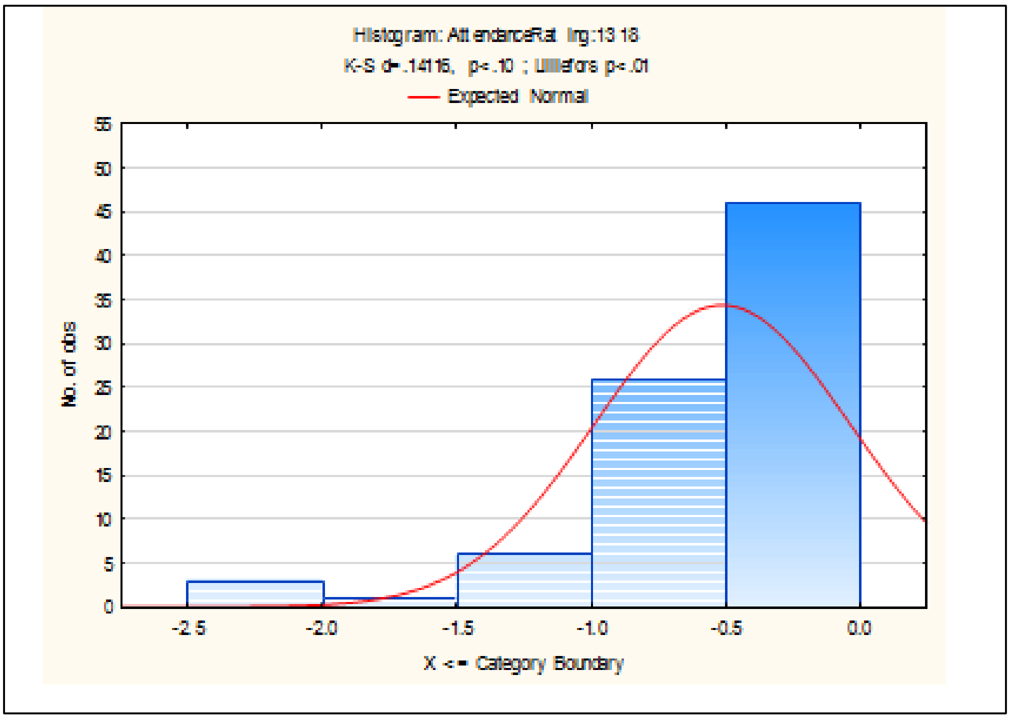
Histogram of values for Attendance ratings (t_0)



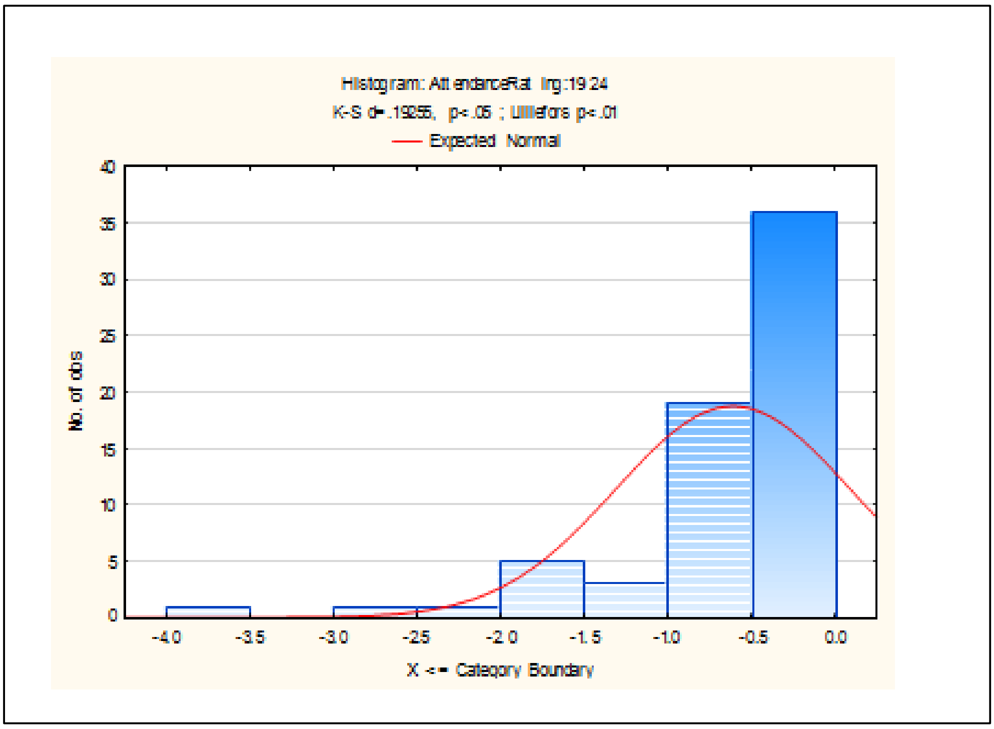
Histogram of values for Attendance ratings ($t_{1\text{-}6}$)



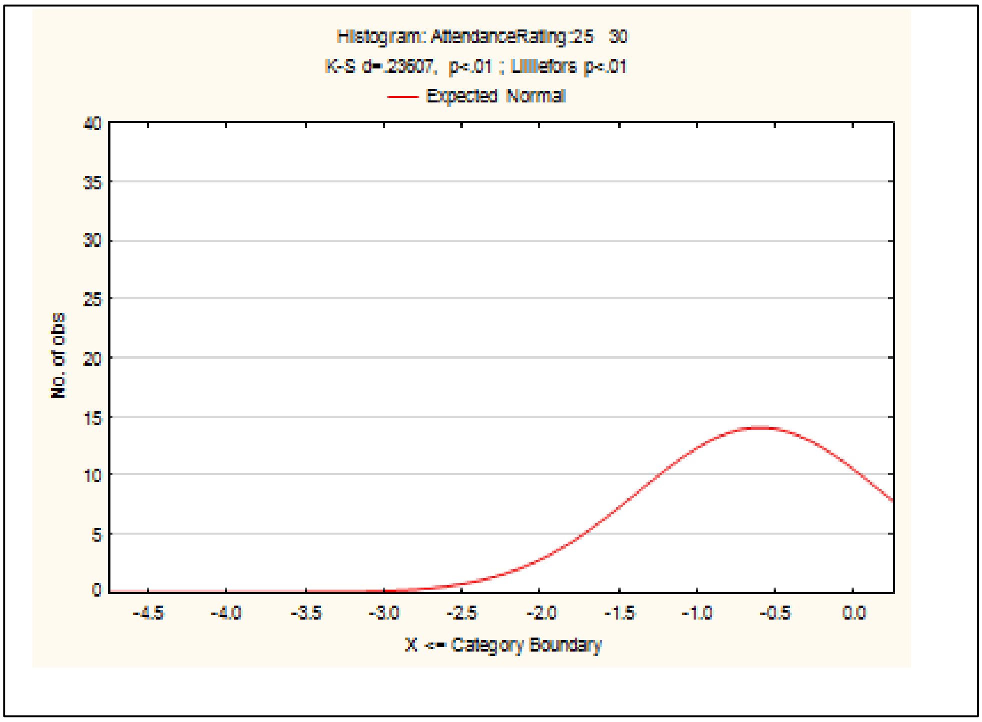
Histogram of values for Attendance ratings ($t_{7\text{-}12}$)



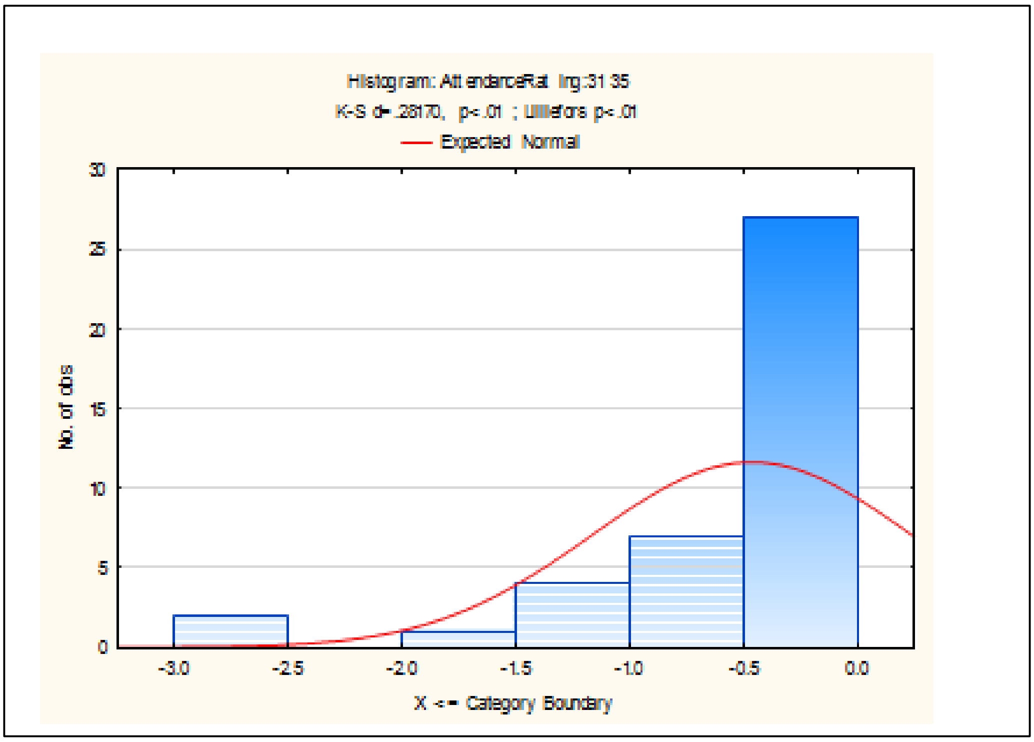
Histogram of values for Attendance ratings ($t_{13\text{-}18}$)



Histogram of values for Attendance ratings (**t_{19-24}**)



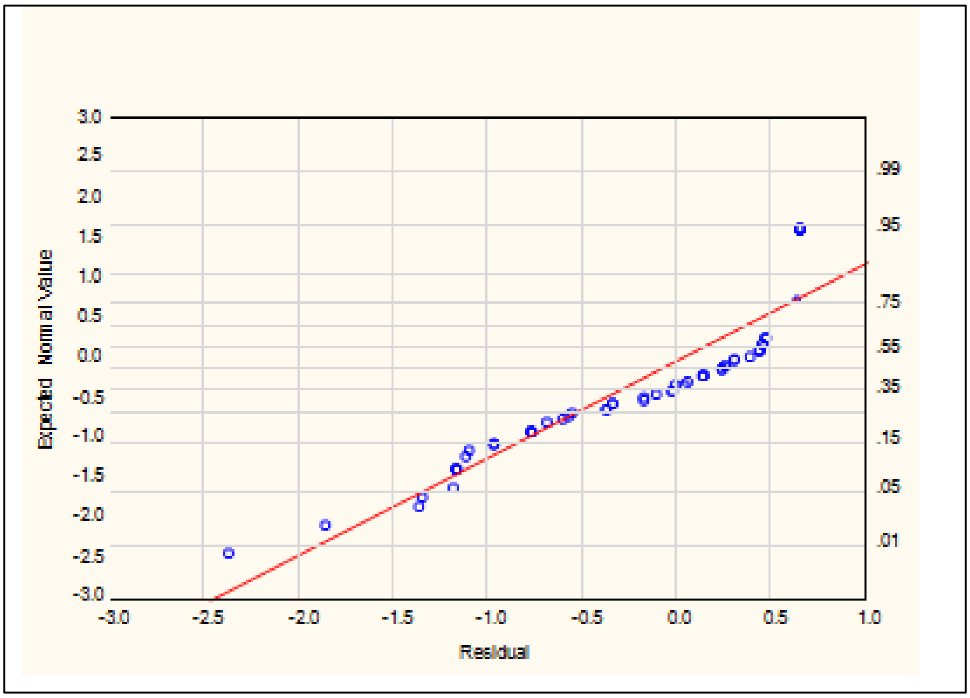
Histogram of values for Attendance ratings (t_{25-30})



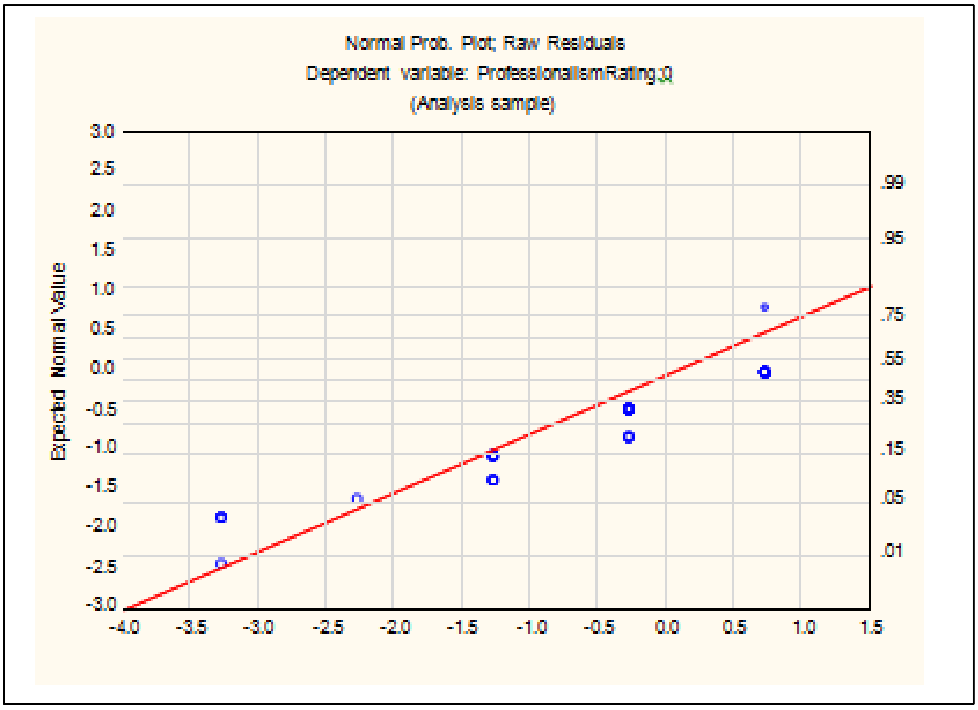
Histogram of values for Attendance ratings ($t_{31\text{-}35}$)

APPENDIX BR

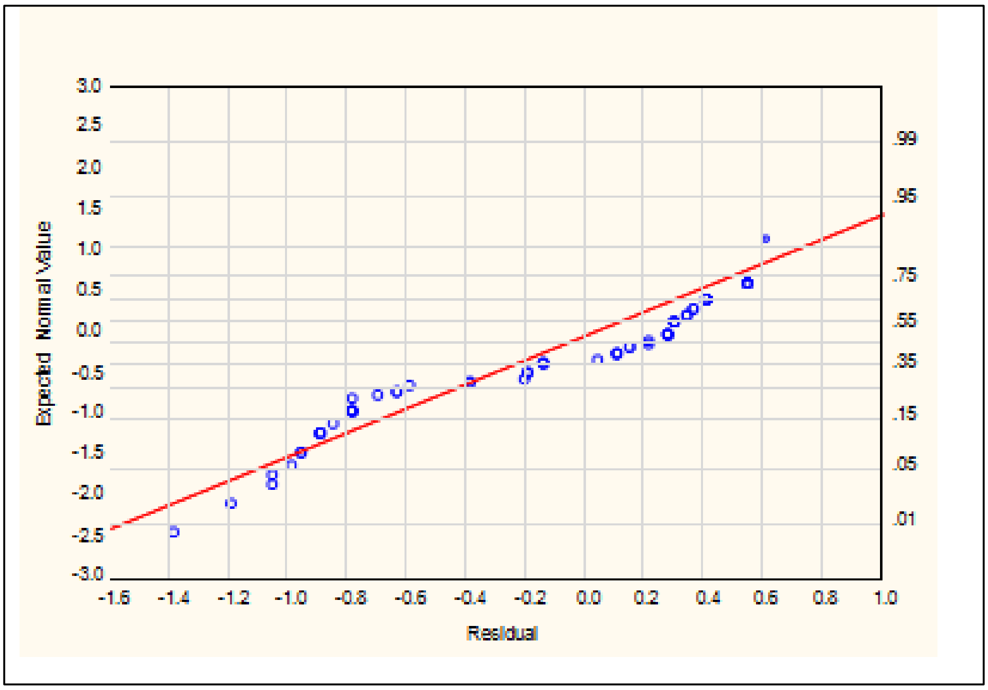
Probability plots Professionalism rating data



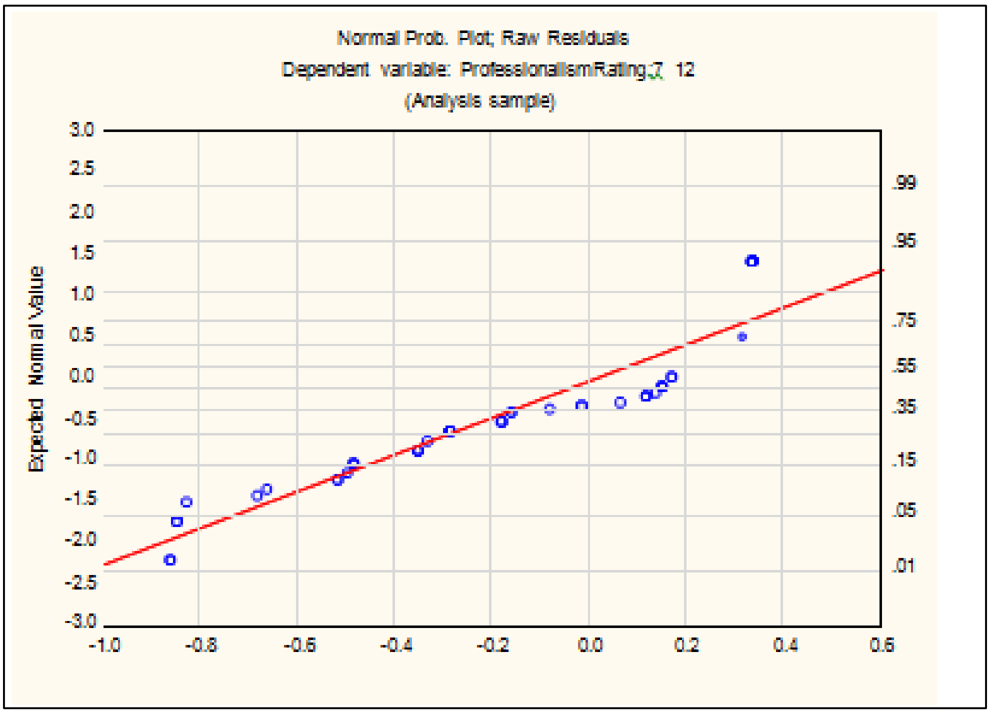
Normal prob. plot of raw residuals for Professionalism ratings (t_{-6-1})



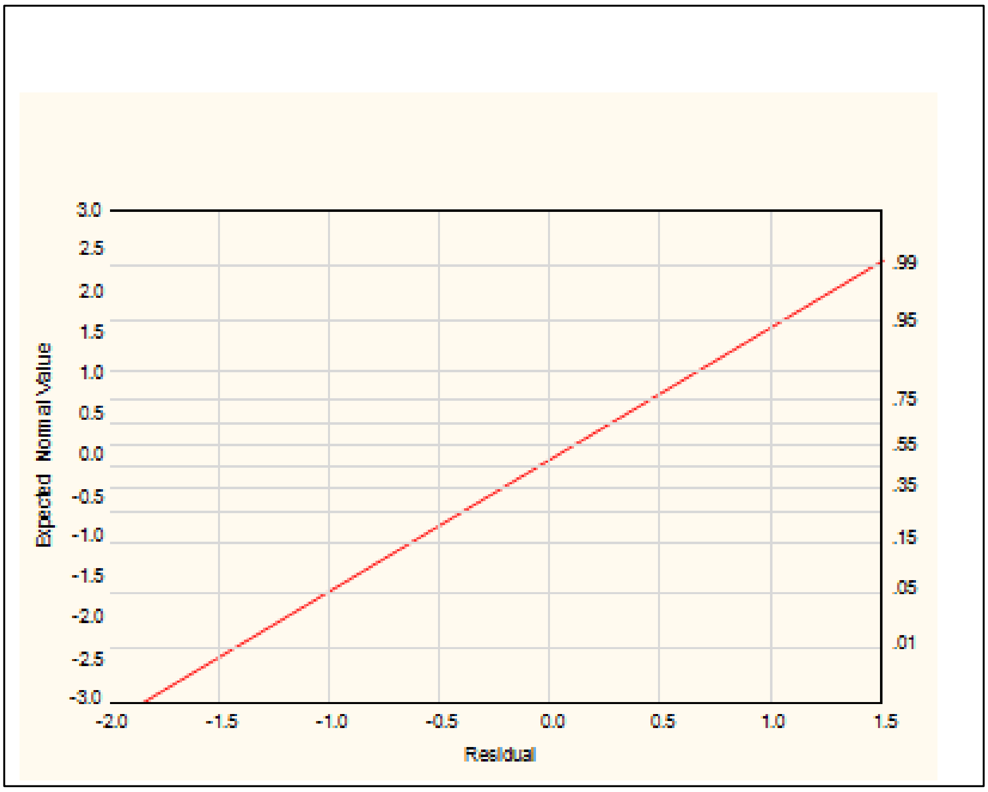
Normal prob. plot of raw residuals for Professionalism ratings (t_0)



Normal prob. plot of raw residuals for Professionalism ratings (t_{1-6})



Normal prob. plot of raw residuals for Professionalism ratings (t_{7-12})



Normal prob. plot of raw residuals for Professionalism ratings ($t_{13\text{-}18}$)

APPENDIX BS

Correlation Matrix of variables used

Correlations (SEM G2 lower 3 of 6 in buckets at least 2 of 3 periods all data)Marked correlations are significant at p < .05000

Variable	Value_of_straight_Deps:-6-1 sqrt	Value_of_straight_Deps:1 6 sqrt	Value_of_straight_Deps:7 12 sqrt	% Difference/Total value:-6-1 sqrt	% Difference/Total value:1 6 sqrt	% Difference/Total value:7 12 sqrt	Avg_straight_time_dep:-6-1 sqrt	Avg_straight_time_dep:1 6 sqrt	Avg_straight_time_dep:7 12 sqrt	Avg_straight_time_envelope:-6-1 sqrt	Avg_straight_time_envelope:1 6 sqrt	Avg_straight_time_envelope:7 12 sqrt	VolumesRating:-6-1	VolumesRating:1 6	VolumesRating:7 12	AccuracyRating:-6-1 sqrt	AccuracyRating:1 6 sqrt	AccuracyRating:7 12 sqrt	AccuracyRating:-6-1	AccuracyRating:1 6	AccuracyRating:7 12	FinalRating:-6-1	FinalRating:1 6	FinalRating:7 12
Value_of_straight_Deps:-6-1 sqrt	1.00	0.74	0.59	0.02	0.00	0.08	-0.15	-0.15	0.01	-0.09	-0.19	0.07	0.44	0.39	0.33	-0.09	-0.01	-0.06	-0.08	0.00	-0.05	0.08	0.17	0.06
Value_of_straight_Deps:1 6 sqrt	0.74	1.00	0.77	-0.03	0.16	0.04	-0.06	-0.13	0.04	-0.03	-0.07	0.01	0.32	0.43	0.35	0.04	-0.17	0.03	0.04	-0.18	0.04	0.17	0.10	0.09
Value_of_straight_Deps:7 12 sqrt	0.59	0.77	1.00	-0.03	0.05	0.04	-0.14	-0.21	-0.03	-0.19	-0.22	-0.02	0.33	0.41	0.55	0.03	-0.07	-0.02	0.03	-0.07	-0.02	0.08	0.14	0.30
% Difference/Total value:-6-1 sqrt	0.02	-0.03	-0.03	1.00	0.55	0.56	0.02	-0.01	0.17	0.02	-0.07	-0.05	-0.02	0.06	0.04	-0.79	-0.58	-0.52	-0.80	-0.57	-0.54	-0.50	-0.32	-0.26
% Difference/Total value:1 6 sqrt	0.00	0.16	0.05	0.55	1.00	0.49	-0.01	0.05	0.14	0.00	0.04	0.00	0.02	0.12	0.02	-0.44	-0.82	-0.41	-0.47	-0.83	-0.42	-0.25	-0.48	-0.29
% Difference/Total value:7 12 sqrt	0.08	0.04	0.04	0.56	0.49	1.00	-0.02	0.08	0.11	-0.06	0.05	0.06	0.17	0.09	-0.02	-0.44	-0.49	-0.82	-0.49	-0.48	-0.83	-0.28	-0.20	-0.46
Avg_straight_time_dep:-6-1 sqrt	-0.15	-0.06	-0.14	0.02	-0.01	-0.02	1.00	0.55	0.36	0.66	0.38	0.30	0.02	0.01	-0.09	0.04	-0.09	-0.07	0.02	-0.09	-0.08	0.01	0.03	0.01
Avg_straight_time_dep:1 6 sqrt	-0.15	-0.13	-0.21	-0.01	0.05	0.08	0.55	1.00	0.41	0.38	0.59	0.37	0.01	-0.03	-0.20	-0.06	-0.11	-0.13	-0.05	-0.10	-0.14	-0.07	-0.07	-0.09
Avg_straight_time_dep:7 12 sqrt	0.01	0.04	-0.03	0.17	0.14	0.11	0.36	0.41	1.00	0.33	0.33	0.63	-0.10	-0.04	-0.12	-0.08	-0.18	-0.12	-0.09	-0.18	-0.13	-0.04	-0.09	-0.03
Avg_straight_time_envelope:-6-1 sqrt	-0.09	-0.03	-0.19	0.02	0.00	-0.06	0.66	0.38	0.33	1.00	0.62	0.46	-0.33	-0.25	-0.36	0.09	-0.04	0.05	0.07	-0.04	0.03	-0.07	-0.09	-0.13
Avg_straight_time_envelope:1 6 sqrt	-0.19	-0.07	-0.22	-0.07	0.04	0.05	0.38	0.59	0.33	0.62	1.00	0.60	-0.21	-0.29	-0.43	0.09	-0.02	-0.09	0.08	-0.03	-0.09	-0.10	-0.16	-0.17
Avg_straight_time_envelope:7 12 sqrt	0.07	0.01	-0.02	-0.05	0.00	0.06	0.30	0.37	0.63	0.46	0.60	1.00	-0.30	-0.38	-0.43	0.02	-0.05	-0.09	0.04	-0.05	-0.09	-0.16	-0.16	-0.13
VolumesRating:-6-1	0.44	0.32	0.33	-0.02	0.02	0.17	0.02	0.01	-0.10	-0.33	-0.21	-0.30	1.00	0.67	0.47	-0.08	-0.11	-0.18	-0.12	-0.12	-0.19	0.31	0.22	0.15
VolumesRating:1 6	0.39	0.43	0.41	0.06	0.12	0.09	0.01	-0.03	-0.04	-0.25	-0.29	-0.38	0.67	1.00	0.68	-0.12	-0.17	-0.13	-0.14	-0.18	-0.13	0.24	0.32	0.19
VolumesRating:7 12	0.33	0.35	0.55	0.04	0.02	-0.02	-0.09	-0.20	-0.12	-0.36	-0.43	-0.43	0.47	0.68	1.00	0.02	-0.04	-0.04	0.00	-0.04	-0.03	0.24	0.30	0.43
AccuracyRating:-6-1 sqrt	-0.09	0.04	0.03	-0.79	-0.44	-0.44	0.04	-0.06	-0.08	0.09	0.09	0.02	-0.08	-0.12	0.02	1.00	0.55	0.50	0.98	0.55	0.51	0.58	0.30	0.20
AccuracyRating:1 6 sqrt	-0.01	-0.17	-0.07	-0.58	-0.82	-0.49	-0.09	-0.11	-0.18	-0.04	-0.02	-0.05	-0.11	-0.17	-0.04	0.55	1.00	0.48	0.59	1.00	0.50	0.25	0.53	0.32
AccuracyRating:7 12 sqrt	-0.06	0.03	-0.02	-0.52	-0.41	-0.82	-0.07	-0.13	-0.12	0.05	-0.09	-0.09	-0.18	-0.13	-0.04	0.50	0.48	1.00	0.53	0.48	0.99	0.33	0.20	0.53
AccuracyRating:-6-1	-0.08	0.04	0.03	-0.80	-0.47	-0.49	0.02	-0.05	-0.09	0.07	0.08	0.04	-0.12	-0.14	0.00	0.98	0.59	0.53	1.00	0.59	0.55	0.58	0.31	0.22
AccuracyRating:1 6	0.00	-0.18	-0.07	-0.57	-0.83	-0.48	-0.09	-0.10	-0.18	-0.04	-0.03	-0.05	-0.12	-0.18	-0.04	0.55	1.00	0.48	0.59	1.00	0.50	0.25	0.52	0.32
AccuracyRating:7 12	-0.05	0.04	-0.02	-0.54	-0.42	-0.83	-0.08	-0.14	-0.13	0.03	-0.09	-0.09	-0.19	-0.13	-0.03	0.51	0.50	0.99	0.55	0.50	1.00	0.30	0.19	0.53
FinalRating:-6-1	0.08	0.17	0.08	-0.50	-0.25	-0.28	0.01	-0.07	-0.04	-0.07	-0.10	-0.16	0.31	0.24	0.24	0.58	0.25	0.33	0.58	0.25	0.30	1.00	0.39	0.26
FinalRating:1 6	0.17	0.10	0.14	-0.32	-0.48	-0.20	0.03	-0.07	-0.09	-0.09	-0.16	-0.16	0.22	0.32	0.30	0.30	0.53	0.20	0.31	0.52	0.19	0.39	1.00	0.40
FinalRating:7 12	0.06	0.09	0.30	-0.26	-0.29	-0.46	0.01	-0.09	-0.03	-0.13	-0.17	-0.13	0.15	0.19	0.43	0.20	0.32	0.53	0.22	0.32	0.53	0.26	0.40	1.00

APPENDIX BT

TOTVALUE	=	Total Rand value of cash processed
VALVERDE	=	Rand Value of deposits verified
VAL STDEP	=	Rand Value of deposits straight processed
DIFFRNCE	=	The Rand d value of differences calculated
%DIF/TOTV	=	The percentage of the value of total Rand difference divided by the total rand value processed
STRTIMDE	=	Standard time per deposit
STTIMENV	=	Standard time to process a single per envelope
PROFRAT	=	Professional ratings
ATTDRAT	=	Attendance ratings
VOLMRAT	=	Volumes ratings
ACCURAT	=	Accuracy ratings
FINLRAT	=	Final ratings
SQR%DIFT	=	Squareroot of percentage differences
GSQRTDTO	=	Grubbed squareroot of total value processed
GSTIMDEP	=	Grubbed standard time per deposit
GSTIMENV	=	Grubbed standard time per envelope

APPENDIX BU

Summary table for repeated measures ANOVA

Repeated measures effect	MS Effect	MS Error	df Effect	df Error	F	p	Partial eta-squared	Non-centrality	Observed power (alpha= 0.05)
TOTVALUE	4.50E+14	1.83E+13	4	368	24.55	0.000	0.21	98.21	1.00
VALVERDE	5.68E+13	1.45E+13	4	156	3.92	0.005	0.09	15.68	0.90
VALSTDEP	5.08E+14	1.35E+13	4	364	37.75	0.000	0.29	151.01	1.00
DIFFRNCE	1.03E+08	34649901	4	396	2.96	0.020	0.03	11.84	0.79
%DIF/TOTV	0.00	0.00	4	396	3.32	0.011	0.03	13.28	0.84
STRTIMDE	12740.00	9050.00	4	364	1.41	0.231	0.02	5.63	0.44
STTIMENV	6296.00	1099.00	4	368	5.73	0.000	0.06	22.93	0.98
PROFRAT	2.74	0.32	4	396	8.59	0.000	0.08	34.37	1.00
ATTDRAT	0.31	0.24	4	396	1.31	0.266	0.01	5.24	0.41
VOLMRAT	6.81	0.20	4	396	35.02	0.000	0.26	140.08	1.00
ACCURAT	26.62	0.39	4	396	67.78	0.000	0.41	271.13	1.00
FINLRAT	10.75	0.39	4	396	27.39	0.000	0.22	109.57	1.00
SQR%DIFT	0.03	0.00	4	396	8.91	0.000	0.08	35.64	1.00
GSQRTDTO	0.01	0.00	4	324	17.14	0.000	0.17	68.57	1.00
GSTIMDEP	5127.00	1160.00	4	328	4.42	0.002	0.05	17.67	0.94
GSTIMENV	7468.00	497.00	4	328	15.04	0.000	0.15	60.16	1.00

APPENDIX BV

Mauchly Sphericity Test on ANOVA

	Mauchly Sphericity Test W	Chi-Sqr (9)	p	G-G - Epsilon	G-G - Adj. df1	G-G - Adj. df2	G-G - Adj. p	H-F - Epsilon	H-F - Adj. df1	H-F - Adj. df2	H-F - Adj. p	Lowr.Bnd - Epsilon	Lowr.Bnd - Adj. df1	Lowr.Bnd - Adj. df2	Lowr.Bnd - Adj. p
TOTALRA	0.51	61.20	0.000	0.73	2.91	267.81	0.000	0.75	3.02	277.50	0.000	0.25	1	92	0.000
VALVERDE	0.13	77.48	0.000	0.50	2.00	77.98	0.024	0.53	2.11	82.20	0.022	0.25	1	39	0.055
VALSTDEP	0.40	81.08	0.000	0.68	2.72	247.34	0.000	0.70	2.81	255.69	0.000	0.25	1	91	0.000
DIFFRNCE	0.00	566.29	0.000	0.34	1.37	135.65	0.074	0.35	1.38	136.91	0.074	0.25	1	99	0.089
%DIF/TOTV	0.01	488.94	0.000	0.42	1.67	165.60	0.047	0.42	1.70	168.12	0.046	0.25	1	99	0.071
STRTIMDE	0.10	208.54	0.000	0.46	1.83	166.93	0.248	0.47	1.87	170.20	0.248	0.25	1	91	0.239
STTIMENV	0.71	31.17	0.000	0.86	3.43	315.40	0.000	0.89	3.58	329.09	0.000	0.25	1	92	0.019
PROFRAT	0.18	164.99	0.000	0.52	2.07	205.40	0.000	0.53	2.12	209.87	0.000	0.25	1	99	0.004
ATTDRAT	0.60	50.46	0.000	0.77	3.10	306.82	0.271	0.80	3.21	317.87	0.271	0.25	1	99	0.255
VOLMRAT	0.23	141.08	0.000	0.59	2.37	234.56	0.000	0.61	2.43	240.69	0.000	0.25	1	99	0.000
ACCURAT	0.31	114.86	0.000	0.68	2.71	268.35	0.000	0.70	2.79	276.63	0.000	0.25	1	99	0.000
FINLRAT	0.58	53.22	0.000	0.77	3.10	306.59	0.000	0.80	3.21	317.62	0.000	0.25	1	99	0.000
SQR%DIFT	0.15	184.99	0.000	0.55	2.19	216.63	0.000	0.56	2.24	221.72	0.000	0.25	1	99	0.004
GSQRTDTO	0.80	18.02	0.035	0.89	3.55	287.77	0.000	0.93	3.74	302.60	0.000	0.25	1	81	0.000
GSTIMDEP	0.83	15.28	0.083	0.91	3.62	297.22	0.003	0.95	3.81	312.66	0.002	0.25	1	82	0.039
GSTIMENV	0.71	27.31	0.001	0.88	3.50	287.25	0.000	0.92	3.68	301.64	0.000	0.25	1	82	0.000

APPENDIX BW

Multivariate Tests[a]

Effect		Value	F	Hypothesis df	Error df	Sig.	Partial Eta Squared	Noncent. Parameter	Observed Power[c]
Time	Pillai's Trace	.330	10.330[b]	3.000	63.000	.000	.330	30.990	.998
	Wilks' Lambda	.670	10.330[b]	3.000	63.000	.000	.330	30.990	.998
	Hotelling's Trace	.492	10.330[b]	3.000	63.000	.000	.330	30.990	.998
	Roy's Largest Root	.492	10.330[b]	3.000	63.000	.000	.330	30.990	.998
Time * Employee_status	Pillai's Trace	.081	1.852[b]	3.000	63.000	.147	.081	5.556	.458
	Wilks' Lambda	.919	1.852[b]	3.000	63.000	.147	.081	5.556	.458
	Hotelling's Trace	.088	1.852[b]	3.000	63.000	.147	.081	5.556	.458
	Roy's Largest Root	.088	1.852[b]	3.000	63.000	.147	.081	5.556	.458

a. Design: Intercept + Employee_status
Within Subjects Design: Time

b. Exact statistic

c. Computed using alpha = .05

Mauchly's Test of Sphericity[a]

Measure: Dif_to_TotalVal_sqrt

Within Subjects Effect	Mauchly's W	Approx. Chi-Square	df	Sig.	Epsilon[b]		
					Greenhouse-Geisser	Huynh-Feldt	Lower-bound
Time	.807	13.684	5	.018	.884	.940	.333

Tests the null hypothesis that the error covariance matrix of the orthonormalized transformed dependent variables is proportional to an identity matrix.

a. Design: Intercept + Employee_status
Within Subjects Design: Time

b. May be used to adjust the degrees of freedom for the averaged tests of significance. Corrected tests are displayed in the Tests of Within-Subjects Effects table.

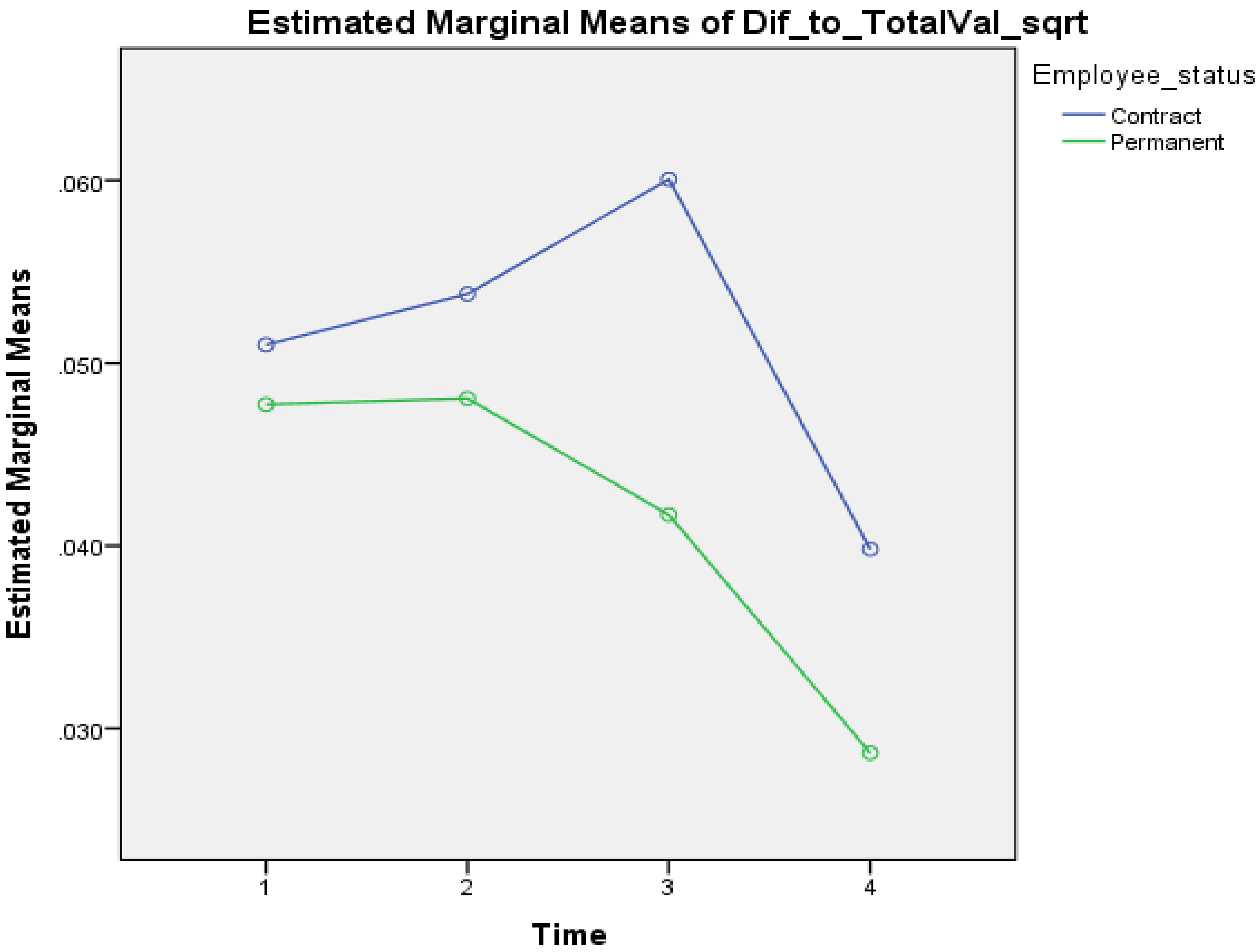
Tests of Between-Subjects Effects

Measure: Dif_to_TotalVal_sqrt

Transformed Variable: Average

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared	Noncent. Parameter	Observed Power[a]
Intercept	.400	1	.400	189.088	.000	.744	189.088	1.000
Employee_status	.004	1	.004	2.041	.158	.030	2.041	.291
Error	.138	65	.002					

a. Computed using alpha = .05



Tests of Within-Subjects Effects

Measure: Dif_to_TotalVal_sqrt

Source		Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared	Noncent. Parameter	Observed Power[a]
Time	Sphericity Assumed	.009	3	.003	10.824	.000	.143	32.471	.999
	Greenhouse-Geisser	.009	2.653	.003	10.824	.000	.143	28.719	.998
	Huynh-Feldt	.009	2.819	.003	10.824	.000	.143	30.515	.998
	Lower-bound	.009	1.000	.009	10.824	.002	.143	10.824	.900
Time * Employee_status	Sphericity Assumed	.002	3	.001	1.842	.141	.028	5.525	.473
	Greenhouse-Geisser	.002	2.653	.001	1.842	.148	.028	4.886	.442
	Huynh-Feldt	.002	2.819	.001	1.842	.145	.028	5.192	.457
	Lower-bound	.002	1.000	.002	1.842	.179	.028	1.842	.267
Error(Time)	Sphericity Assumed	.055	195	.000					
	Greenhouse-Geisser	.055	172.468	.000					
	Huynh-Feldt	.055	183.256	.000					
	Lower-bound	.055	65.000	.001					

a. Computed using alpha = .05

APPENDIX BX

Multivariate Tests[a]

Effect		Value	F	Hypothesis df	Error df	Sig.	Partial Eta Squared	Noncent. Parameter	Observed Power[c]
Time	Pillai's Trace	.568	34.158[b]	3.000	78.000	.000	.568	102.475	1.000
	Wilks' Lambda	.432	34.158[b]	3.000	78.000	.000	.568	102.475	1.000
	Hotelling's Trace	1.314	34.158[b]	3.000	78.000	.000	.568	102.475	1.000
	Roy's Largest Root	1.314	34.158[b]	3.000	78.000	.000	.568	102.475	1.000
Time * Employee_status	Pillai's Trace	.046	1.259[b]	3.000	78.000	.294	.046	3.778	.325
	Wilks' Lambda	.954	1.259[b]	3.000	78.000	.294	.046	3.778	.325
	Hotelling's Trace	.048	1.259[b]	3.000	78.000	.294	.046	3.778	.325
	Roy's Largest Root	.048	1.259[b]	3.000	78.000	.294	.046	3.778	.325

a. Design: Intercept + Employee_status
Within Subjects Design: Time

b. Exact statistic

c. Computed using alpha = .05

Mauchly's Test of Sphericity[a]

Measure: AccuracyRatings

Within Subjects Effect	Mauchly's W	Approx. Chi-Square	df	Sig.	Epsilon[b]		
					Greenhouse-Geisser	Huynh-Feldt	Lower-bound
Time	.325	88.361	5	.000	.572	.590	.333

Tests the null hypothesis that the error covariance matrix of the orthonormalized transformed dependent variables is proportional to an identity matrix.
a. Design: Intercept + Employee_status
Within Subjects Design: Time

b. May be used to adjust the degrees of freedom for the averaged tests of significance. Corrected tests are displayed in the Tests of Within-Subjects Effects table.

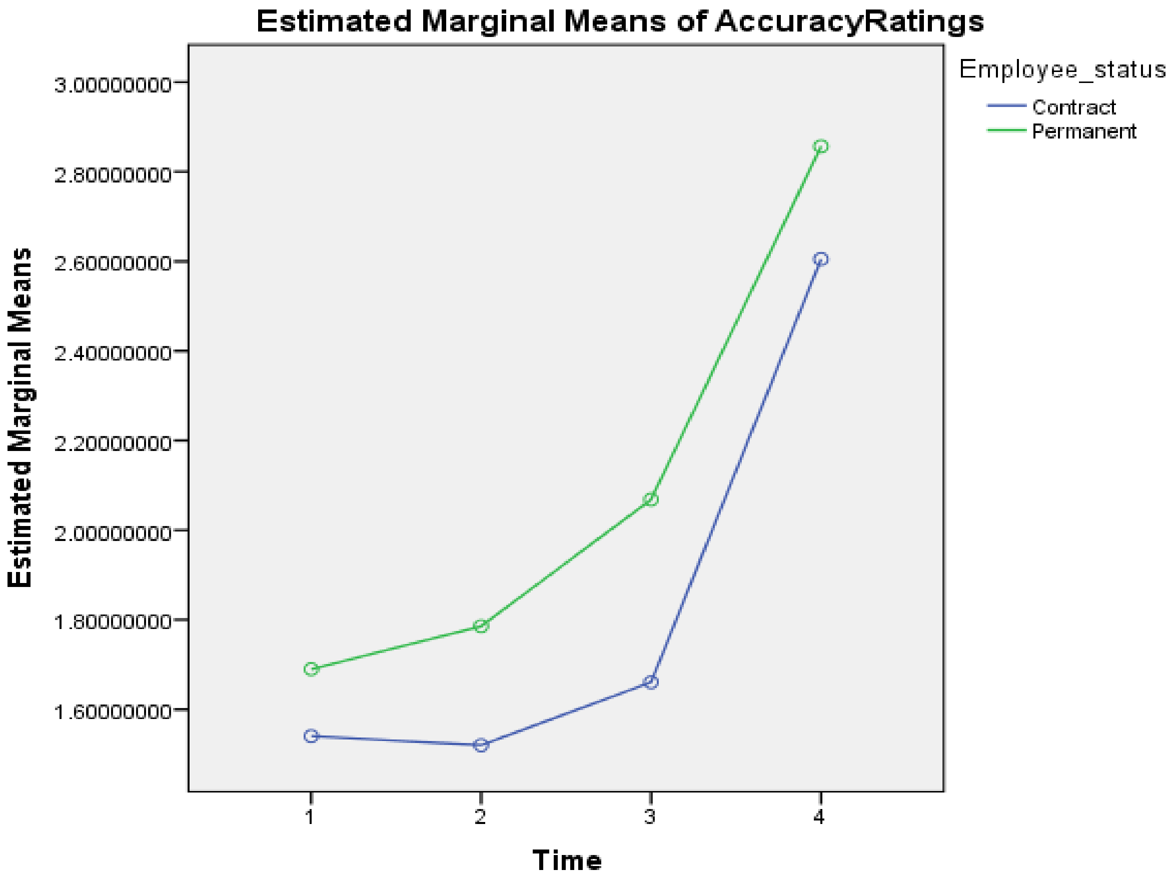
Tests of Between-Subjects Effects

Measure: AccuracyRatings

Transformed Variable: Average

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared	Noncent. Parameter	Observed Power[a]
Intercept	1023.410	1	1023.410	419.250	.000	.840	419.250	1.000
Employee_status	4.775	1	4.775	1.956	.166	.024	1.956	.282
Error	195.284	80	2.441					

a. Computed using alpha = .05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Estimated Marginal Means
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2.60000000
2.40000000
2.20000000
2.00000000
1.80000000
1.60000000
1
2
3
4
Time
Employee_status
Contract
Permanent

Tests of Within-Subjects Effects

Measure: AccuracyRatings

Source		Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared	Noncent. Parameter	Observed Power[a]
Time	Sphericity Assumed	54.037	3	18.012	57.792	.000	.419	173.376	1.000
	Greenhouse-Geisser	54.037	1.715	31.505	57.792	.000	.419	99.124	1.000
	Huynh-Feldt	54.037	1.771	30.512	57.792	.000	.419	102.352	1.000
	Lower-bound	54.037	1.000	54.037	57.792	.000	.419	57.792	1.000
Time * Employee_status	Sphericity Assumed	.561	3	.187	.600	.616	.007	1.800	.174
	Greenhouse-Geisser	.561	1.715	.327	.600	.525	.007	1.029	.141
	Huynh-Feldt	.561	1.771	.317	.600	.531	.007	1.063	.142
	Lower-bound	.561	1.000	.561	.600	.441	.007	.600	.119
Error(Time)	Sphericity Assumed	74.803	240	.312					
	Greenhouse-Geisser	74.803	137.215	.545					
	Huynh-Feldt	74.803	141.683	.528					
	Lower-bound	74.803	80.000	.935					

a. Computed using alpha = .05

APPENDIX BY

Multivariate Tests[a]

Effect		Value	F	Hypothesis df	Error df	Sig.	Partial Eta Squared	Noncent. Parameter	Observed Power[c]
Time	Pillai's Trace	.384	16.217[b]	3.000	78.000	.000	.384	48.652	1.000
	Wilks' Lambda	.616	16.217[b]	3.000	78.000	.000	.384	48.652	1.000
	Hotelling's Trace	.624	16.217[b]	3.000	78.000	.000	.384	48.652	1.000
	Roy's Largest Root	.624	16.217[b]	3.000	78.000	.000	.384	48.652	1.000
Time * Employee_status	Pillai's Trace	.008	.206[b]	3.000	78.000	.892	.008	.617	.087
	Wilks' Lambda	.992	.206[b]	3.000	78.000	.892	.008	.617	.087
	Hotelling's Trace	.008	.206[b]	3.000	78.000	.892	.008	.617	.087
	Roy's Largest Root	.008	.206[b]	3.000	78.000	.892	.008	.617	.087

a. Design: Intercept + Employee_status
Within Subjects Design: Time

b. Exact statistic

c. Computed using alpha = .05

Mauchly's Test of Sphericity[a]

Measure: FinalRatings

Within Subjects Effect	Mauchly's W	Approx. Chi-Square	df	Sig.	Epsilon[b]		
					Greenhouse-Geisser	Huynh-Feldt	Lower-bound
Time	.855	12.332	5	.031	.914	.961	.333

Tests the null hypothesis that the error covariance matrix of the orthonormalized transformed dependent variables is proportional to an identity matrix.

a. Design: Intercept + Employee_status
Within Subjects Design: Time

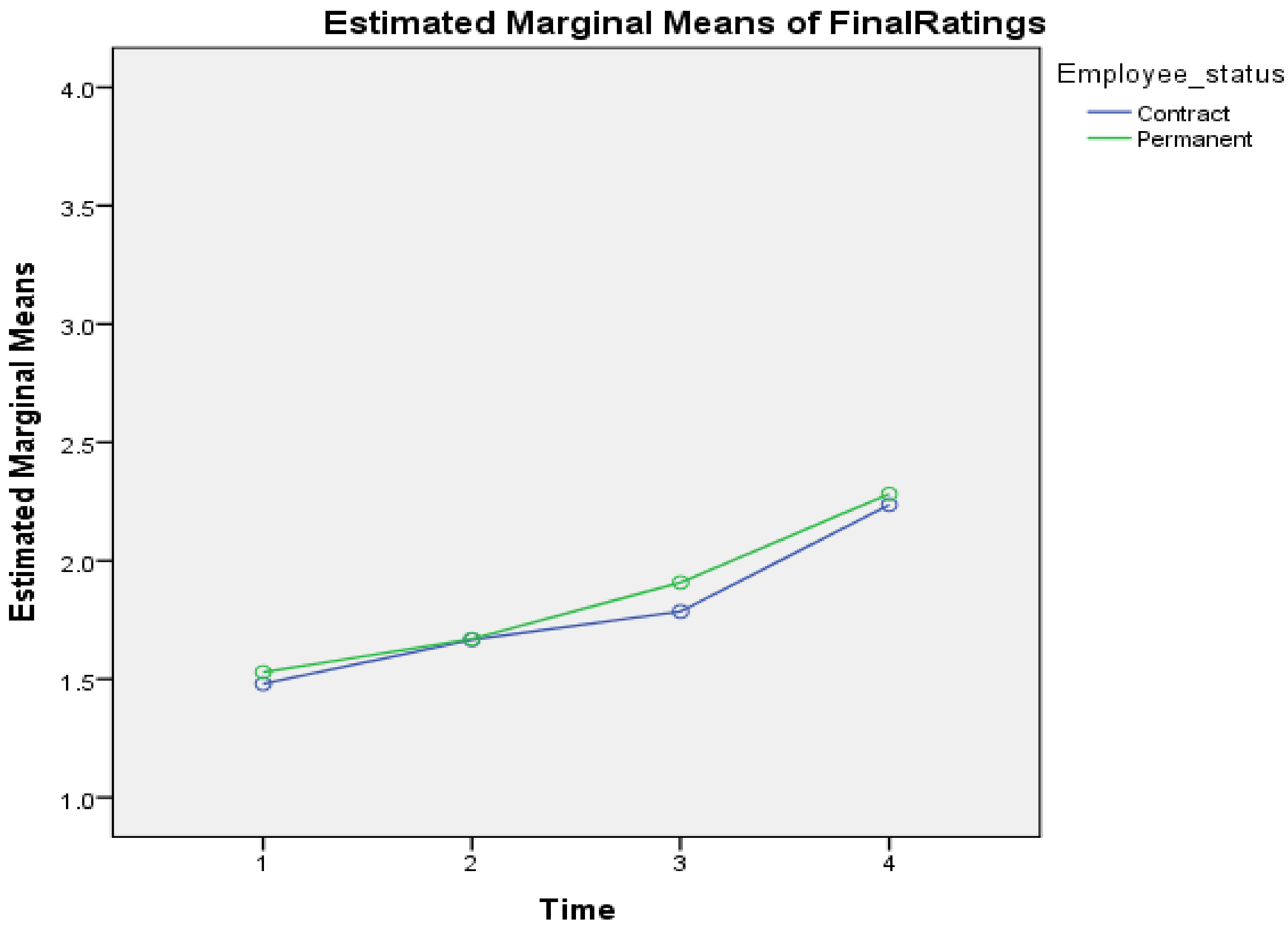
b. May be used to adjust the degrees of freedom for the averaged tests of significance. Corrected tests are displayed in the Tests of Within-Subjects Effects table.

Tests of Between-Subjects Effects

Measure: FinalRatings
Transformed Variable: Average

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared	Noncent. Parameter	Observed Power[a]
Intercept	876.810	1	876.810	784.337	.000	.907	784.337	1.000
Employee_status	.202	1	.202	.180	.672	.002	.180	.070
Error	89.432	80	1.118					

a. Computed using alpha = .05


Estimated Marginal Means of FinalRatings
Estimated Marginal Means
4.0
3.5
3.0
2.5
2.0
1.5
1.0
1
2
3
4
Time
Employee_status
Contract
Permanent

Tests of Within-Subjects Effects

Measure: FinalRatings

Source		Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared	Noncent. Parameter	Observed Power[a]
Time	Sphericity Assumed	20.939	3	6.980	22.149	.000	.217	66.447	1.000
	Greenhouse-Geisser	20.939	2.741	7.640	22.149	.000	.217	60.707	1.000
	Huynh-Feldt	20.939	2.883	7.263	22.149	.000	.217	63.859	1.000
	Lower-bound	20.939	1.000	20.939	22.149	.000	.217	22.149	.996
Time * Employee_status	Sphericity Assumed	.123	3	.041	.130	.942	.002	.389	.074
	Greenhouse-Geisser	.123	2.741	.045	.130	.930	.002	.356	.073
	Huynh-Feldt	.123	2.883	.043	.130	.937	.002	.374	.073
	Lower-bound	.123	1.000	.123	.130	.720	.002	.130	.065
Error(Time)	Sphericity Assumed	75.631	240	.315					
	Greenhouse-Geisser	75.631	219.267	.345					
	Huynh-Feldt	75.631	230.651	.328					
	Lower-bound	75.631	80.000	.945					

a. Computed using alpha = .05

APPENDIX BZ

Multivariate Tests[a]

Effect		Value	F	Hypothesis df	Error df	Sig.	Partial Eta Squared
Time	Pillai's Trace	.256	8.124[b]	3.000	71.000	.000	.256
	Wilks' Lambda	.744	8.124[b]	3.000	71.000	.000	.256
	Hotelling's Trace	.343	8.124[b]	3.000	71.000	.000	.256
	Roy's Largest Root	.343	8.124[b]	3.000	71.000	.000	.256
Time * Employeestatus	Pillai's Trace	.038	.932[b]	3.000	71.000	.430	.038
	Wilks' Lambda	.962	.932[b]	3.000	71.000	.430	.038
	Hotelling's Trace	.039	.932[b]	3.000	71.000	.430	.038
	Roy's Largest Root	.039	.932[b]	3.000	71.000	.430	.038

a. Design: Intercept + Employeestatus
Within Subjects Design: Time

c. Exact statistic

Mauchly's Test of Sphericity[a]

Measure: Avg_straight_time_envelope

Within Subjects Effect	Mauchly's W	Approx. Chi-Square	df	Sig.	Epsilon[b]		
					Greenhouse-Geisser	Huynh-Feldt	Lower-bound
Time	.682	27.421	5	.000	.826	.869	.333

Tests the null hypothesis that the error covariance matrix of the orthonormalized transformed dependent variables is proportional to an identity matrix.

a. Design: Intercept + Employeestatus
Within Subjects Design: Time

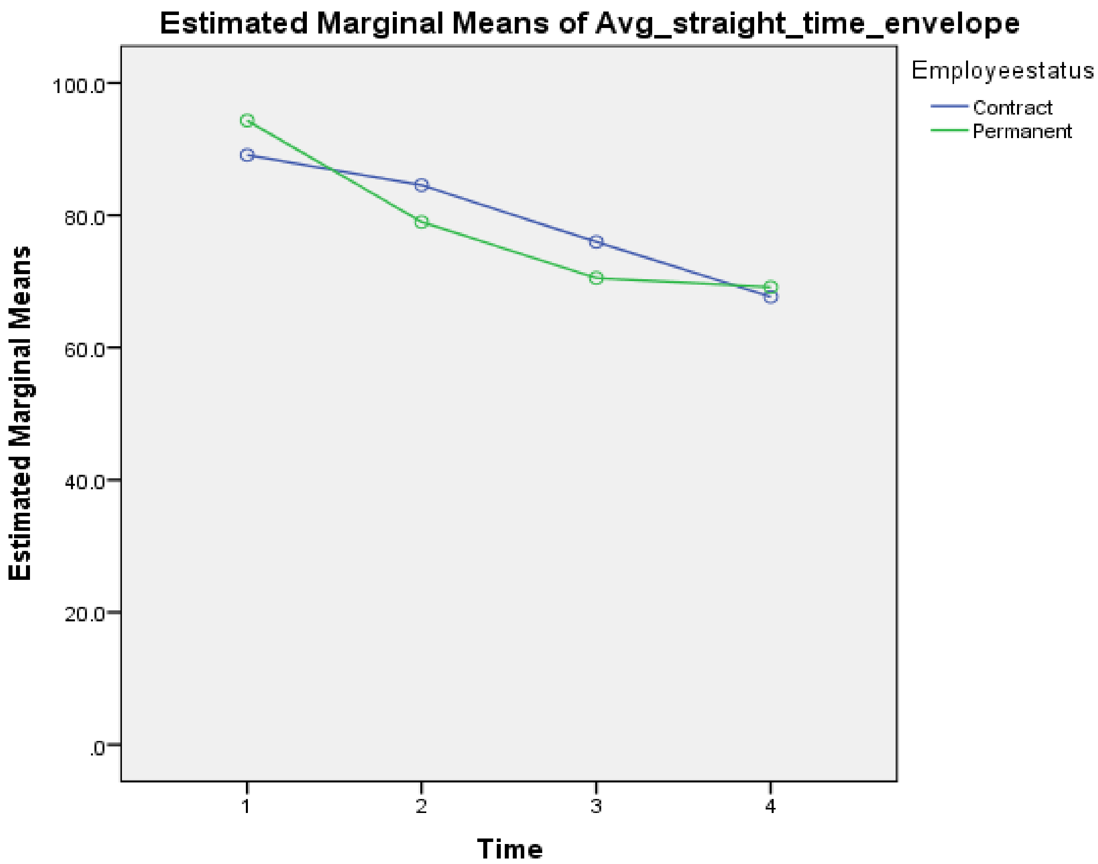
b. May be used to adjust the degrees of freedom for the averaged tests of significance. Corrected tests are displayed in the Tests of Within-Subjects Effects table.

Tests of Between-Subjects Effects

Measure: Avg_straight_time_envelope

Transformed Variable: Average

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Intercept	1408949.720	1	1408949.720	836.023	.000	.920
Employeestatus	66.548	1	66.548	.039	.843	.001
Error	123026.955	73	1685.301			


Estimated Marginal Means of Avg_straight_time_envelope
Employeestatus
Contract
Permanent
Estimated Marginal Means
100.0
80.0
60.0
40.0
20.0
.0
1
2
3
4
Time

Tests of Within-Subjects Effects

Measure: Avg_straight_time_envelope

Source		Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Time	Sphericity Assumed	17850.937	3	5950.312	11.658	.000	.138
	Greenhouse-Geisser	17850.937	2.478	7202.991	11.658	.000	.138
	Huynh-Feldt	17850.937	2.607	6846.570	11.658	.000	.138
	Lower-bound	17850.937	1.000	17850.937	11.658	.001	.138
Time * Employeestatus	Sphericity Assumed	1215.009	3	405.003	.793	.499	.011
	Greenhouse-Geisser	1215.009	2.478	490.265	.793	.478	.011
	Huynh-Feldt	1215.009	2.607	466.006	.793	.483	.011
	Lower-bound	1215.009	1.000	1215.009	.793	.376	.011
Error(Time)	Sphericity Assumed	111782.740	219	510.423			
	Greenhouse-Geisser	111782.740	180.914	617.879			
	Huynh-Feldt	111782.740	190.332	587.305			
	Lower-bound	111782.740	73.000	1531.270			

APPENDIX CA

Multivariate Tests[a]

Effect		Value	F	Hypothesis df	Error df	Sig.	Partial Eta Squared	Noncent. Parameter	Observed Power[c]
Time	Pillai's Trace	.319	12.158[b]	3.000	78.000	.000	.319	36.473	1.000
	Wilks' Lambda	.681	12.158[b]	3.000	78.000	.000	.319	36.473	1.000
	Hotelling's Trace	.468	12.158[b]	3.000	78.000	.000	.319	36.473	1.000
	Roy's Largest Root	.468	12.158[b]	3.000	78.000	.000	.319	36.473	1.000
Time * Employee_status	Pillai's Trace	.072	2.013[b]	3.000	78.000	.119	.072	6.038	.499
	Wilks' Lambda	.928	2.013[b]	3.000	78.000	.119	.072	6.038	.499
	Hotelling's Trace	.077	2.013[b]	3.000	78.000	.119	.072	6.038	.499
	Roy's Largest Root	.077	2.013[b]	3.000	78.000	.119	.072	6.038	.499

a. Design: Intercept + Employee_status
Within Subjects Design: Time

b. Exact statistic

c. Computed using alpha = .05

Mauchly's Test of Sphericity[a]

Measure: VolumesRating

Within Subjects Effect	Mauchly's W	Approx. Chi-Square	df	Sig.	Epsilon[b]		
					Greenhouse-Geisser	Huynh-Feldt	Lower-bound
Time	.566	44.841	5	.000	.725	.755	.333

Tests the null hypothesis that the error covariance matrix of the orthonormalized transformed dependent variables is proportional to an identity matrix.
a. Design: Intercept + Employee_status
Within Subjects Design: Time
b. May be used to adjust the degrees of freedom for the averaged tests of significance. Corrected tests are displayed in the Tests of Within-Subjects Effects table.

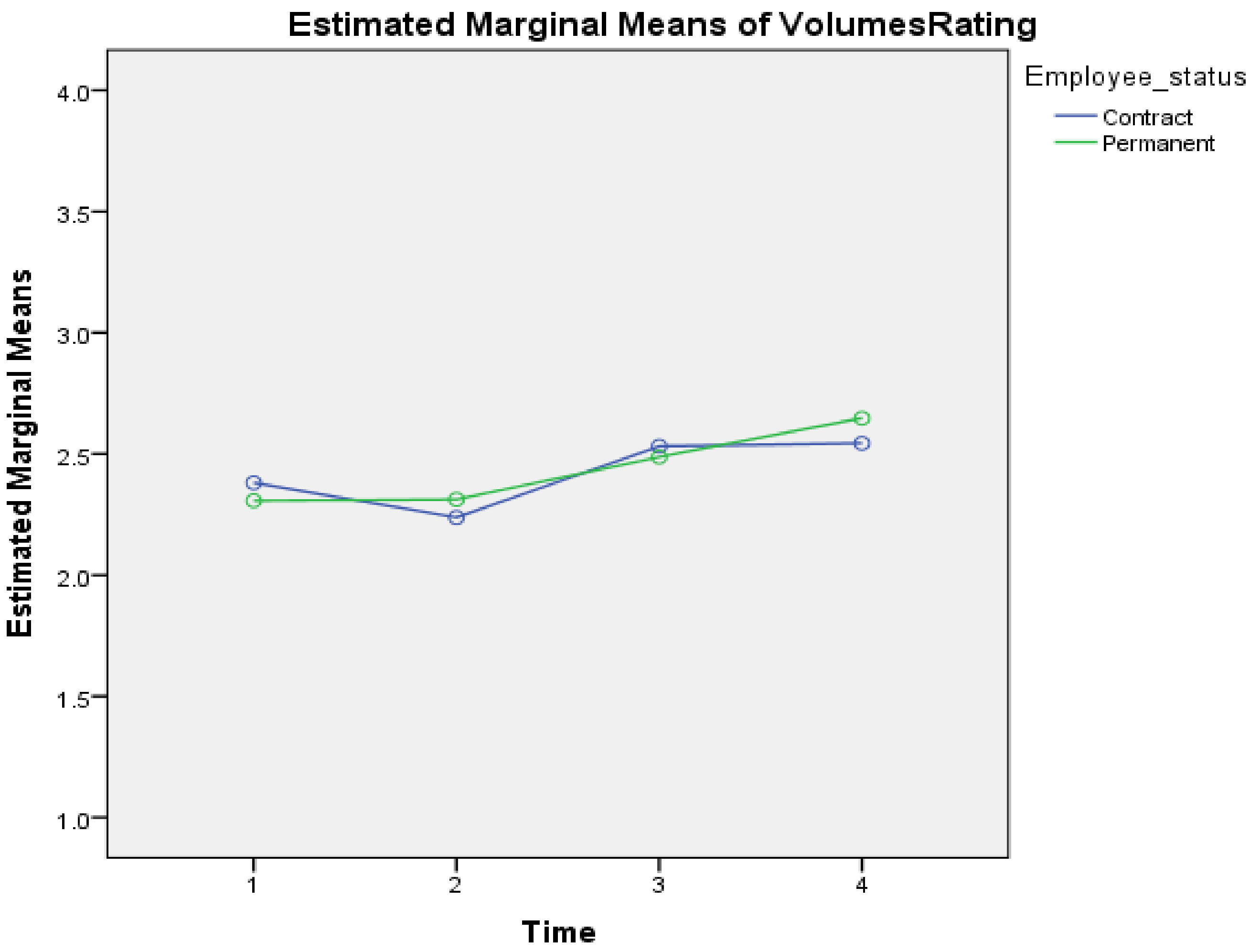
Tests of Between-Subjects Effects

Measure: VolumesRating

Transformed Variable: Average

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared	Noncent. Parameter	Observed Power[a]
Intercept	1564.626	1	1564.626	1143.831	.000	.935	1143.831	1.000
Employee_status	.015	1	.015	.011	.918	.000	.011	.051
Error	109.431	80	1.368					

a. Computed using alpha = .05


Estimated Marginal Means of VolumesRating
Estimated Marginal Means
4.0
3.5
3.0
2.5
2.0
1.5
1.0
1
2
3
4
Time
Employee_status
Contract
Permanent

Tests of Within-Subjects Effects

Measure: VolumesRating

Source		Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared	Noncent. Parameter	Observed Power[a]
Time	Sphericity Assumed	4.312	3	1.437	13.430	.000	.144	40.290	1.000
	Greenhouse-Geisser	4.312	2.174	1.983	13.430	.000	.144	29.198	.999
	Huynh-Feldt	4.312	2.265	1.904	13.430	.000	.144	30.419	.999
	Lower-bound	4.312	1.000	4.312	13.430	.000	.144	13.430	.952
Time * Employee_status	Sphericity Assumed	.378	3	.126	1.176	.319	.014	3.528	.314
	Greenhouse-Geisser	.378	2.174	.174	1.176	.313	.014	2.557	.266
	Huynh-Feldt	.378	2.265	.167	1.176	.314	.014	2.664	.271
	Lower-bound	.378	1.000	.378	1.176	.281	.014	1.176	.188
Error(Time)	Sphericity Assumed	25.684	240	.107					
	Greenhouse-Geisser	25.684	173.931	.148					
	Huynh-Feldt	25.684	181.203	.142					
	Lower-bound	25.684	80.000	.321					

a. Computed using alpha = .05

APPENDIX CB

Multivariate Tests[a]

Effect		Value	F	Hypothesis df	Error df	Sig.	Partial Eta Squared	Noncent. Parameter	Observed Power[c]
Time	Pillai's Trace	.199	5.892[b]	3.000	71.000	.001	.199	17.675	.944
	Wilks' Lambda	.801	5.892[b]	3.000	71.000	.001	.199	17.675	.944
	Hotelling's Trace	.249	5.892[b]	3.000	71.000	.001	.199	17.675	.944
	Roy's Largest Root	.249	5.892[b]	3.000	71.000	.001	.199	17.675	.944
Time * Employee_status	Pillai's Trace	.066	1.667[b]	3.000	71.000	.182	.066	5.000	.419
	Wilks' Lambda	.934	1.667[b]	3.000	71.000	.182	.066	5.000	.419
	Hotelling's Trace	.070	1.667[b]	3.000	71.000	.182	.066	5.000	.419
	Roy's Largest Root	.070	1.667[b]	3.000	71.000	.182	.066	5.000	.419

a. Design: Intercept + Employee_status
Within Subjects Design: Time

b. Exact statistic

c. Computed using alpha = .05

Mauchly's Test of Sphericity[a]

Measure: AvStTimeDep

Within Subjects Effect	Mauchly's W	Approx. Chi-Square	df	Sig.	Epsilon[b]		
					Greenhouse-Geisser	Huynh-Feldt	Lower-bound
Time	.918	6.134	5	.293	.945	1.000	.333

Tests the null hypothesis that the error covariance matrix of the orthonormalized transformed dependent variables is proportional to an identity matrix.

a. Design: Intercept + Employee_status
Within Subjects Design: Time

b. May be used to adjust the degrees of freedom for the averaged tests of significance. Corrected tests are displayed in the Tests of Within-Subjects Effects table.

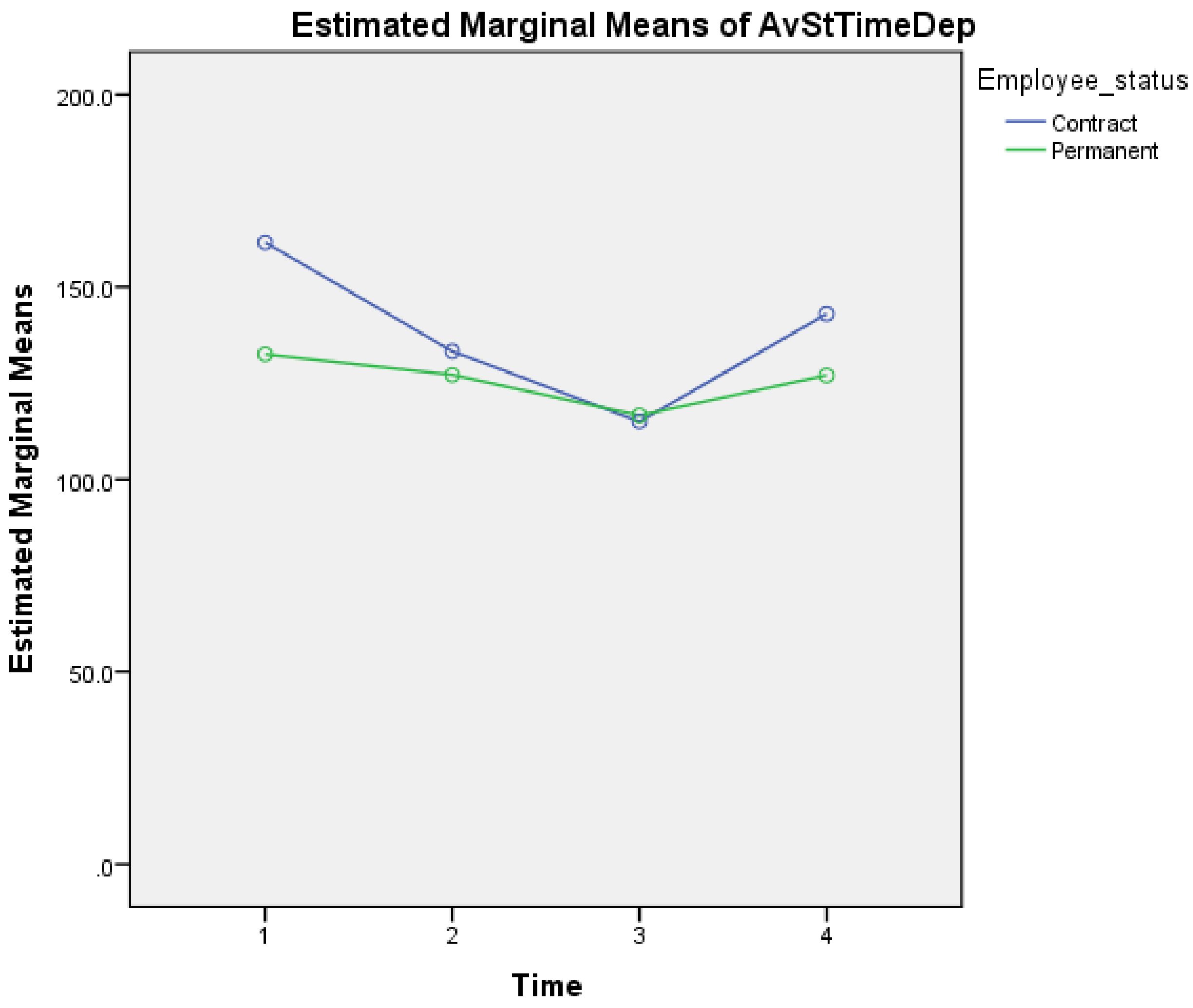
Tests of Between-Subjects Effects

Measure: AvStTimeDep

Transformed Variable: Average

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared	Noncent. Parameter	Observed Power[a]
Intercept	4216594.031	1	4216594.031	798.518	.000	.916	798.518	1.000
Employee_status	9305.424	1	9305.424	1.762	.188	.024	1.762	.258
Error	385478.462	73	5280.527					

a. Computed using alpha = .05


Estimated Marginal Means of AvStTimeDep
Estimated Marginal Means
200.0
150.0
100.0
50.0
.0
1
2
3
4
Time
Employee_status
Contract
Permanent

Tests of Within-Subjects Effects

Measure: AvStTimeDep

Source		Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared	Noncent. Parameter	Observed Power[a]
Time	Sphericity Assumed	30295.940	3	10098.647	6.541	.000	.082	19.623	.970
	Greenhouse-Geisser	30295.940	2.835	10686.514	6.541	.000	.082	18.544	.964
	Huynh-Feldt	30295.940	3.000	10098.647	6.541	.000	.082	19.623	.970
	Lower-bound	30295.940	1.000	30295.940	6.541	.013	.082	6.541	.714
Time * Employee_status	Sphericity Assumed	7943.055	3	2647.685	1.715	.165	.023	5.145	.445
	Greenhouse-Geisser	7943.055	2.835	2801.813	1.715	.168	.023	4.862	.431
	Huynh-Feldt	7943.055	3.000	2647.685	1.715	.165	.023	5.145	.445
	Lower-bound	7943.055	1.000	7943.055	1.715	.194	.023	1.715	.253
Error(Time)	Sphericity Assumed	338110.426	219	1543.883					
	Greenhouse-Geisser	338110.426	206.953	1633.756					
	Huynh-Feldt	338110.426	219.000	1543.883					
	Lower-bound	338110.426	73.000	4631.650					

a. Computed using alpha = .05

APPENDIX CC

Multivariate Tests[a]

Effect		Value	F	Hypothesis df	Error df	Sig.	Partial Eta Squared	Noncent. Parameter	Observed Power[c]
Time	Pillai's Trace	.148	4.184[b]	3.000	72.000	.009	.148	12.552	.836
	Wilks' Lambda	.852	4.184[b]	3.000	72.000	.009	.148	12.552	.836
	Hotelling's Trace	.174	4.184[b]	3.000	72.000	.009	.148	12.552	.836
	Roy's Largest Root	.174	4.184[b]	3.000	72.000	.009	.148	12.552	.836

a. Design: Intercept
Within Subjects Design: Time

b. Exact statistic

c. Computed using alpha = .05

Mauchly's Test of Sphericity[a]

Measure: AvStTimeDep

Within Subjects Effect	Mauchly's W	Approx. Chi-Square	df	Sig.	Epsilon[b] Greenhouse-Geisser	Huynh-Feldt	Lower-bound
Time	.917	6.337	5	.275	.945	.987	.333

Tests the null hypothesis that the error covariance matrix of the orthonormalized transformed dependent variables is proportional to an identity matrix.

a. Design: Intercept
Within Subjects Design: Time

b. May be used to adjust the degrees of freedom for the averaged tests of significance. Corrected tests are displayed in the Tests of Within-Subjects Effects table.

Tests of Within-Subjects Effects

Measure: AvStTimeDep

Source		Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared	Noncent. Parameter	Observed Power[a]
Time	Sphericity Assumed	22994.859	3	7664.953	4.917	.003	.062	14.752	.907
	Greenhouse-Geisser	22994.859	2.835	8110.630	4.917	.003	.062	13.941	.894
	Huynh-Feldt	22994.859	2.960	7768.963	4.917	.003	.062	14.554	.904
	Lower-bound	22994.859	1.000	22994.859	4.917	.030	.062	4.917	.590
Error(Time)	Sphericity Assumed	346053.481	222	1558.799					
	Greenhouse-Geisser	346053.481	209.801	1649.436					
	Huynh-Feldt	346053.481	219.028	1579.952					
	Lower-bound	346053.481	74.000	4676.398					

a. Computed using alpha = .05

APPENDIX CD

Multivariate Tests[a]

Effect		Value	F	Hypothesis df	Error df	Sig.	Partial Eta Squared	Noncent. Parameter	Observed Power[c]
Time	Pillai's Trace	.354	14.413[b]	3.000	79.000	.000	.354	43.238	1.000
	Wilks' Lambda	.646	14.413[b]	3.000	79.000	.000	.354	43.238	1.000
	Hotelling's Trace	.547	14.413[b]	3.000	79.000	.000	.354	43.238	1.000
	Roy's Largest Root	.547	14.413[b]	3.000	79.000	.000	.354	43.238	1.000

a. Design: Intercept
Within Subjects Design: Time

b. Exact statistic

c. Computed using alpha = .05

Mauchly's Test of Sphericity[a]

Measure: VolumesRating

Within Subjects Effect	Mauchly's W	Approx. Chi-Square	df	Sig.	Epsilon[b]		
					Greenhouse-Geisser	Huynh-Feldt	Lower-bound
Time	.583	42.958	5	.000	.734	.755	.333

Tests the null hypothesis that the error covariance matrix of the orthonormalized transformed dependent variables is proportional to an identity matrix.

a. Design: Intercept
Within Subjects Design: Time

b. May be used to adjust the degrees of freedom for the averaged tests of significance. Corrected tests are displayed in the Tests of Within-Subjects Effects table.

Tests of Within-Subjects Effects

Measure: VolumesRating

Source		Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared	Noncent. Parameter	Observed Power[a]
Time	Sphericity Assumed	5.738	3	1.913	17.834	.000	.180	53.502	1.000
	Greenhouse-Geisser	5.738	2.201	2.607	17.834	.000	.180	39.258	1.000
	Huynh-Feldt	5.738	2.265	2.533	17.834	.000	.180	40.400	1.000
	Lower-bound	5.738	1.000	5.738	17.834	.000	.180	17.834	.987
Error(Time)	Sphericity Assumed	26.062	243	.107					
	Greenhouse-Geisser	26.062	178.305	.146					
	Huynh-Feldt	26.062	183.493	.142					
	Lower-bound	26.062	81.000	.322					

a. Computed using alpha = .05

APPENDIX CE

Multivariate Tests[a]

Effect		Value	F	Hypothesis df	Error df	Sig.	Partial Eta Squared	Noncent. Parameter	Observed Power[c]
Time	Pillai's Trace	.636	45.914[b]	3.000	79.000	.000	.636	137.741	1.000
	Wilks' Lambda	.364	45.914[b]	3.000	79.000	.000	.636	137.741	1.000
	Hotelling's Trace	1.744	45.914[b]	3.000	79.000	.000	.636	137.741	1.000
	Roy's Largest Root	1.744	45.914[b]	3.000	79.000	.000	.636	137.741	1.000

a. Design: Intercept
Within Subjects Design: Time

b. Exact statistic

c. Computed using alpha = .05

Mauchly's Test of Sphericity[a]

Measure: AccuracyRatings

Within Subjects Effect	Mauchly's W	Approx. Chi-Square	df	Sig.	Epsilon[b]		
					Greenhouse-Geisser	Huynh-Feldt	Lower-bound
Time	.334	87.500	5	.000	.578	.589	.333

Tests the null hypothesis that the error covariance matrix of the orthonormalized transformed dependent variables is proportional to an identity matrix.

a. Design: Intercept
Within Subjects Design: Time

b. May be used to adjust the degrees of freedom for the averaged tests of significance. Corrected tests are displayed in the Tests of Within-Subjects Effects table.

Tests of Within-Subjects Effects

Measure: AccuracyRatings

Source		Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared	Noncent. Parameter	Observed Power[a]
Time	Sphericity Assumed	67.642	3	22.547	72.701	.000	.473	218.103	1.000
	Greenhouse-Geisser	67.642	1.733	39.027	72.701	.000	.473	126.008	1.000
	Huynh-Feldt	67.642	1.768	38.264	72.701	.000	.473	128.519	1.000
	Lower-bound	67.642	1.000	67.642	72.701	.000	.473	72.701	1.000
Error(Time)	Sphericity Assumed	75.364	243	.310					
	Greenhouse-Geisser	75.364	140.392	.537					
	Huynh-Feldt	75.364	143.189	.526					
	Lower-bound	75.364	81.000	.930					

a. Computed using alpha = .05

APPENDIX CF

Multivariate Tests[a]

Effect		Value	F	Hypothesis df	Error df	Sig.	Partial Eta Squared	Noncent. Parameter	Observed Power[c]
Time	Pillai's Trace	.440	20.729[b]	3.000	79.000	.000	.440	62.188	1.000
	Wilks' Lambda	.560	20.729[b]	3.000	79.000	.000	.440	62.188	1.000
	Hotelling's Trace	.787	20.729[b]	3.000	79.000	.000	.440	62.188	1.000
	Roy's Largest Root	.787	20.729[b]	3.000	79.000	.000	.440	62.188	1.000

a. Design: Intercept
Within Subjects Design: Time

b. Exact statistic

c. Computed using alpha = .05

Mauchly's Test of Sphericity[a]

Measure: FinalRatings

Within Subjects Effect	Mauchly's W	Approx. Chi-Square	df	Sig.	Epsilon[b]		
					Greenhouse-Geisser	Huynh-Feldt	Lower-bound
Time	.858	12.248	5	.032	.915	.950	.333

Tests the null hypothesis that the error covariance matrix of the orthonormalized transformed dependent variables is proportional to an identity matrix.

a. Design: Intercept
Within Subjects Design: Time

b. May be used to adjust the degrees of freedom for the averaged tests of significance. Corrected tests are displayed in the Tests of Within-Subjects Effects table.

Tests of Within-Subjects Effects

Measure: FinalRatings

Source		Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared	Noncent. Parameter	Observed Power[a]
Time	Sphericity Assumed	26.236	3	8.745	28.053	.000	.257	84.158	1.000
	Greenhouse-Geisser	26.236	2.745	9.559	28.053	.000	.257	76.996	1.000
	Huynh-Feldt	26.236	2.850	9.204	28.053	.000	.257	79.963	1.000
	Lower-bound	26.236	1.000	26.236	28.053	.000	.257	28.053	.999
Error(Time)	Sphericity Assumed	75.753	243	.312					
	Greenhouse-Geisser	75.753	222.320	.341					
	Huynh-Feldt	75.753	230.888	.328					
	Lower-bound	75.753	81.000	.935					

a. Computed using alpha = .05

APPENDIX CG

Multivariate Tests[a]

Effect		Value	F	Hypothesis df	Error df	Sig.	Partial Eta Squared	Noncent. Parameter	Observed Power[c]
Time	Pillai's Trace	.434	16.369[b]	3.000	64.000	.000	.434	49.108	1.000
	Wilks' Lambda	.566	16.369[b]	3.000	64.000	.000	.434	49.108	1.000
	Hotelling's Trace	.767	16.369[b]	3.000	64.000	.000	.434	49.108	1.000
	Roy's Largest Root	.767	16.369[b]	3.000	64.000	.000	.434	49.108	1.000

a. Design: Intercept
Within Subjects Design: Time

b. Exact statistic

c. Computed using alpha = .05

Mauchly's Test of Sphericity[a]

Measure: Dif_to_TotalVal_sqrt

Within Subjects Effect	Mauchly's W	Approx. Chi-Square	df	Sig.	Epsilon[b]		
					Greenhouse-Geisser	Huynh-Feldt	Lower-bound
Time	.807	13.853	5	.017	.884	.924	.333

Tests the null hypothesis that the error covariance matrix of the orthonormalized transformed dependent variables is proportional to an identity matrix.

a. Design: Intercept
Within Subjects Design: Time

b. May be used to adjust the degrees of freedom for the averaged tests of significance. Corrected tests are displayed in the Tests of Within-Subjects Effects table.

Tests of Within-Subjects Effects

Measure: Dif_to_TotalVal_sqrt

Source		Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared	Noncent. Parameter	Observed Power[a]
Time	Sphericity Assumed	.015	3	.005	16.872	.000	.204	50.616	1.000
	Greenhouse-Geisser	.015	2.651	.005	16.872	.000	.204	44.720	1.000
	Huynh-Feldt	.015	2.772	.005	16.872	.000	.204	46.764	1.000
	Lower-bound	.015	1.000	.015	16.872	.000	.204	16.872	.982
Error(Time)	Sphericity Assumed	.057	198	.000					
	Greenhouse-Geisser	.057	174.937	.000					
	Huynh-Feldt	.057	182.934	.000					
	Lower-bound	.057	66.000	.001					

a. Computed using alpha = .05

APPENDIX CH

Multivariate Tests[a]

Effect		Value	F	Hypothesis df	Error df	Sig.	Partial Eta Squared	Noncent. Parameter	Observed Power[c]
Time	Pillai's Trace	.325	11.544[b]	3.000	72.000	.000	.325	34.632	.999
	Wilks' Lambda	.675	11.544[b]	3.000	72.000	.000	.325	34.632	.999
	Hotelling's Trace	.481	11.544[b]	3.000	72.000	.000	.325	34.632	.999
	Roy's Largest Root	.481	11.544[b]	3.000	72.000	.000	.325	34.632	.999

a. Design: Intercept
Within Subjects Design: Time

b. Exact statistic

c. Computed using alpha = .05

Mauchly's Test of Sphericity[a]

Measure: AvStTimeEnv

Within Subjects Effect	Mauchly's W	Approx. Chi-Square	df	Sig.	Epsilon[b]		
					Greenhouse-Geisser	Huynh-Feldt	Lower-bound
Time	.687	27.354	5	.000	.829	.860	.333

Tests the null hypothesis that the error covariance matrix of the orthonormalized transformed dependent variables is proportional to an identity matrix.

a. Design: Intercept
Within Subjects Design: Time

b. May be used to adjust the degrees of freedom for the averaged tests of significance. Corrected tests are displayed in the Tests of Within-Subjects Effects table.

Tests of Within-Subjects Effects

Measure: AvStTimeEnv

Source		Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared	Noncent. Parameter	Observed Power[a]
Time	Sphericity Assumed	26428.191	3	8809.397	17.307	.000	.190	51.922	1.000
	Greenhouse-Geisser	26428.191	2.487	10628.178	17.307	.000	.190	43.037	1.000
	Huynh-Feldt	26428.191	2.580	10243.950	17.307	.000	.190	44.651	1.000
	Lower-bound	26428.191	1.000	26428.191	17.307	.000	.190	17.307	.984
Error(Time)	Sphericity Assumed	112997.748	222	508.999					
	Greenhouse-Geisser	112997.748	184.010	614.086					
	Huynh-Feldt	112997.748	190.911	591.886					
	Lower-bound	112997.748	74.000	1526.997					

a. Computed using alpha = .05

APPENDIX CI

Reference table for periods in study

Period	Reference Months	Definition of period
1	-12 : -7	12 to 7 months prior to IV_2
2	-6 : -1	6 to 1 month prior to IV_2
3	0	Supervisor intervention
4	1: 6	1 to 6 months post IV_2
5	7 : 12	7 to 12 months post IV_2
6	13 :18	13 to18 months post IV_2
7	19 : 24	19 to 24 months post IV_2
8	25 : 30	25 to 30 months post IV_2
9	31 : 34	31 to 34 months post IV_2

Number of tellers used for final sample per period

Period (months)	Tellers with complete info on total rating
-6 : -1 1 : 6 7 : 12	121 (100 using transformed & Grubs).
-6 : -1 1 : 6 7 : 12 13 :18	81

Number of supervisors used for final sample data

Period (months)	Supervisors with complete info on total rating
0 7 : 12	52
0 7 :12 13 : 18	45
0 7 : 12 13 : 18 19 : 24	41