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AN EXPLORATORY STUDY ON THE CONSTRUCT VALIDATION OF THE ORGANISATIONAL CLIMATE MEASURE IN THE BELGIAN WORKPLACE

By

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LETTER OF DECLARATION

This is to certify that the thesis entitled “An Exploratory Study on the Construct Validation of the Organisational Climate Measure in the Belgian Workplace” submitted by me to the University of Pretoria for the award of the degree Magister Commercii (Human Resource Management) is a bonafide record of research work carried out by me under the supervision of Chantal Olckers. The contents of this thesis, in full or in parts, are my own work and have not been submitted to any other Institute or University for the award of any degree or diploma and that all the sources I have used or quoted have been indicated and acknowledged by complete references.

Willie van Tonder 30 April 2011

Signed: _____

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ABSTRACT

THE CONSTRUCT VALIDATION OF THE ORGANISATIONAL CLIMATE MEASURE IN THE BELGIAN WORKPLACE

Supervisor : **Chantal Olckers**
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To obtain valid and reliable research findings it is important to validate one's measuring instrument with specific reference to the linguistic and cultural context in which it is to be used. This entails determining that items of the measurement instrument load significantly on the different constructs, and establishing the psychometric properties of the instrument. The purpose is to decrease or eliminate measurement errors, which detract from the validity of research findings.

The aim of this study was to perform both an exploratory and confirmatory factor analysis study on the Organisational Climate Measure Questionnaire (OCM), developed by Patterson and colleagues, to assess constructs and the model fit of the data within the Belgian context. Exploratory factor analysis was employed as part of the process to uncover the underlying structure of the relatively large set of variables, while confirmatory factor analysis was employed to assess the construct validity of the questionnaire, to pinpoint areas of weakness and to provide a foundation for further research.

The OCM was administered to a sample of 301 participants in the Belgian manufacturing sector, drawn by means of convenient sampling. The study resulted in a final ten-factor model with 44 items, and the fit indices indicated that the data reflected a reasonable model fit. The fit indices displayed the following: CFI = .941, NNFI = .935

and the NFI = .840. The reliability scales for the ten factors ranged between .797 and .915.

KEY TERMS

Organisational climate, organisational construct validity, structural equation modelling.

CHAPTER 1

INTRODUCTION

1.1 Background

Organisational climate is generally interpreted as employees' perceptions of their work environment. Organisational climate has also been defined as a psychological state of the employee of an organisation that is strongly exaggerated by organisational conditions (Altman, 2000). In the management sciences, it is mainly understood as an overruling variable between the context of an organisation and the behaviour of its members (Patterson, West, Shackleton, Dawson, Lawthom, Maitlis, Robinson, & Wallace, 2005).

The term *organisational climate* was first used in the early 1960s, and from then on the research progressed quite intensively. Over the past 20 years the research on organisational perceptions has increased enormously. Most organisations now view their employees as the most important asset of the business, and therefore a lot of time is spent on how to encourage and motivate them. Organisational climate is a much discussed topic in the business world. Most, if not all, models of organisational behaviour and actions are perceptions of the environment, usually referred to as "organisational climate" (Rousseau, 1988).

Most of the studies that have been done are to establish how employees experience their organisations. The impact of employee attitudes on the performance of work has been the main focus. Organisations want to determine how individuals perceive the working environment, and whether this influences their behaviour towards the organisation and the organisational outcomes. Research also suggests that attitudes shared by employees about their work environment (which make up the organisational

climate) are essential determinants of the organisation's effectiveness (Glisson & Hemmelgarn, 1998). Regardless of the level of awareness surrounding organisational climate, however, there are few well validated measures of the construct (Patterson et al., 2005). A measurement of organisational climate would provide us with an accurate picture of the interactions between employees of an organisation, as well as the effects of the interaction on the employees (Olckers, Buys, & Zeeman, 2007).

1.2 Problem statement

Organisational climate differs around the world and organisations use different measures to determine it. Organisational climate has also become a topic for discussion in organisations, because of its impact on organisational outcome. Nevertheless, regardless of the level of interest surrounding organisational climate, there are few well-validated measures of the construct (Patterson et al., 2005). Research has shown that climate perceptions are connected with a range of essential work outcomes at individual, group, and organisational level, such as leader behaviour, turnover intentions, job satisfaction, individual job performance and organisational performance (Patterson et al., 2005). According to Brown and Leigh (1996), perceptions of a motivating and involving organisation climate were positively related to supervisory ratings of performance.

Organisations use different measures for determining organisational climate (Altman, 2000). Although organisational climates differ in context, they still provide important information regarding individuals and their perceptions of environment. Such measures should be validated according to the context that they are tested in, and therefore the problem of construct validation of the Organisational Climate Measure (OCM) arises. The OCM was developed by Patterson and colleagues and tested with a large sample of employees in the manufacturing sector in the United Kingdom (UK), and the results showed that the instrument has good psychometric properties. The instrument assesses 17 scopes of employee perceptions of their work environments (Patterson et al., 2005).

According to Jensen (2003), validity is generally seen as the most important factor to be considered in the evaluation of a measure, and it always needs to be evaluated in relation to the uses of the measure. Validity refers to the aptness, meaningfulness, and effectiveness of a measure for a specific purpose. Validity does not refer to any intrinsic feature of the measure; measures themselves are never “valid” or “invalid.” Thus validity always needs to be estimated in relation to the uses of the measure (Jensen, 2003).

1.3 Purpose of the research

The construct of the measurement can have a huge influence on the results of the study, and the validity and reliability of the measurement instrument will determine its significant use in a specific context. Construct validity, on the other hand, refers to the degree to which a measure assesses the precise area or construct of interest (Jensen, 2003), thus seeking conformity between hypothetical concepts and a specific measure tool or procedure.

The aim of this study is to determine the construct validity of the OCM in a Belgian context. In this way, the psychological and work-related constructs could be generalised to similar organisations in Belgium and other organisations with the same culture and context. Organisations in Belgium would also be able to use the OCM to determine organisational climate if the construct measures what it purports to. When psychological and work-related constructs are measured in a cross-cultural framework, it is essential to establish equivalence of the measures prior to drawing significant substantive conclusions about the relative value of constructs across countries (De Beuckelaer, Lievens, & Swinnen, 2007). The vital point is that an organisation’s philosophy and culture will affect decision making and achievement in that organisation (Beyer, 1981; Zammuto, Gifford, & Goodman, 2000) and therefore will play an essential role in the progress of its climate. In modern years, climate surveys have become progressively more popular as tools for organisational analysis and change, since employee perceptions of climate have been found to be connected to important individual and organisational outcomes (Parker et al., 2003).

This study will provide the business community and researchers with an initial insight into organisational climate constructs in a Belgian context. The study shows whether results could be generalised to other climate constructs and the same constructs done in previous research. Thus managers will be better equipped to recognise the construct validity of the OCM in the Belgian context and be able to determine organisational climate in this context. In the field of Human Resources/Industrial Psychology the research aims at determining the construct validation (in Belgium) of the OCM (which measured organisational climate in the UK only), and thus expanding the knowledge of organisational climate in Belgium. Human Resource managers have a huge responsibility when determining organisational climate in an organisation, and should not lightly generalise results of a measurement to a different context. Therefore the ultimate aim of the study from the Human Resource/Industrial Psychology perspective is to ensure that the importance of determining the construct validity of climate measures is known and understood. Furthermore, this study should stimulate further research to empirically validate constructs of organisational climate and explore organisational climate in general.

1.4 Research objectives

The primary objective of the study was to determine the construct validity of the Organisational Climate Measure (developed by Patterson and colleagues) as a tool of determining organisational climate in Belgium.

In achieving this aim it was important to address the following secondary objectives:

- To determine what is meant by organisational climate
- To understand why it is necessary to measure organisational climate
- To determine what aspects of organisational climate should be looked at in Belgium
- To evaluate the OCM as a valid and reliable instrument

Lack of measurement correspondence data across countries entails that there is no general basis for comparing data across countries. This could mean that experiential mean differences on applicable constructs (across countries) might result from measurement artefacts linked to the measurement instrument used rather than from factual differences across countries (De Beuckelaer et al., 2007).

Establishing measurement correspondence enables us to answer a sequence of essential questions, such as the following:

- Do respondents from different countries use a comparable frame of reference when answering items used to measure relevant constructs?
- Do respondents from different countries standardise the gap on the measurement scale used in comparable ways?
- Are dissimilarities in response styles across countries partly responsible for observed cross-country disparity in mean item scores? (e.g. the propensity to use extreme response categories)

2. Layout of research

This document contains five chapters.

Chapter 1 presents the background and rationale behind the current research study. The chapter discusses the problem statement, highlighting the overall aim of the study and the contribution made to the field of Human Resources/Industrial Psychology and the world of business.

The theoretical background for the study is provided in **Chapter 2,** which provides a conceptual and theoretical foundation of organisational climate and review of available research. Chapter 2 focuses first on defining the climate concept and the focal point of organisational climate studies, while creating the basis for the research argument of the

topic at hand. Then it explains the effects and outcomes of different organisational climate studies in the workplace. It also contains a detailed discussion and presentation of the literature with regard to the different constructs of the Organisational Climate Measure. These constructs include the following: Involvement, Autonomy, Supervisory Support, Integration, Welfare, Training, Reflexivity, Innovation and Flexibility, Outward Focus, Pressure to Produce, Clarity of Organisational Goals, Performance Feedback, Quality, Efficiency, Effort, Formalisation, and Tradition.

Chapter 3 follows by discussing the research approach, design and methodology. Theoretical standpoints and justification for the chosen methodology are provided in detail, with all considerations made during the study design being highlighted. An indication is also given of the sample and respondents identified and the procedure for collecting and analysing the data obtained. The ethical issues of the study are then comprehensively discussed.

Chapter 4 entails a detailed presentation and discussion of the results of the study. The findings obtained are reported, consolidated and summarised.

Conclusions of the findings of the study are provided for the management and human resource management profession as well as for the individual employee in **Chapter 5**. Limitations of the study are discussed, with recommendations for future research

CHAPTER 2

ORGANISATIONAL CLIMATE

2.1 Introduction

Organisations determine organisational climate in order to improve the attitudes and beliefs of their employees towards their work environment (Litwin & Stringer, 1968). Some researchers believe that we can predict organisational effectiveness while researching behavioural perceptions of employees regarding their environment. Many measures of organisational climate have been developed, though few of them have been validated for a specific context. An instrument is therefore needed which is able to determine organisational climate in the Belgian context.

2.2 The concept of organisational climate

Organisational climate as a concept has increasingly become the focal point of a broad variety of research studies. Nevertheless, there is substantial diversity in both the definitions and measurement techniques of this concept (Muchinsky, 1976). However, most, if not all researchers agree upon “employees’ shared perceptions of organisational events, practices and procedures” (Patterson et al., 2005). For the purposes of this study, Litwin and Stringer’s definition of organisational climate is used, as their studies made a substantial contribution on both theoretical and practical grounds. Therefore, in this study ‘climate’ refers to a set of measurable properties of the work environment, perceived directly or indirectly by the people who live and work in this environment, and is assumed to influence motivation and behaviour (Litwin & Stringer, 1968).

As organisations operate in various settings and environments (contexts), different events, practices and procedures occur. People’s perceptions of these events will also

differ because of cultural differences (Wilderom, Glunk, & Maslowski, 2000). These perceptions are assumed to be mainly descriptive rather than affective or evaluative (Schneider & Reichers, 1983). Perceptual agreement entails a shared obligation of psychological meaning, allowing individual perceptions to be combined and treated as a higher-level construct (Patterson et al., 2005).

There are assumptions that organisational collectives have their own climate, and that these can be identified through the demonstration of significant differences in climate between units and significant agreement in perceptions within units (James, 1982). Therefore researchers have combined individual scores to a suitable level and used the mean to represent climate at that level (Patterson et al., 2005). According to James (1982), a composite model represents how a construct operationalised at one level of analysis is associated with another form of that construct at a different level of analysis, thus explaining how the “same” construct must be represented at different levels of analysis. As for the unit of analysis, here the importance of contextual differences arises. The context in which such climate is measured could differ between organisations, although the same measurement is used, therefore the necessity arises for construct validation of such a measurement in a different context.

2.3 Organisational climate and organisational culture

Some researchers debate the distinction between organisational climate and organisational culture. According to Denison (1996), during the early development of the culture perspective, the distinction between culture and climate was fairly clear. The main difference between climate and culture was that studying climate required quantitative methods and the hypothesis of generalising across social settings, while culture required qualitative research methods and an exploration of the exclusive aspects of individual social settings (Patterson et al., 2005). If researchers used field notes, stories, quotes and obtainable qualitative data to support their thoughts, then they were studying culture. If researchers used computer printouts and questionnaires

and obtainable quantitative analysis to support their thoughts, then they were studying climate (Denison, 1996).

According to Patterson et al. (2005) there is no doubt that climate and culture are comparable concepts, since both describe employees' experience of their organisations. Litwin and Stringer (1968) describe the variables measured by the Organisational Climate Questionnaire as assessing the shared values and beliefs of organisational members that comprise the perceived work environment; shared values and beliefs are frequently included as central elements in definitions of organisational culture.

Organisational climate, according to Reichers and Schneider (1990, p. 431), refers to the *"*shared perceptions of organizational policies, practices, and procedures, both formal and informal*"*. Culture, on the other hand, is defined as "a set of cognitions shared by members of a social unit that produces norms of behaviour and establishes an organisational way of life*"* (Shadur, Kienzle, & Rodwell, 1999, p. 480). Even though climate and culture are comparable concepts, culture differs in that it refers to the deeper, unconsciously held suppositions that help to direct organisational members (Reichers & Schneider, 1990).

Climate can best be described as an expression of culture, and climate and culture studies appear to be addressing common phenomena (Denison, 1996). It is essential, however, that climate be seen as an individual construct that reproduce orientations based on personal values (Shadur et al., 1999).

Culture, on the other hand, is a shared phenomenon within a group or society and, due to its entrenched nature, is difficult to measure (Schein, 1985). Schein perceived climate in this context to be a surface-level indicator of culture. Organisational culture is assumed to be one of the supreme theoretical levers required for understanding organisations. Confirming and using such theories simply requires comparing the cultures of different organisations, which in turn entails identifying common dimensions

for evaluating organisational culture. Qualitative approaches used in preliminary research on organisational culture review culture along sole dimensions, reflecting the central view of the organisation's members (Delobbe, Haccoun, & Vandenberghe, n.d.).

It is very clear that there is confusion regarding these two concepts, and that researchers experience conflicts in the literature of climate and culture. Nevertheless, most researchers conclude that deciding on your method of analysis will determine which concept to use.

2.4 The dimensions of organisational climate

A preliminary assumption of theory and investigation in the area of organisational climate was that social environments could be characterised by a restricted number of dimensions (Patterson et al., 2005). Nevertheless, over the years the number of climate dimensions recognised as targets of assessment has increased, leading to perplexity and slow theoretical progress (Patterson et al., 2005). Reichers and Schneider (1990) propose that the dimensions of organisational climate will vary depending on the purpose of the exploration and the criteria of interest and those general measures of organisational climate will include dimensions that are not applicable to each specific study. Patterson et al. (2005) developed a multidimensional measure of climate namely the Organisational Climate Measure (OCM). A multidimensional global approach can emphasise subcultures and identify the effects of exacting dimensions on specific outcome measures, such as organisational productivity or innovation, and will give an overall snapshot of organisational functioning (Ashkanasy, Wilderom, & Peterson, 2000).

The OCM developed and validated by Patterson and colleagues contains the following dimensions, as displayed in Figure 2.1.

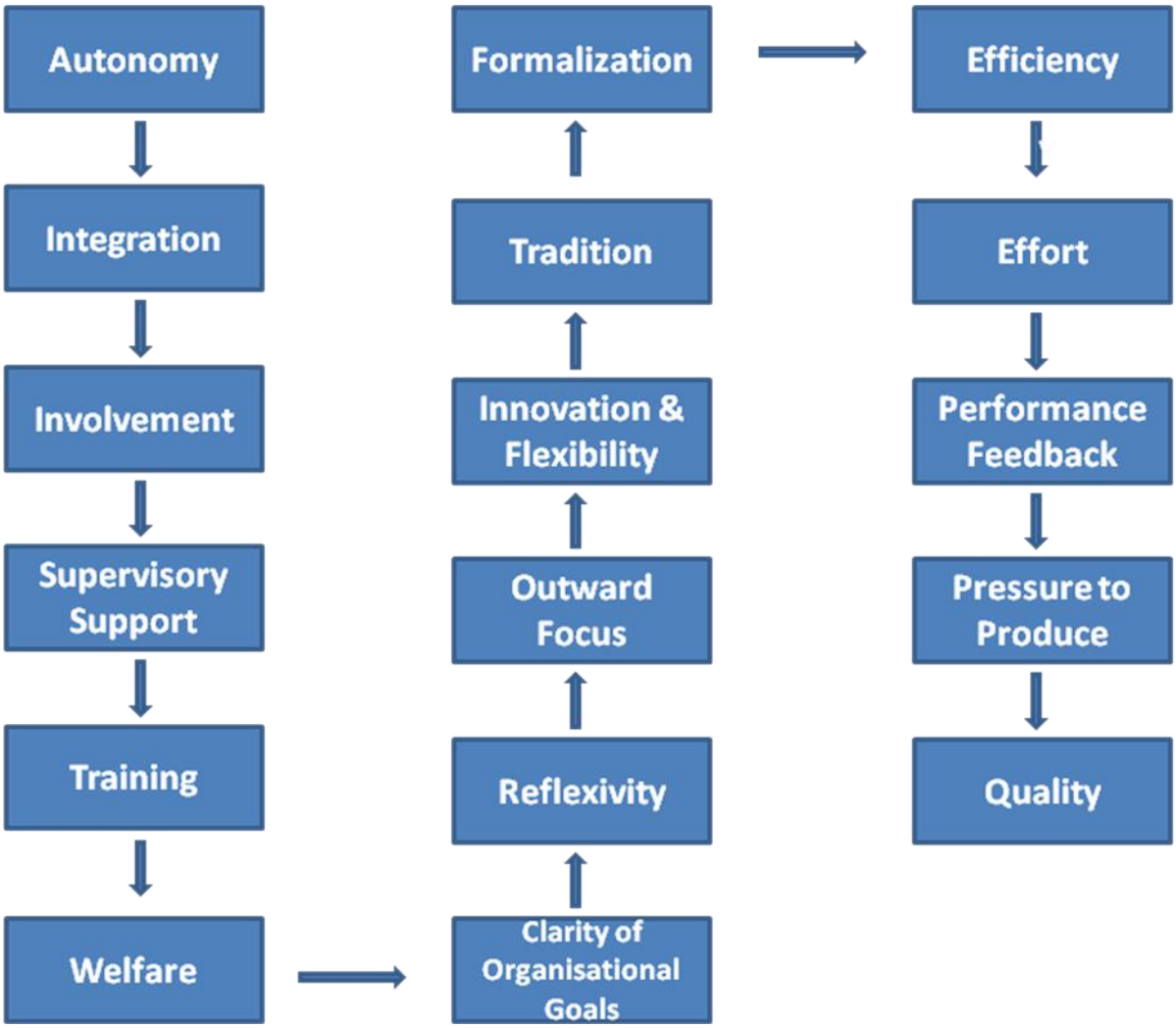

Figure 2.1: Dimensions of the OCM

Each one of these dimensions will be described in more detail as follows:

- **Autonomy**: Autonomy connotes an inner endorsement of one's actions, the sense that they emanate from oneself and are one's own. This dimension entails organisations' encouraging employees to make their own choices, and designing jobs in ways which give employees wide scope to enact work (Deci & Ryan, 1987).

- **Integration**: This is defined as a system of interrelated behaviours of people who are performing a task that has been differentiated into several distinct subsystems, each subsystem performing a portion of the task. Thus this dimension implies interdepartmental trust and cooperation, collective goals, mutual respect and teamwork between departments (Lawrence & Lorsch, 1967).

- **Involvement:** In employee involvement, positive changes in employee attitudes and behaviour are said to be realised through a process of involving employees in aspects of decision making that have been traditionally reserved for management (Leana, Ahlbrandt, & Murrell, 1992). Thus this can be seen as the extent to which employees participate in the processes of an organisation such as decision making.

- **Supervisory Support:** Organisational support theory (Eisenberger, Cummings, Armeli, & Lynch, 1997) supports the idea that to determine the organisation's readiness to reward increased work effort, employees develop general beliefs about how much the organisation values their contributions and cares about their well-being. Thus this dimension measures the extent to which employees experience support and understanding from their immediate supervisor.

- **Training:** Specific training tends to be on the job and presumably increases future productivity for an individual's employing firm. Training allows employees to transfer newly acquired skills to various jobs (Gattiker, 1995).

- **Welfare:** Wages and salary provided by the company to its employees can be seen as a way to reduce economic insecurity.

- **Formalisation:** Formalisation denotes the extent to which rules; procedures, instructions, and communications are written (Pugh, Hickson, Hinings, &

Turner, 1968). Thus this dimension details the organisational concern with formal rules and procedures.

- **Tradition:** This refers to the extent to which established ways of doing things are valued.

- **Innovation & Flexibility:** This is the extent of encouragement and support for new ideas and innovative approaches, as well as the orientation towards change and the adoption of an idea or behaviour that is new to the organisation (Hage, 1999). A high degree of emphasis on innovativeness tends to be linked with a higher level of customer orientation, because the commitment to innovation will force a firm to become externally focused, and thus more customer oriented (Appiah-Adu & Singh, 1998).

- **Outward Focus:** An outward focus will provide the business with the ability to identify more prospects in the marketplace than those of its competitors that are characterised by low levels of customer orientation and an internal focus (Appiah-Adu & Singh, 1998). Thus this dimension can be seen as the extent to which the organisation is responsive to the needs of the customer and the marketplace in general.

- **Reflexivity:** Team reflexivity is the extent to which team members collectively reflect upon the team's objectives, strategies and processes, as well as their wider organisations and environments, and adapt them accordingly (West, 1996). Team reflexivity will also predict group innovation and effectiveness (West, 2000).

- **Clarity of organisational goals:** Employees need to work on assignments with a clear understanding of what they are supposed to be doing and what the exact goal is. Therefore this reflects a concern with clearly defining the goals of the organisation (Allen & Meyer, 1990).

- **Efficiency:** Efficiency refers to an input-output ratio or comparison (Ostroff & Schmitt, 1993). Thus it denotes the degree of importance placed on employee efficiency and productivity at work.

- **Effort:** This can be seen as the amount of energy put into behaviour (Mohr & Bitner, 1995), and thus how hard people in organisations work towards achieving goals.

- **Performance feedback:** This is information about appropriateness of past performance, thus the measure of feedback on job performance. Feedback about the effectiveness of an individual's behaviour has long been recognised as essential for learning and for motivation in performance-oriented organisations (Ilgen, Fisher, & Taylor, 1979).

- **Pressure to produce:** The extent of pressure for employees to meet targets.

- **Quality:** The emphasis given to quality procedures.

2.5 The effects/outcomes of organisational climate

In recent years, climate studies have become increasingly more popular as tools for organisational analysis and change, because employee perceptions of climate have been found to be related to important individual and organisational outcomes (Parker et al., 2003). These studies have constantly shown that distinctive group-level climates appear within individual organisations, influencing outcome criteria such as safety behaviour, innovation-creativity, and service quality (Zohar & Luria, 2005). *"*Climate perceptions therefore serve an adaptive function, by providing information for behaviour-outcome expectancies such as the probable consequences of working safely or fast*"* (Zohar & Luria, 2005, p. 617). Because such studies frequently involve evaluations of organisations that employ similar and equal outcome measures, they

may provide a clearer depiction of the ways in which HR practices generate value for the organisation (Rogg, Schmidt, Shull, & Schmitt, 2001).

Studies of organisational climate compare climate with different outcomes such as satisfaction, job performance, commitment, tenure, productivity and safety and security. These outcomes can be divided into short-term and long-term outcomes. Short-term or immediate outcomes manipulate expectancies more than long-term outcomes, whose effect will take place weeks or months later (Zohar & Luria, 2005).

Schneider, Salvaggio, and Subirats (2002) hypothesise that climate strength moderates the relationship between climate perceptions and organisational outcomes. Some support was found for the specific hypothesis that climate strength moderated the relationship between managerial practices regarding service climate and customer experiences (Schneider et al., 2002). The present results, revealing both predictive and concurrent relationships for the moderator construct, suggest that additional research on this construct might prove useful (Schneider et al., 2002).

Schneider et al. (2002) also state that one cannot generalise results of climate strength to other contexts and against other organisational outcomes. For example, one cannot forecast that sales units and production teams with high climate strength will show better productivity, because that would be treating climate strength as the core effect (Schneider et al., 2002). In the culture literature, culture strength has not been found to be a core effect for organisational performance (Wilderom et al., 2000), and there is no reason to expect that organisational climate would be any different. Nevertheless, it is rational to hypothesise that sales unit and production team results will be more predictable when they have high climate strength.

Findings of Glisson and Hemmelgarn (1998) show that organisational climate (including low conflict, cooperation, role clarity and personalisation) is the main predictor of constructive service outcomes and a considerable predictor of service quality. In contrast, inter-organisational harmonisation had a negative effect on service quality and

no effect on outcome (Glisson & Hemmelgarn, 1998). A study done by Neal, Griffin, and Hart (2000) on the effects of general organisational climate on safety climate and safety performance proposes that a specific climate for safety is “more powerfully” related to safety performance than the universal climate of the organisation. As a result the findings encourage a focus on exact forms of organisational climate when precise organisational outcomes, such as safety, are of interest (Neal et al., 2000).

Several studies were done (e.g., Rogg et al., 2001; Zohar & Luria, 2005; Neal et al., 2000) in which individuals were allocated to climates on the grounds of the similarity of individuals’ climate profiles. These illustrated that climates measured in this way were considerably related to outcomes such as performance and satisfaction. One should note that this approach to the dimension of climates defines climate as agreement within a group, and does not illustrate that shared perceptions occur out of interaction prototypes among group members (Schneider & Reichers, 1983). A study done by Rogg et al. (2001) confirms the assumption that human resource practices influence organisational climate, which in turn influences customer satisfaction indexes. “Our results obviously apply to only one set of organisational outcomes, though a very important set for these organisations” (Rogg et al., 2001, p. 439). It ought to be useful to consider in more detail which of the numerous HR practices lead the way to specific climate dimensions and/or service outcomes.

Researchers conclude that although climate is linked to organisational outcomes, it only predicts outcome levels and could not be seen as a core reason for the success or failure of an organisation. It is essential to remember that a data set created to specifically test the suggestion that climate strength provides moderate climate-outcome relationships would necessitate the design of a measure of climate that exploits the potential for within-group variability (Schneider et al., 2002).

2.6 Existing measures of organisational climate

The lack of a theoretical foundation for many climate instruments has resulted in much of the variation in climate magnitudes employed in different measures (Patterson et al., 2005). Wilderom et al. (2000) state that different features of climate have emerged as imperative in various studies. This diverse pattern of outcomes is likely to be due, in part, to the selection of diverse methods of assessment of climate in these studies. The difficulty in drawing obvious research conclusions because of a lack of theory, and the resultant inconsistent operationalisation of organisational climate, is compounded by the fact that most climate instruments have not been validated. “With the exception of some domain-specific climates such as Schneider’s service climate (Schneider et al., 2002), there are few measures with demonstrated reliability and validity” (Patterson et al., 2005, p. 383).

The Organisational Climate Questionnaire (OCQ) developed by Litwin and Stringer (1968) is one of the best-known universal measures of organisational climate. It comprises 50 items that assess nine scopes of climate. Some researchers have reported that the existing nine scales showed poor split-half reliabilities and suggest that a six-factor structure would be more appropriate. An analysis by Rogers, Miles, and Biggs (1980) showed that most studies had found six factors and that there was almost no agreement among researchers concerning which items loaded best on the different factors. They concluded that the OCQ lacked validity and was not a reliable measurement tool. Olckers et al. (2007) indicated that only four factors could be extracted. They also concluded that the OCQ is not a very effective questionnaire to use, although it was tested in a South-African context.

These measurement problems are not new in this field of research and they encouraged the development of the climate measures. Several culture questionnaires have been published over the last 25 years, but they can also be seen as an assessment of climate, as they target the surface manifestations of fundamental cultural assumptions (Schein, 1985). Once again, these instruments suffer from some problems, including few or no confirmatory studies, small sample sizes used for their development

(Patterson et al., 2005), little validity information and a lack of theoretical basis (Ashkanasy et al., 2000).

A further methodological flaw of climate research is the unclear or poorly specified descriptive level of items in several climate measures (Patterson et al., 2005). Researchers should ensure that each climate item focuses on the specific communal unit which corresponds to the climate being studied (team, department, or organisation). Schneider and Reichers (1983) state that climate research respondents have not been instructed to focus on a specific organisational unit, but rather to descriptions relating to their work environments. This vagueness can lead to individuals unfolding perceptions of different parts of the organisation, some assuming the survey asks them to describe their department and others assuming the referent is the organisation (Rousseau, 1988).

Thus the type of respondent included in a study of organisational climate can become a related issue of concern. Although explorations often focus only on managerial employees, it is vital that researchers examine all kinds of organisational members, representative of all the various departmental or professional entities (Denison, 2001). Thus researchers should see organisational climate as a characteristic of the entire organisation. Undoubtedly, researchers need measures of organisational climate that evaluate the understanding of employees throughout the workforce. “The content and wording of such measures should therefore be relevant and comprehensible to all organisational members” (Patterson et al., 2005, p. 383).

Patterson et al. (2005:383) describe the OCM as “designed to be theoretically grounded, to explicitly and consistently specify the appropriate frame of reference, and to be applicable across a range of work settings and to target all employee levels”. Thus this global, multidimensional measure of organisational climate planned to address the methodological and conceptual issues summarised above. They found a very good internal reliability of the scales and their study succeeded in discriminating between organisations, as the agreement between raters (employees) within organisations was

high. The fact that the measure does successfully discriminate between organisations is vital, since it proposes that variations in climate can reliably be replicated in the data gathered using this instrument (Patterson et al., 2005). In this study the OCM will be used to determine the construct validity of the OCM in a Belgian context.

2.7 The competing values model

The organisational climate measure was developed to assess the organisational level of climate in an organisation. Patterson et al. (2005) chose the competing values model as their theoretical framework in order to clearly anchor the measure at the organisational level. The Competing Values Model was developed in a series of articles by Quinn and colleagues (e.g., Quinn & Rohrbaugh, 1981, 1983; Quinn & McGrath, 1985).

The framework's focus is on the competing strains and conflicts natural in any human system: main emphasis is placed on the conflict between constancy and change, and the conflict between the internal organisational and the external environment. By focusing on the natural strains of organisational existence, the model allows for the conceptualisation of both inconsistent and linear occurrence, and the psychoanalysis of both transformation and equilibrium (Quinn & Spreitzer, 1991).

Quinn and Spreitzer (1991) extended the framework to investigate organisational culture. They recommend that the value orientations intrinsic in the framework could be used to "explore the deep structures of organisational culture, the basic assumptions that are made about such things as the means to compliance, motives, leadership, decision making, effectiveness, values and organisational forms" (Quinn & Spreitzer, 1991:272). The framework ties together the political, interpersonal, strategic and institutional aspects of organisational existence by organising the diverse patterns of assumptions, shared values, and interpretations that classify an organisation's culture (Quinn & Spreitzer, 1991). Therefore this model, according to Patterson et al. (2005), provides a framework of values that underlie organisational climate, and the intention of

the model is to encapsulate into one framework the major approaches to organisational values and effectiveness over the last 100 years (Patterson et al., 2005).

The framework's four quadrants portray four broad domains of valued results and associated managerial philosophies about the resources through which these results may be achieved. It promotes awareness of how opposing values exist in organisations and how individual organisations can embrace diverse mixtures of values that vary in their desired ends and in the means to reach them (Patterson et al., 2005). The crucial point is that an organisation's philosophy and culture will influence decision making and achievement in that organisation, and therefore will play a significant role in the growth of its climate (Patterson et al., 2005).

The framework involves two axes: the vertical axis relates to organisational structure and the horizontal axis relates to organisational focus. The two axes create four quadrants, and each quadrant represents one of the four models of organisational effectiveness (Patterson et al., 2005). The four quadrants are as follows:

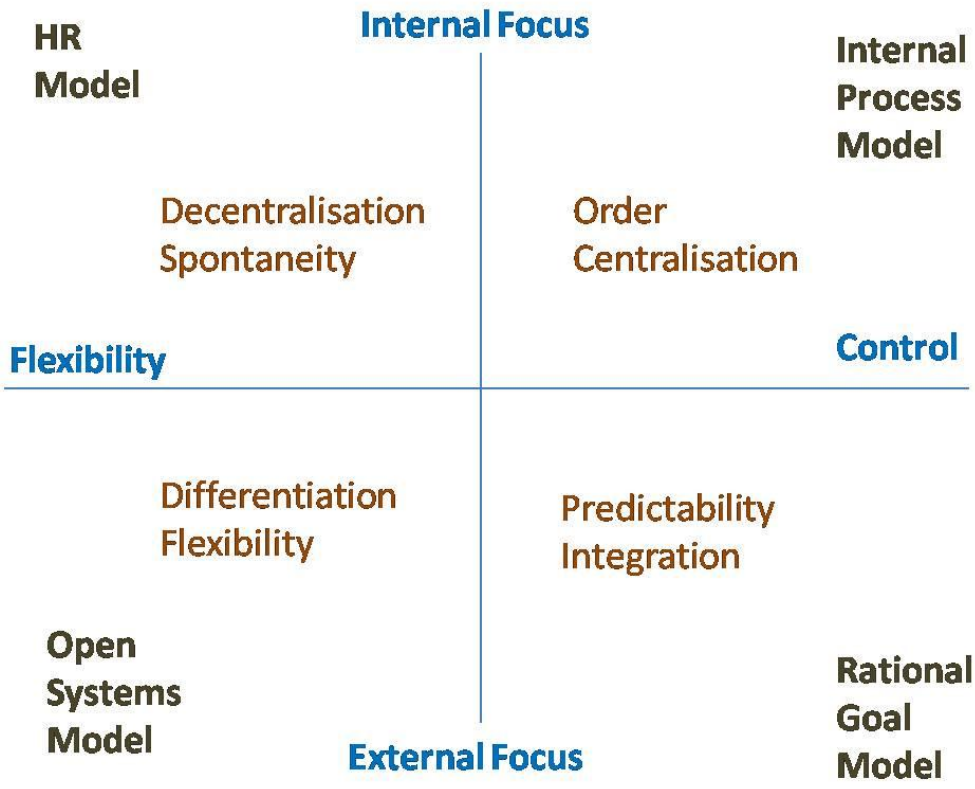

Figure 2.2: Four quadrants of the competing values model

Each one of the quadrants will be described in more detail as follows:

- **The human relations approach:** This approach emphasises the well-being, growth and commitment of the community of workers within an organisation.

- **The internal process approach:** This reflects a concern with formalisation and internal control of the system in order to use resources efficiently.

- **The open systems approach:** Emphasises the interaction with and adaptation of the organisation to its environment.

- **The rational goal approach:** Reflects a rational economic model of organisational functioning in which the emphasis is upon productivity and goal achievement.

It can be said that the competing values framework has three major characteristics: first, it integrates four different perspectives into a single framework; second, it illustrates how contrasting values can coexist in the organisation; third, it makes obvious the conflicting but interrelated values of organisational existence (Yang & Shao, 1996). It is essential, however, to recognise that the model does not suggest that organisations can be situated primarily in one quadrant but, reflecting the loaded mix of competing outlooks and perspectives in organisations, recommends that organisations will be active in, and give emphasis to, each area, but with reverse strengths (Patterson et al., 2005).

2.8 Chapter summary

This chapter conceptualised organisational climate and culture within the organisational work frame. It discussed the effects and outcomes of organisational climate and the existing measures of organisational climate. Chapter 3 contains a detailed discussion of the research design and methodology for the present study, as well as the statistical analyses that were employed and concludes with a discussion of the ethical considerations pertaining to an empirical research study.

CHAPTER 3
RESEARCH DESIGN AND METHODS

3.1 Introduction

The Organisational Climate Measure has been developed and tested in the United Kingdom (Patterson et al., 2005). Companies in Belgium want to explore organisational perceptions and thoughts, as they believe this might have an influence on the motivation and encouragement of employees. Therefore the current methodology is aimed at addressing the gap of existing research on the OCM in a Belgian context.

This chapter will involve a discussion of the choice of the appropriate research strategy and design utilised in the present study. The implications of the chosen research design for reliability and validity are presented. For the purpose of this research, a customised questionnaire devised by Patterson and colleagues (2005) was used. A well-planned sample selection procedure is then discussed, including the appropriateness of the sample for the research. The chapter will expand on the method for capturing, computerising and analysing the data obtained from the sample, and the statistical analysis processes employed.

3.2 Research strategy and design

The concept behind the research in question is the construct validation of the OCM in a Belgian context. The construct validity of any questionnaire could be determined in a variety of ways, and forms part of quantitative research. The method through which this concept was explored is known as the research strategy and design.

In the case of this research a non-experimental, quantitative, cross-sectional survey design was used. According to Ruane (2005), this type of design obtains information from a single group of respondents at a single time without any attempt to follow up. Cross-sectional research is thus a reasonable strategy for pursuing many descriptive and exploratory research projects. In performing the cross-sectional study, the researcher asked a broad cross-section of people a sequence of questions in order to address construct equivalence between various constructs on the OCM. For determining construct validity of a measurement in a specific country, this is the best method to utilise, because the researcher would not have to consider the effects of deliberations linked with longitudinal designs.

Furthermore, as researchers had developed the OCM electronically, the survey could be conducted by distributing electronic questionnaires to various individuals in the manufacturing business. The researcher obtained a database of individuals at different manufacturing companies in Belgium. Those individuals who were available and willing and were currently employed in the manufacturing business in Belgium then had the chance of participating in this research study. The rationale for distributing the electronic questionnaire via an email database is simply because it is convenient and expedient, with the likelihood of a suitable response rate. The data obtained was then analysed, interpreted and made known, with the objective of validating the constructs of the OCM in the Belgian workplace.

3.3 Considerations for utilising the research approach

The method utilised in this study is a quantitative research approach, with data being gathered through the distribution of electronic questionnaires (Ruane, 2005). The accumulated data was then analysed with the aim of discovering general statistical patterns, using descriptive statistics, item analysis and both exploratory and confirmatory factor analysis. The rationale for choosing a quantitative approach is simply that construct validation of a measurement should be calculated through

empirical analysis. The OCM was developed from a theoretical base; the Competing Values model referred to above (Patterson et al., 2005), in the form of a questionnaire.

3.4 Population and sample

Duke and Mallette (2004) describe the population parameter as a value or term which describes the population under study. The population from which the sampling frame was chosen consisted of various workers employed within Belgian organisations whose core business was manufacturing and engineering. A minimum of 1000 individuals were asked to participate in this research; however only 301 completed the electronic questionnaire. The sampling technique utilised in this study is discussed in more depth below. According to Duke and Mallette (2004), the size of one's sample is an essential consideration when planning one's research, as it has vital implications for statistical analysis of the results generated from respondents. The sample size used in this study is sufficient for descriptive and exploratory research; however, it may have implications for the construct validity of a questionnaire consisting of 82 items. Hair, Anderson, Tatham, and Black (1992) explain that the total number of items in a questionnaire should be multiplied by five in order to have a reliable sample size.

3.4.1 Unit of analysis

The unit of analysis for this study is the individual employee currently employed within different Belgian manufacturing sectors. The original intended scope of the research was to focus on one organisation specifically; however, on commencing the research process the researcher decided to use more organisations with manufacturing as the main core of the business.

The population from which the sampling frame was chosen consists of various Belgian workers (Dutch speaking), employed within different organisations in Belgium whose

core business is the manufacturing sector. From there, individuals, or more specifically employees, from the manufacturing sector of Belgium were asked for their participation.

3.4.2 Sampling technique

Non-probability purposive sampling was chosen for the proposed study, more specifically heterogeneity sampling (Ruane, 2005). One samples for heterogeneity when one wants to include all perspectives or views, in this case the researcher is not concerned with representing these views proportionately. Another term for this is sampling for *diversity* (Garson, 2006). In many nominal group processes, we would use some form of heterogeneity sampling because our primary interest is in getting a broad spectrum of thoughts, not identifying the "average" or "modal instance" ones. In order to get all of the ideas, and especially the "outlier" or unusual ones, we have to include a broad and diverse range of participants. Heterogeneity sampling is, in this sense, approximately the opposite of modal instance sampling. Although the individuals were selected randomly from the population of the manufacturing businesses in Belgium (probability sampling), the names came from another company's database of individuals in the manufacturing sector, and thus this should be termed non-probability sampling. In other words, if an individual was not listed at the company in question's database he or she did not get the chance of participating.

3.4.3 Sampling procedure

The population under study is theoretically all employees currently employed in a Belgian organisation which deals primarily with the manufacturing sector. The sampling frame available to the researcher, as already mentioned, is employees' of manufacturing firms in Belgium. The sample size was 301 employees across different organisations. As mentioned above, according to Hair et al. (1992), when determining construct validation of a measurement, it is important to multiply the items of the measurement by five, in order to get a representative response rate. The OMC consists

of 17 scales with 82 items, thus a sample size of 301 employees was not totally adequate for the purpose of construct validity.

Use was made of the OCM as an electronic self-report questionnaire, which incorporated the desired constructs for measuring organisational climate in the workplace. The questionnaire was distributed electronically to the participants, measuring the organisational climate with the aim of determining the construct validity of the OCM in a Belgian context. Consent was obtained and all participants indicated that they agreed to participate, by clicking “Yes, I agree” on the electronic version of the OCM prior to the questions asked. If a participant clicked on the “No, I do not agree” button, he would not have been be able to complete or submit his questionnaire. Furthermore, an information sheet accompanied the questionnaire that explained the ethical issues of the proposed study.

An electronic version of the OCM was e-mailed to each participant. A specific time frame for responses was given to participants and the researcher had access to their answers automatically through a computer program. Thereafter, the researcher personally followed up with participants concerning the submission of their responses. Participants were not required to provide any identifying details about themselves (names, contact details and so on). This ensured that anonymity was maintained and reduced any anxiety on the part of participants. Biographical data was obtained by means of a categorical response format, with participants being able to choose only one answer for variables pertaining to: nationality, language and gender. The other section of the questionnaire consisted of items that participants had to respond to on a numerical four-point scale.

The benefits of this method of data collection procedure include:

- Quality of answers is improved.
- There should be an acceptable response rate.

- Time taken for data collection is minimised.
- Anonymity can be ensured, and thus more honest responses are generated.
- Bias due to personal characteristics of the interviewer is reduced.

This method was chosen as it ensured that enough respondents existed to carry out statistical analysis of data and hopefully further ensure that the sample was representative of the population being measured. The expected sample population for the manufacturing sector companies was roughly 430 employees, with approximately 1000 individuals being contacted to partake in the research. Four hundred and thirty respondents would have been sufficient for the construct validation of the OCM, but due to the low response rate of electronic surveys, only 301 employees participated. While 301 respondents are not perfectly ideal for the purposes of this study, the electronic questionnaire was is the best method available in view of the constraints of time, expertise and resources at the researcher's disposal.

Detailed information about the demographic characteristics of the sample is presented in Table 3.1.

Table 3.1: Demographic information of the respondents

Variable	Category	Frequency	Percentage	Cumulative percentage
Gender	Male	235	78.07	78.07
	Female	66	21.93	100
	Total	301		
Nationality	Belgian	301		100
Language	Dutch	301		100

3.4.4 Information letter

To ensure that participants in the proposed study were able to make an informed decision as to whether or not they wished to participate in the proposed study, it was important that an information letter be available. Therefore an information letter was constructed with the aim of providing the respondents with adequate background information on the proposed study and the reason thereof. A copy of this letter is provided in Appendix B.

3.4.5 Letter of consent

Together with the information letter, it is essential that each participant in the proposed study sign a letter of consent. The electronic questionnaire has an option to select or not. Participants who agree to participation simply select the “Yes, I agree” button at the top of the questionnaire. A copy of this letter is provided in Appendix C. An informed consent letter forms part of the ethical considerations when conducting a research study, as will be explained in more detail in the ethics part of this study.

3.5 Questionnaire construction and design

The present research study adopted a survey research approach and as such the theory behind survey research and the design of a survey or questionnaire is relevant at this point. Baker and Siryk (1986) state that there are four possible options available to a survey researcher with regard to the construction of items in the questionnaire. These options include the utilisation of open-ended or closed questions, contingency questions or matrix questions. The first two possibilities are the ones which are most generally used. Matrix questions are more complex and involve allowing respondents in a research study to answer questions or items with another set of questions, typically using a Likert-type ordinal scale and making only one response on this scale per question (Baker & Siryk, 1986).

It is not uncommon to find questionnaires with a combination of these four options, as open-ended responses in particular allow for greater depth of information about a particular topic to be gathered. The disadvantage behind open-ended items is the amount of time and effort taken to code the responses made by research respondents, as well as the amount of extra time it will actually take the participant to make the responses.

3.5.1 Measurement instrument

The OCM was developed and validated by Patterson and colleagues (2005). Patterson el al. used the theoretical framework of the Competing Values model developed by Quinn and colleagues (e.g., Quinn & Rohrbaugh, 1981, 1983; Quinn & McGrath, 1985) for the development of the OCM. “In choosing a framework we were mindful of the need to clearly anchor the measure at the organisational level” (Patterson et al., 2005, p. 384). The measure assesses an extensive group of organisational, rather than psychological, variables. It also constitutes the organisational context for individual events and thus enables relative constructs of organisational climate (Patterson et al., 2005).

The framework’s four quadrants illustrate four broad areas of valued results and associated managerial beliefs about the means through which these results may be achieved. The purpose of the model is to summarise in one framework the main approaches to organisational morale and efficiency over the last century.

The four quadrants are:

- Human Relations Approach: This focuses on flexibility in relation to the environment (Internal focus).
- The Internal Process Approach: This focuses on the tightness of control within the organisation (Internal focus).
- The Open System Approach: This focuses on the flexibility of relationships with the environment (External focus).

- The Rational Goal Approach: This focuses on the tightness of control within the organisation (External focus).

Scopes were generated within domains to ascertain that there was a sufficient sample of scopes identified within each of the four generally conceptualised domains. Patterson and colleagues developed subscales that reflected climate studies from 1960 to 2000 and that fitted into the competing values model with a moderately explicit location in one of the four quadrants (Patterson et al., 2005). Subscales that were developed are illustrated in Figure 3.1

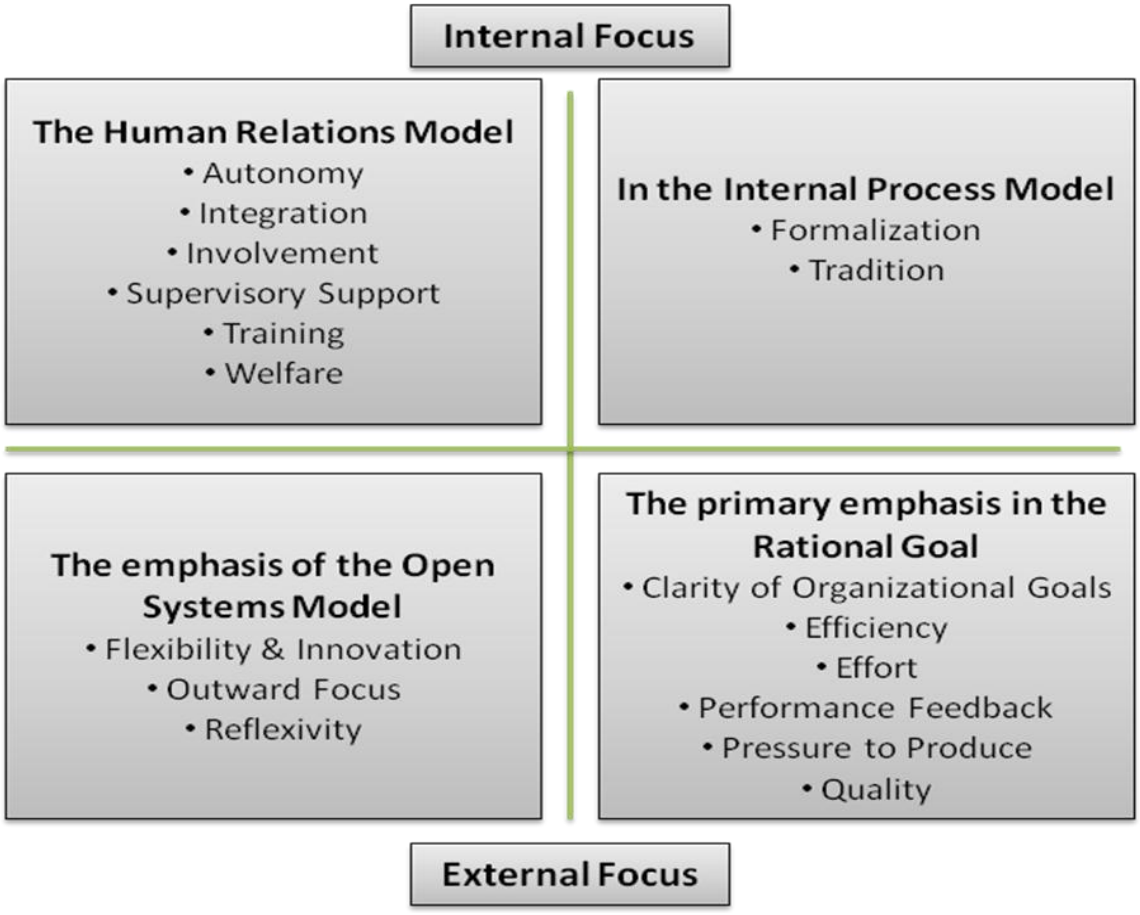

Figure 3.1: Subscales of the competing values model

3.5.2 Item generation

Patterson and colleagues developed 19 proposed dimensions of climate. Roughly 10 items per scale were generated to tap into each of the 19 dimensions of climate. In this study, item sets were abridged and customised during the piloting of the questionnaire. Scale items were also selected on the grounds of item differentiation and measurement breadth within scales by examining both semantic context and inter-item correlations. Substances from across all the scales were arranged at random, so that effects due to response set were diminished. The response format is a 4-point Likert scale of definitely false, mostly false, mostly true and definitely true. "Because the questionnaire was designed for use within all levels of the workforce, care was taken to use straightforward wording" (Patterson et al., 2005:387).

Patterson et al. (2005) examined regression weights for diminutive loadings in order to identify items that had inadequate co-variation with other items in a subscale. They addressed internal consistency and unidimensionality by calculating inter-item correlations and reliability coefficients (Cronbach's alpha). They removed items that was loading highly on other factors and came up with a new 17-scale model.

3.5.3 Scale of the OCM

The response scale for the various constructs assessed is a 4-point Likert scale, with respondents having to respond according to the extent that they agree or disagree with the statement made in each item. The numerical four point scale is as follows:

1 = Definitely False

2 = Mostly False

3 = Mostly True

4 = Definitely True

The logic behind utilisation of this scale for the OCM was that it would provide the most valuable results or information for the research in question (Patterson et al., 2005). A five point Likert-type scale was considered; however, it was felt that giving respondents an option to respond “unsure” or “uncertain” could provide many worthless responses (Patterson et al., 2005).

3.6 Reliability and validity of the OCM

As previously stated, the reliability of a measure refers to the constancy with which it measures whatever it measures (Foxcroft & Roodt, 2001) while the validity of a measure refers to whether or not the instrument measures what it is believed to measure (Pallant, 2005). The purpose of Patterson’s study was to develop and validate the OCM, therefore statistical analysis of the validity and reliability of the OCM was conducted in the pre-test stage. Nevertheless, the very nature of conducting questionnaire-based research presents some threats to validity and/or reliability. One of the most commonly used indicators of internal consistency is Cronbach’s alpha coefficient, preferably with a score of above 0.7.

3.6.1 Reliability of the OCM

Patterson et al. (2005) reported reasonably high internal consistency (using Cronbach’s alpha); for the final 17 scales, all alpha values were at or above 0.73. They also produced regression weights, and found that all critical ratios were significant, indicating that the latent factors explained significant sizes of variance in the scale items. Patterson and colleagues also performed a goodness-of-fit test in order to fit the item scales into the four quadrants of the competing values model. They used the Bentler-Bonnett normal fit index (NFI), the non-normal fit index (NNFI) and the comparative fit index (CFI). Their results fell short of the recognised level (above 0.9). Nevertheless, it

is broadly accepted that achieving high levels of fit with a large number of items is hard or even impossible (Floyd & Widaman, 1995).

Some authors specify that low reliability is usually established on scales with less than 10 items (Owen & Taljaard, 1996). However due to the large number of constructs to be assessed, it was decided that there would be at least five items per construct comprising the OCM (Patterson et al., 2005).

3.6.2 Validity of the OCM

There are different types of validity that are identified for research studies. Patterson and colleagues performed as many as possible, as this was the main aim of their study. To determine the discriminant validity of the OCM, analysis of variance was performed using all the scales with organisations as the independent variables. There were significant between-organisation differences on all scales. F-values ranged from 5.21 to 27.25 (df. = 53). Further, interviewers' ratings, which were made before the climate surveys were carried out, provided rich data for determining the concurrent validity of the climate dimensions. Most of the dimensions were significantly correlated with similar variables from management interviews, with scores ranging from ($r = 0.34$, $p < 0.05$ to $r = 0.55$, $p < 0.01$). Although some dimensions had negative correlations, the overall associations between the climate dimensions and intimately related management practices assessed by interviews with senior management showed good concurrent validity (Patterson et al., 2005). Patterson and colleagues also tested predictive validity approximately one year after the collection of climate data. They managed to prove significant correlations in controlled analysis with most of the aspects of organisational climate.

Both the reliability and validity of this questionnaire has been determined; however, the relevant statistical analyses on the instrument will be explained in the next chapter, along with analyses of responses obtained in the Belgian context. The entire OCM was analysed and the various constructs throughout the instruments explained by means of

Cronbach's alpha. The value of Cronbach's alpha is that it establishes the extent to which the OCM is reliable, with an alpha value of 0.7 being considered to be within the acceptable range for this kind of instrument, as it measures organisational rather than psychometric properties (Patterson et al., 2005). The main aim of this study is to determine the construct validity of the OCM in a Belgian context. Construct validity of a measure is the extent to which it measures the theoretical construct or trait it is supposed to measure (Foxcroft & Roodt, 2005). It is essential that when the researcher wants to evaluate the degree to which a certain construct believed to be reflected in the test is in fact present in the test (Owen & Taljaart, 1996). The researcher would thus determine the construct validity of the OCM in Belgium during the statistical analysis.

3.7 Statistical methods used in data processing

3.7.1 Introduction

Construct validity of a questionnaire can be determined in a variety of ways. Researchers can look for the correlation between the test they are developing and some established test that has already been shown to possess construct validity (Bagozzi, Yi, & Phillips, 1991). Another way is to show that the scores on the newly designed test will differ between groups of people with and without certain traits or characteristics. The researcher can also analyse the task requirements of the items and determine whether these requirements are consistent with the theory underlying the development of the test (Bagozzi et al., 1991). Regardless of how construct validity is defined, there is no particular best way to study it. In most cases construct validity ought to be established from a number of perspectives. Consequently, the more approaches used to reveal the validity of a test, the more confidence researchers have in the construct validity of that test, provided the evidence presented by those approaches is convincing (Ruane, 2005). Construct validity of a test should therefore be demonstrated by an accretion of evidence. Taking the combined definition of construct validity, the researcher could demonstrate this by making use of content analysis, correlation

coefficients, and factor analysis demonstrating differences between differential groups (Ruane, 2005).

The responses of the participants on the OCM were electronically captured and put onto a database which formed the body of information to be analysed by statistical means. The statistical programs SPSS and SAS were used to conduct the analyses required for construct validation of a measurement. It has already been stated that the research design is that of an exploratory and descriptive approach, therefore the analysis of the main research questions is linked with the objective of the proposed study.

The main research question for this research study is: Can the OCM be used to test organisational climate in a Belgium context, more specifically the construct validity of the OCM in a Belgian context? This includes: What are the reliability coefficients of the 17 constructs of the OCM? Do the items discriminate between each other? Is the pattern of variance and covariance in the data consistent with the postulated theoretical model?

Descriptive statistics were performed on the OCM, including means and standard deviations followed by Cronbach's alpha coefficient for ascertaining the reliability, and then internal reliability was determined for the item analysis. This was followed by exploratory factor analysis to distinguish how many factors should be extracted, and finally confirmatory factor analysis was done to conclude whether the number of factors and the loadings of measured variables on them matched what was expected on the basis of pre-established theory. Each of these statistical tools will be discussed below.

3.7.2 Descriptive statistics

Data can be planned and obtained through the presentation of summaries thereof; the central part of which are otherwise known as descriptive statistics (Ruane, 2005). Descriptive statistics are used to describe variables and therefore they were utilised in analysis of this study. According to Pallant (2005), they allow a researcher to answer

specific research questions, and to describe their sample. It is appropriate to use descriptive statistics for the determination of construct validity of an instrument, therefore an exploratory and descriptive research study. Descriptive statistics are used to describe variables; they basically provide a picture of the characteristics of the research respondents. Therefore they were utilised in analysis and presentation of biographical data in the present study.

Descriptive techniques involve the presentation of such information through the use of percentage, means, medians, modes, standard deviations, frequency and normality distributions and the standard error of the mean (Ruane, 2005). In this study, descriptive statistics are used to provide the reader with summary statistics. Summary statistics serve two purposes: they describe the data with one or two numbers which make it easier to compare, and also provide a basis for later analysis (Graziano & Raulin, 2000).

3.7.3 Item analysis (internal consistency)

In order to determine the characteristics of the items that are included in the constructs of the OCM questionnaire, item analysis was performed on each of the 17 scales. Item analysis also enables a researcher to determine the item-total correlations, item means and item variances. This information is calculated with an average across all test takers, providing the researcher with a single number that indicates how well each item for that specific scale corresponds with the scale being measured. It also shows how well the information this item gives the researcher, corresponds to the information for the rest of the items on the test.

The validity and reliability of the construct measures in the proposed study were evaluated with a reliability analysis where the Cronbach's alpha coefficients of the already recognised sub-constructs of the measures were used. Cronbach's alpha coefficients and inter-item correlations were used to assess the internal consistency and homogeneity of the measuring instruments. Coefficient alpha contains significant

information concerning the proportion of variance of the items of a scale in terms of the total variance clarified by the particular scale.

3.7.4 Exploratory Factor Analysis (EFA)

The first stage of factor analysis, when applied to concerns about construct validity, offers a systematic means of investigative interrelationships among items on a scale and can be seen as exploratory factor analysis (EFA) (Froman, 2001). These interrelationships are used to unveil the clusters of items that have enough common variation to defend their grouping as a factor. The factors, in line, are often interpreted as indicators of the latent constructs underlying responses to the instrument as a whole. The rationale therefore of using EFA in the process of investigating construct validity of a measurement instrument is to determine and describe the inconsistency of the observed variables relative to the underlying latent factors.

When using EFA, the researcher studies a sizeable group of variables, assuming that the pragmatic variables are connected by means of an underlying structure; yet the precise characteristics and features of the structure are not known to the researcher. With EFA, the researcher endeavours to expose and explain this structure. For instance, EFA assists in determining the number of factors that are present, the relationship between these factors, and how the variables and factors are linked. In EFA, several groupings and explanations are approximated by changing numbers of factors and different forms of rotation. Then the researcher reviews the different explanations and chooses the most appropriate explanation in terms of theory and a range of descriptive statistics. As suggested by the term, EFA is an exploratory statistical technique. After selecting a solution, the researcher can experimentally evaluate the correlation matrix generated from the factor model against the sample correlation matrix. EFA is usually performed using correlations that present the extent and level of linear relationships within scale-free components (Ullman, 2006b).

3.7.5 SEM Approach (Structural Equation Modelling)

The SEM Approach (Structural Equation modelling) was used in this study for the determination of model adequacy and validating of the measurement. SEM is generally used to model causal relationships among latent variables, but can easily be used to explore confirmatory factor analysis measurement models. To make the interpretation of factor analysis easier, significant loadings are underlined and highlighted.

Significance can then be measured in two ways. Firstly, practical significance is used to establish if the factor loadings are big enough for the factors to truly have a meaningful effect on the variables. Hair, Black, Babin, Anderson, and Tatham (2006) recommend the following guidelines for practical significance.

- +/- 0.3 Minimal
- +/- 0.4 More Important
- +/- 0.5 Practically Significant

Secondly, statistical significance should be determined. This means that the loadings should be statistically significantly different from zero. According to Hatcher (1994), at least three variables should load on each factor, and preferably more. Stevens (2002) reports the following rules on sample size for statistical significance and their approximate loadings as a general rule of thumb.

Table 3.2: Stevens' rules on sample size

n	50	100	200	300	600	1000
Loading	0.722	0.512	0.384	0.298	0.210	0.162

For the validation of the measurement model a Confirmatory Factor Analysis was employed. CFA aims to determine whether the number of factors and the loadings of measured (indicator) variables conform to what is expected on the basis of pre-established theory. CFA may be used to confirm that the indicators sort themselves into factors corresponding to how well the indicators have been linked to the latent variables (Garson, 2006).

The measurement model is estimated to determine whether the model being tested should be accepted or rejected using goodness-of-fit measures. The goal of estimation is to minimise the difference between the structured and unstructured estimated population covariance matrices. In EFA, the observed and reproduced correlation matrices are compared. This idea is extended in SEM to include a statistical test of the differences between the estimated structured and unstructured population covariance matrices. The SAS Proc Calis programme (Garson, 2006) was used for all the SEM procedures in this study, with Maximum Likelihood estimation, which is one of the most frequently used estimation method in SEM (Ullman, 2006b).

There is no agreement among researchers on how many fit indexes one should report (Garson, 2006). Jaccard and Wan (1996) recommend the use of at least three goodness-of-fit tests. Kline (1998) recommends at least four tests. McDonald and Ho (2002) believe that no global index of fit (together with a criterion for its acceptability) can substitute for a detailed examination of the discrepancies. Therefore, the most popular fit indexes have been selected to report on in this study. The following indexes of model fit were used: the non-normed fit index (NNFI) (Bentler & Bonnett, 1980), the normed fit index (NFI) (Bentler & Bonnett, 1980), the CFI (Bentler, 1990, 1995), the goodness of fit index (GFI) (Bollen, 1989) and the RMSEA. An NNFI close to 1 indicates a good fit. CFI values greater than 0.95 are often indicative of good fitting models (Hu & Bentler, 1999). The CFI is normed to the 0 to 1 range, and does a good job of estimating model fit even in small samples (Hu & Bentler, 1998, 1999). By convention, the IFI should be equal to or greater than 0.90 for the model to be accepted, but it can be greater than 1.0 for the model to be accepted. The RMSEA by convention indicates an acceptable fit if it is less than 0.08. Values of 0.06 or less indicate a close fitting model (Hu & Bentler, 1999). Values larger than 0.10 are indicative of poor fitting models (Browne & Cudeck, 1993).

Both exploratory and confirmatory factor analysis were conducted in this study. Exploratory factor analysis gives a multiple clarification of the common variance

underlying a correlation medium, while confirmatory factor analysis establishes whether the data is constant with hypothesised factor structure (Schaap & Basson, 2003). Items in numerous item scales should “load together” in factor analysis on a single factor or component (Patterson et al., 2005). Prior to analysing the data by means of factor analysis, the KMO (Kaiser-Meyer-Olkin) and Bartlett’s test of sphericity need to be done in order to measure the applicability of factor analysis. For factor analysis to carry on, the KMO should prove a result of $p > 0.5$ and the Bartlett’s test a result of $p = 0.000$. For the sample size, a general rule of thumb is that there should be at least 50 explanations and at least five times as many explanations as variables; thus 301 participants was not entirely sufficient for this specific research study.

For the determination of appropriate factors for the data for exploratory factor analysis, there should usually be a much smaller number of factors than variables. A number of variables must load on each factor before one can truly believe that the factor is meaningful. On the other hand, when performing confirmatory factor analysis, indicator variables are selected on the source of prior theory and then factor analysis will be used to see if they load as predicted on the expected number of factors. Researchers usually assume that each factor is connected with a particular subset of indicator variables. According to Kim and Mueller (1978), the number of factors in the model is predominantly hypothesised in advance, and this is seen as a minimum obligation of confirmatory factor analysis. In essence, a model is estimated for the data to obtain unidentified parameters, and fit statistics are used to assess model adequacy.

3.7.6 Factor extraction

There are several extraction methods in factor analysis to choose from. Usually principal component analysis is set as the default, because choosing from the extraction methods can be very confusing (Costello & Osborne, 2005). Generally, factor analysis should retain factors until additional factors report for insignificant variance; however, different methods of indicating the number of factors to retain frequently lead to different solutions (Hayton, Allen, & Scarpello, 2004). Factor extraction entails establishing the minimum

number of factors that need to be employed to most successfully characterise the interrelations between the groups of variables. There are a number of techniques that may be employed to help in deciding on the number of factors to keep. These include Kaiser's criterion, screen test, parallel analysis and Velicer's MAP test.

i Kaiser's criterion

The Kaiser criterion can be seen as one of the most frequently used methods of factor extraction, which retains factors with eigenvalues larger than one (Hayton et al., 2004). The level of the correlation matrix is equal to the negligible number of components that can report accurately for the off-diagonal correlations in the matrix (Hayton et al., 2004). Kaiser (1970) proposed that the reliability of a component must constantly be non-negative when its eigenvalue is greater than one.

ii Scree Test

The scree test examines the eigenvalues for breaks or discontinuities with means on a plot, and is also frequently used by researchers. "The rationale for this test is that a few major factors account for the most variance, resulting in a steep "cliff", as these factors are identified first, followed by a shallow "scree" describing the small and relatively consistent variance accounted for by the numerous minor factors" (Hayton et al., 2004, p. 54). The principle for retention is fairly straightforward in identifying the breakpoint at which the scree begins and retaining only factors that do not belong to the scree. The scree test may work well with high factors; however, it suffers from vagueness and subjectivity, mainly when there are either two or more apparent breaks or even no breaks. The scree test was used in this study as one of the methods for determining the number of factors to retain. The scree test together with the parallel analysis is recommended by O'Connor (2000) in order to get more information from both methods, and retain the correct number of factors.

iii Parallel analysis

Parallel analysis's challenge is to overcome a key limitation of the Kaiser's criterion, and therefore it regulates for the effect of sampling error (Hayton et al., 2004). Parallel analysis can therefore be seen as a sample-based substitute for the population-based Kaiser's criterion. Significant components from the real dataset with an applicable underlying factor structure should have higher eigenvalues than parallel components derived from the random dataset having the same sample size and number of variables. Therefore this technique, designed by Horn, involves evaluating the size of the eigenvalues against those calculated from a randomly generated data set of the same size (Horn, 1965). Only the eigenvalues that are higher than the corresponding values from the random data set are kept. The parallel analysis technique is used frequently and is more popular, predominantly in the field of social sciences (Choi, Fuqua, & Griffin, 2001; Stober, 1998) and has proved to be the most accurate.

iv Velicer's Map test

Velicer's (1976) minimum average partial (MAP) test entails a complete principal components analysis, along with the examination of a series of matrices of partial correlations (O'Connor, 2000). The MAP test involves two steps. In the first, the principal component is partialled out of the correlation between the relevant variables, and the average squared coefficient in the off-diagonals of the resulting partial correlation matrix is computed. In the second step, the first two principal components are partialled out of the original correlation matrix and the average squared partial correlation is once more computed. Other than in parallel analysis, the focus here is on the comparative amounts of systematic and unsystematic variance remaining in a correlation matrix after extractions of growing number of components, and not on the number of components that account for more variance than the components derived from random data (O'Connor, 2000). Statistically, components are retained as long as the variance in the correlation matrix signifies systematic variance, and are no longer retained when there is impartially more unsystematic variance than systematic variance (O'Connor, 2000).

In this study the researcher made use of the Kaiser Criterion method, the scree test, and the parallel analysis method, in order to retain and extract the appropriate amount of factors. According to Hayton et al. (2004), when doing a factor analytical study, a researcher should use as many possible extraction methods as possible, as different methods of indicating the number of factors to retain frequently lead to different solutions.

3.7.7 Rotation

After extraction, one must decide how many factors to retain for rotation. Both under-extraction and over-extraction of factors retained for rotation can have harmful effects on the results (Costello & Osborne, 2005). Rotation has one goal, which is to clarify and simplify the data structure, and cannot improve the essential aspects of the analysis, for example the amount of variance extracted. There are a variety of extraction methods, the varimax rotation being by far the most common choice. Ordinary available orthogonal rotation methods are the varimax, quartimax and equamax methods; however, direct oblimin, quartimin and promax are oblique rotation methods.

Oblique methods allow the factors to be correlated, while orthogonal rotations produce factors that are uncorrelated. The oblique rotation, oblimin, allows for determining the extent to which the factors are in fact intercorrelated; that is, the strength of the correlations. This statistical technique produces three main tables with results indicating correlations and factor loadings that need to be considered: Pattern Matrix, Structure Matrix and Component Correlations Matrix. The *Pattern Matrix* shows the details of the factor loadings of every one of the variables; the *Structure Matrix* provides information about the correlation between variables and factors; and the *Component Correlation Matrix* indicates the strength of the relationship between the two factors. This gives the researcher substantive evidence from which to conclude whether it is a rational and satisfactory assumption that the factors are uncorrelated.

According to Tabachnick and Fidell (2001), the solutions obtained from orthogonal rotation are more straightforward and easier to understand, which facilitates interpretation and reporting. However, they do oblige the researcher to presuppose independence of the underlying constructs, so that they are perceived as being uncorrelated. Employing the oblique approaches permits the factors to be correlated; nevertheless, these approaches are more complicated and confusing to understand, interpret and report on (Tabachnick & Fidell, 2001). Costello and Osborne (2005) suggest that this is a flawed argument, and that in the social sciences one usually expects some correlation among factors, as behaviour is hardly ever partitioned into tidily packaged components that function independently of one another. Therefore oblique rotation should theoretically provide a more precise and possibly more reproducible solution, while using orthogonal rotation results in a loss of important information if the factors are correlated (Costello & Osborne, 2005). If factors are in fact uncorrelated, both oblique and orthogonal rotation produce virtually identical results. The rotated factor matrix is interpreted after orthogonal rotation, and when using oblique rotation, the pattern matrix is inspected for item loadings and the factor correlation matrix reveals any correlation between the factors. Researchers agree that the output for oblique rotation is, however, slightly more complex to examine than the output of the orthogonal rotation. In the oblique rotation output, the pattern matrix is examined for item loadings, while in orthogonal rotation, the rotated factor matrix is interpreted.

Every rotation method attempts to allocate variance more equally between factors, frequently giving a more rational, interpretable structure (Sapsford, 2007). Varimax is the most frequently used rotation method, maximising the discrepancy explained by each factor. Direct oblimin is the most common method of oblique rotation when one needs a non-orthogonal (oblique) explanation; that is, one in which the factors are allowed to be correlated. Therefore a factor correlation matrix is generated when oblique rotation is demanded (Sapsford, 2007). Direct oblimin rotation will also result in higher eigenvalues, but reducing the interpretability of the factors.

The oblique method with a direct oblimin rotation was used to determine whether the obtained factors (which were specified) were significantly correlated ($r > 0.30$). Rotation will change the eigenvalues (and percentage of variance explained) or particular factors, and will change the factor loadings, but will not affect the sum of eigenvalues. Different rotations may describe the same variance but have different loadings; factor loadings are used to perceive the meaning of factors, and this means that different meanings may be attributed to the factors depending on the rotation. This is a problem that is often quoted as a drawback of factor analysis (Sapsford, 2007).

3.8 Application of criteria for reliability

In order to assess and determine the suitability of the proposed study's research design, it is important to consider issues of validity and reliability pertaining to the research design. The reliability of the instrument and therefore of the findings obtained by the research study were determined once all the data had been collected and analysed by means of the SPSS programme. Reliability for the purposes of the proposed study refers to the internal consistency of the instrument and therefore the degree of generalisability across the items within the instrument (Welman & Kruger, 2001). The reliabilities of the 17 constructs were determined using Cronbach's alpha coefficient through the SPSS programme.

3.9 Application of criteria for validity

3.9.1 Possible threats to internal validity not covered by chosen design

The degree to which variables may co-vary cannot be completely determined and this has implications for the internal validity of the study. Threats to internal validity for this research study are illustrated in Figure 3.2 below.

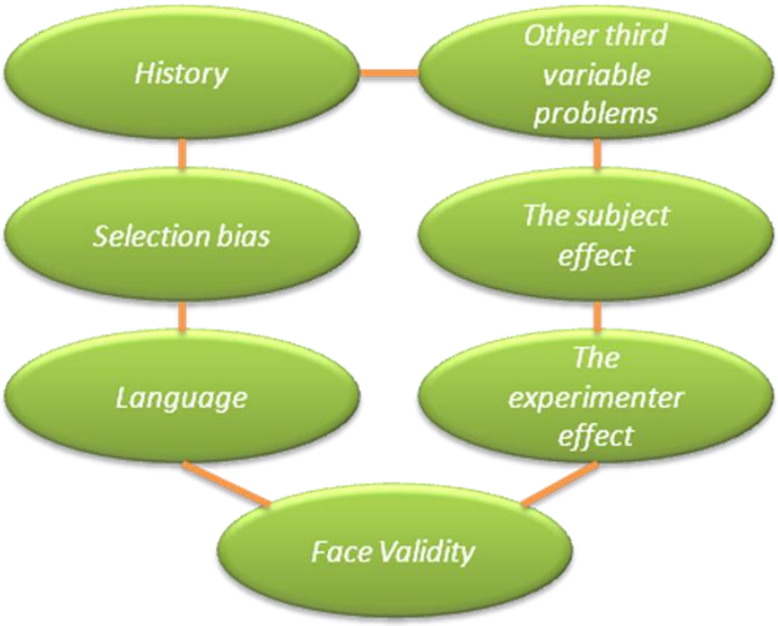

Figure 3.2: Threats to internal validity

History. Welman and Kruger (2001) point out that the events which take place concurrently with an intervention may affect the dependent variable. Consequently, changes in the dependent variable cannot be credited to the independent variable in question. This is particularly the case in the current study, in which participants could be influenced by uncontrolled variables. For example, the respondents might want to present themselves in a positive light or respond to the question in the way that they think the researcher would like them to answer.

Selection bias. The internal validity of the current study could be endangered by selection bias, as respondents were not selected completely at random. As such, individuals might have characteristics that are common in their business units/professions but might not arise across all categories of respondents. Therefore the researcher made an attempt to distribute the questionnaire to as many respondents as possible (Welman & Kruger, 2001) by emailing it to all employees (on the database of the organisation in question), currently employed in a manufacturing business.

Language. The effects of English on linguistic research in Belgium could hypothetically surface in various domains (Ammon, 2001). The official languages of Belgium are Dutch, French and German; 60% of the population speak Dutch, 30% French and 1% German and the other 9% other foreign languages (Ammon, 2001). Although English is not seen as an official language in Belgium, it is used by most of the organisations as an international language. According to Ammon (2001), it is remarkable to observe that English is barely used in Belgium. The expansion of English as a language of knowledge is probably the motive for discussions in Dutch speaking countries, like The Netherlands and Belgium, on whether English is to be considered a 'threat' to the use of Dutch.

Since a substantial part of the professional literature and business is in English, and appropriate textbooks may not always be available in Dutch, it is essential to be able to read books and business reviews in English. Business people therefore strive to obtain the necessary proficiency in English. It is also not irrational to believe that in future the use of English in the business and academic world in Belgium will rather increase than decrease (Ammon, 2001). Nevertheless, the researcher is aware that some candidates may experience difficulty in fully understanding some questions, as this questionnaire was developed and validated in English.

Other third variable problems**.** It is unfeasible to manage all kinds of potentially nuisance or intervening variables. Thus the results of the current study will be less internally valid than if the researcher were conducting experimental research.

According to Welman and Kruger (2001, p. 106) another aspect of internal validity of the current study is construct validity, which refers to the "degree to which procedures intended to produce the independent variable of interest indeed succeed in generating this variable rather than something else". The various constructs to be assessed in the proposed study already mentioned include the perceptions of organisational behaviour with regard to: autonomy; integration; involvement; supervisory support; training; welfare; formalisation; tradition; innovation and flexibility; outward focus; reflexivity;

clarity of organisational goals; efficiency; effort; performance feedback; pressure to produce; and quality. As this is the main intention of the study, the results of construct validity will be communicated in five of the research reports.

Threats to the construct validity of the present study were mitigated by ensuring that the following were all taken into consideration in all actions leading up to and during the collection of responses in the proposed study.

The subject effect. Due to the fact that participants would be aware that their perceptions and experiences with regard to organisational actions and behaviour were being assessed, they might answer questions in such a way as to appear in a positive light. This can also be seen as a threat of measurement reactivity, as participants would be aware they were being assessed by the questionnaire and this might affect their answers on either a conscious or unconscious level. None of the respondents knew the researcher personally, but it is possible that some might want to jeopardise the proposed study because of bitterness, jealousy or simply wanting to make it difficult for the researcher to attain the current aims of the planned study (Welman & Kruger, 2001).

The experimenter effect. This is a likely hazard, in that the researcher could already have had in mind some guesses as to what the final outcome should be and therefore might control and interpret data and statistics that were generated in order to corroborate these prospects. Luckily, this was a danger of which the researcher was intensely aware, and in view of the considerable literature review, with many standpoints being considered and available for deliberation; every attempt was made to avoid this as far as possible (Welman & Kruger, 2001).

Face Validity. Face validity relates to whether the test ‘looks valid’ to the respondents, administrative personnel, and other technically inexperienced viewers (Anastasi, 1988). Thus a measurement is said to have face validity if is ‘looks as if’ it is going to measure what it is supposed to measure. In the study of Patterson et al. (2005) the questionnaire

was validated on its face and content value by a panel of experts. Therefore, for purposes of the current study, face validity was not necessary.

3.9.2 Possible threats to external validity not covered by chosen design

External validity refers to the generalisability of the sample results of the study "to the population of interest, across different measures, persons, settings or times" (King & He, 2006, p. 16). It involves the extent to which one's research results could be useful across different contexts and samples in the same situations, and is an important consideration in the case of quantitative research (Hutchinson, 2004). Features of external validity to be considered in the present research study are discussed below.

Ecological validity. Guba and Lincoln (1994, cited in Trochim, 2002) explain transferability as the degree to which the outcomes of research can be generalised or transferred to other contexts or settings, also known as *ecological validity* (Welman & Kruger, 2001). Afterwards, ecological validity cannot be determined because no form of field or realistic research can be done or is afforded by the chosen research design. Therefore the threats to internal validity already discussed, namely subject and experimenter effects, will affect the extent to which the outcomes may be generalised to the target population and thus have an unfavourable effect on ecological validity.

Population validity. A further important aspect of external validity to think about is population validity, whereby the findings obtained from the sample of the proposed study can be generalised to the total population appropriate in terms of the research questions (Welman & Kruger, 2001). As participation in the current study was completely voluntary, the use of volunteers could affect the population validity results. This is because the characteristics of individuals who volunteer for research projects may not be the same as those of the target population (Welman & Kruger, 2001). According to Hair et al. (1992), the sample size for determination of a construct validity study should be five times the number of variables in the model or questionnaire, and there for the sample size of 301 respondents may not be appropriate.

3.10 Ethical considerations

Ethical action is not administered by hard-and-fast rules; it occupies a universal philosophy of human behaviour with an emphasis on the willpower of right and wrong (Peterson & Ferrell, 2005). Professionals are to pursue strict ethical procedures and remain true to clear requirements (codes of conduct) as dictated by institutionalised society for examination of practice (Cascio & Aguinis, 2005).

Plagiarism is a concern which is predominantly relevant for the literature review and final report writing. The researcher made sure that all references have been included in accordance with academic practice and that all information which is not the researcher's own, or general knowledge was accordingly attributed to its source. A consecutive record of sources consulted was kept, and information paraphrased so that findings of different authors have as far as possible been put into the researcher's own words. Where this was not feasible, the information has been appropriately quoted and referenced in the text. Therefore every effort was made to avoid plagiarism.

The Health Professions Council of South Africa, along with the Professional Board of Psychology, requires that any research conducted should be guided by the "Ethical Code of Professional Conduct" (Babbie & Mouton, 2001). This code specifies what is considered acceptable and unacceptable conduct from the research preparation phase through to the publication of research findings.

Based on the International Test Commission's Guidelines for Test Use (2000), one could define fair assessment practices as entailing (Foxcroft & Roodt, 2001):

- The appropriate, fair, professional and ethical use of assessment measures and assessment results;
- Taking into account the needs and rights of those involved in the assessment process;
- Ensuring that the assessment conducted closely matches the purpose to which the assessment results will be put; and

- Taking into account the broader social, cultural, and political context in which assessment is used and the ways in which such factors might affect assessment results, their interpretation and the use to which they are put.

Some of the most vital ethical issues focused on in the proposed study are illustrated in Figure 3.3 below and further discussed in detail.

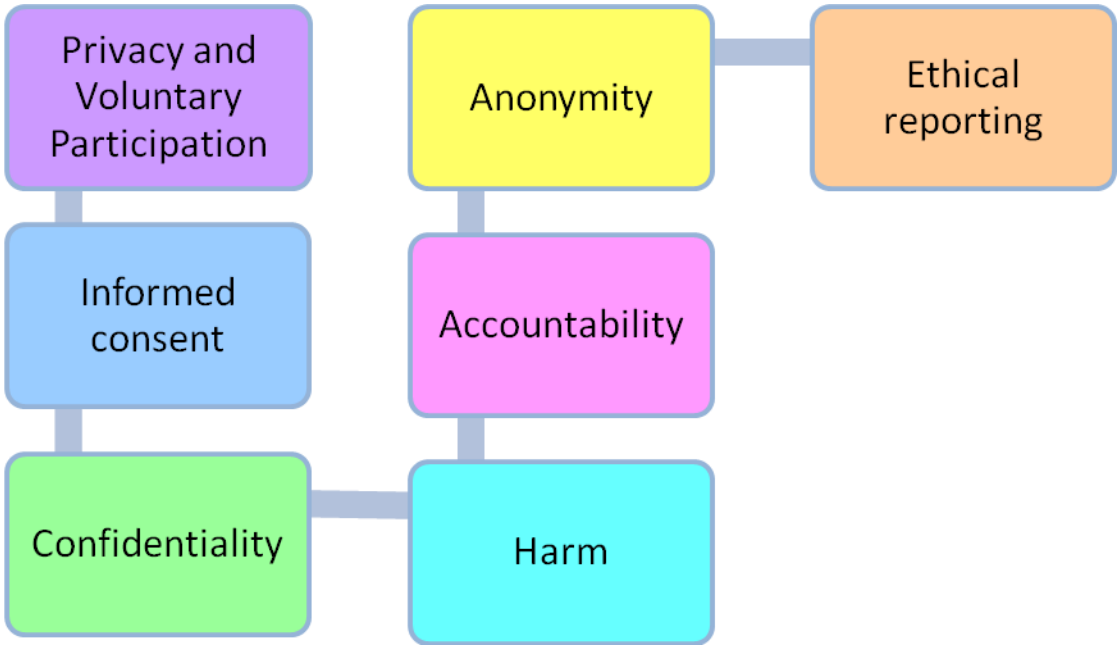

Figure 3.3: Ethical issues

***Privacy and Voluntary Participation*:** When conducting research in any context the notion of voluntary participation is fundamental to the ethical conduct of the study. Participation in survey research should be voluntary and respondents may refuse to disclose certain information about themselves, depart from the research study at any time and should be informed of the consequences of withdrawing and the risks involved.

Participants should not be intimidated in any way as an effect of the organisational setting of the study. The setting of the current study was within the work setting of the respondents, and each respondent in his own office in front of his own computer, which could result in individuals feeling relaxed while participating in the study. The researcher made every effort to reiterate that participation was entirely voluntary and that participants had the right to withdraw their consent at any time.

Informed consent: According to Babbie and Mouton (2001), this consent must be informed in the sense that the participants are aware of the consequences of participation, rights and responsibilities of each party and the nature and purposes of the research. In particular, researchers should support the right of research applicants to be totally informed about all features of a research project that may influence their decision to participate (Ruane, 2005).

The researcher kept in mind that the main language of Belgium is Dutch, and therefore complex language was avoided as far as possible, as was terminology that the participants might be unfamiliar with. The researcher ensured that all participants had full information on all aspects of the research, they were also informed of the definitive intention of the proposed study prior to the questions being answered.

Confidentiality: Any personal information related to the participants should not be discussed or shared with anyone without their consent. While conducting survey research, one should ensure that data collected will only be used for the stated purposes of the specific study (Mouton, 2001).

Anonymity: The researcher should ensure that neither the names, nor any identifiable background information of participants is disclosed. Feelings and perceptions of organisational climate are of a private nature and not for public information, and should be regarded as such by ensuring that the information presented by the participants cannot be personally connected to them (Babbie & Mouton, 2001; Ruane, 2005).

Accountability: Accountability is different from responsibility in the sense that one can be held accountable for another's actions. According to Voskuijl and Evers (2007), researchers may be held accountable for the way in which survey data is understood and interpreted, in addition to protecting the safekeeping and confidentiality of acquired information.

Harm: The researcher should also ensure that the research study does not entail any harm to participants. The study should neither present embarrassing situations to respondents nor expose participants to conditions that are not in accord unsuited with the primary ethical obligation to maintain the physical, psychological and emotional well-being of participants (Babbie & Mouton, 2001). In this study, the precise role of the participants was explained to them. The participants also had the opportunity to communicate any concerns or questions directly to the researcher via e-mail. The researcher minimised the possibility of harm to participants by explaining that this was not a test with any right or wrong answers, and no judgements would be made about them as individuals, nor can the results in any way be linked to them.

According to Cascio and Aguinis (2005), participants should be treated with respect and consideration; they should each be acknowledged as a person in a specific context with specific needs. The researcher ensured that participants were treated in a socially responsive and responsible manner by taking note of how previous research in similar contexts had been conducted. Thus participants were protected from potential negative consequences of the research.

Ethical reporting: As the researcher has working experience in a Belgian context, he already has his own conceptions of organisational climate and the effects thereof within this specific workplace. This could be an ethical issue, and thus the researcher ensured that all findings and statistical analyses were included in this final report. In order to confirm what is stated in the final report, this study is available for the public and academic community. Results which are in disagreement with predominant literature and investigations are also reported and connected to the source of literature.

3.11 Chapter summary

This chapter contained a detailed discussion of the research design and methodology for the current study, as well as the statistical methods used in the data processing, which included both exploratory and confirmatory factor analysis. Implications of the chosen research strategy and design on validity and reliability were also mentioned, and the final section of this chapter pertained to detailed ethical considerations of the current research which were taken into account. The presentation of results from the OCM will follow in the next chapter, focusing on an exploratory factor analysis (EFA), including intercorrelations and factor extractions, with descriptive statistics and a confirmatory factor analysis (CFA) following thereafter.

CHAPTER 4

RESULTS AND FINDINGS

4.1 Introduction

This chapter contains the presentation and preliminary analysis of the results generated by the research on the construct validity of the Organisational Climate Measure in a Belgian context. Firstly, the test of sampling adequacy and Bartlett's test of sphericity were performed to determine whether a factor analysis could be conducted. An exploratory factor analysis (EFA) was used to determine the number of factors that could be extracted from the variables of the Organisational Climate Measure. The presentation of rotated factor analysis, intercorrelation matrix, parallel analysis, total variance explained, and item analysis (Cronbach's alpha) all form part of EFA. The descriptive statistics follow, with confirmatory factor analysis (CFA) being reported in the last pages of this chapter. CFA was conducted with the help of structural equation modelling and goodness-of-fit measures to specify whether the measures that were created throughout EFA presented the latent variable, and in truth belonged together. The empirical findings are integrated with the literature review.

Firstly, EFA was conducted on the original dataset and showed that 18 factors should be extracted. With the 18-factor model the researcher discovered a lot of variable loadings <.3, as well as items that cross-loaded. All the negative items were deleted and the new dataset was subjected to a second round of factor analysis; this showed that 10 factors should be extracted. The researcher therefore ended up with the final 10-factor analytical model, all the accepted loadings. This process will be discussed in more detail in this chapter.

4.2 Kaiser-Meyer-Olkin (KMO) and Bartlett's test

In order to perform factor analysis, the sample size and the relationship between the responses to the items were analysed to determine whether the data were appropriate for factor analysis. Bartlett's test of sphericity and the Kaiser-Meyer-Olkin (KMO) were used. Although the number of subjects (301) was smaller than five times the number of variables (82), the KMO and Bartlett's Test confirmed that the properties of the correlation matrix of the item scores were suitable for factor analysis to continue. These results are displayed in Table 4.1

Table 4.1: KMO and Bartlett's test

KMO and Bartlett's test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.920
Bartlett's Test of Sphericity	Approx. Chi-Square	15683.393
	Df	3321
	Sig.	.000

The results of Bartlett's test of sphericity should be significant ($p<.05$) for the factor analysis to be considered appropriate (Pallant, 2005). The KMO index ranges from 0 to 1. A value close to 1 (.60) indicates that patterns of correlations are relatively compact, therefore factor analysis should yield distinct and reliable factors (Field, 2009). According to Hutcheson and Sofroniou, as cited in Field (2009), values between .50 and .70 are categorised as average, between .70 and .80 as first class, between .80 and .90 as great, while values above .90 are excellent. According to the guidelines set by Hutcheson and Sofroniou, these values were acceptable for factor analysis to continue with the Bartlett's test of sphericity being significant ($p=.000$), and the KMO with an excellent value of 0.920.

4.3 Scree plot (18 factors)

When doing factor analysis one can use more than one method to determine the number of factors that need to be extracted. In the first place a scree plot was drawn and thereafter the researcher used the total variance explained (eigenvalues larger than

one). The scree plot in Figure 4.1 clearly indicates the break at 18; therefore the researcher extracted 18 factors.

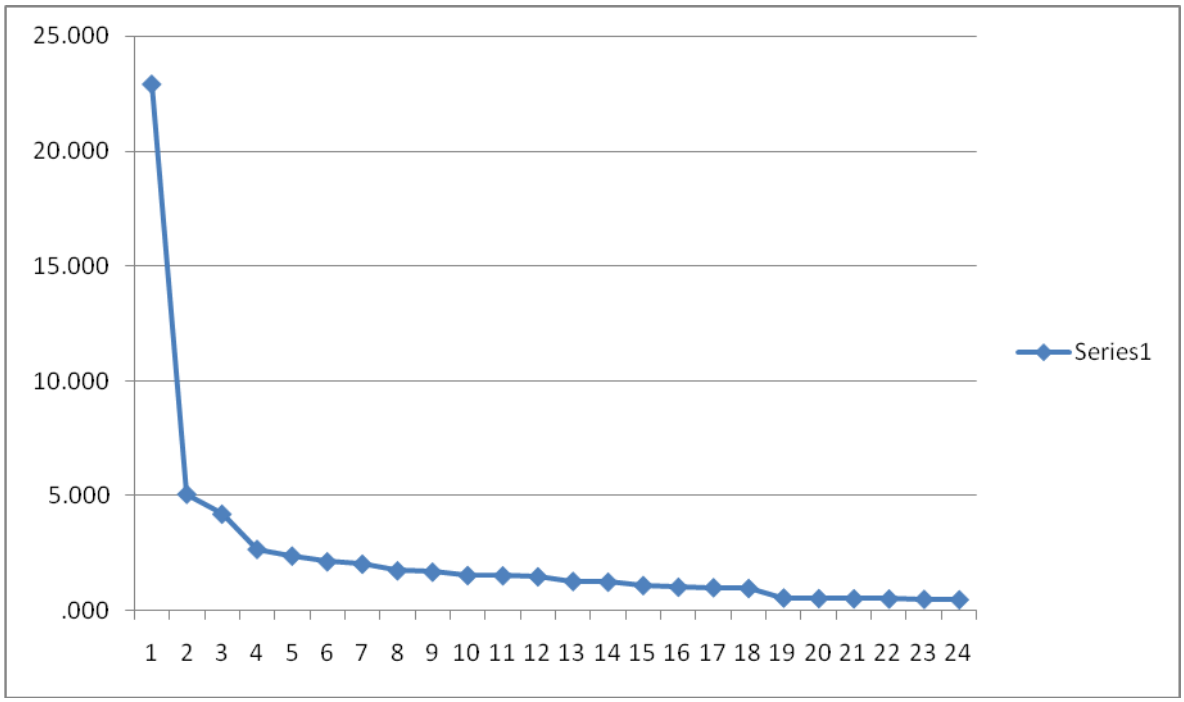

Figure 4.1: Scree plot (18 factors)

4.4 Total variance explained (18 factors)

The first part of the factor extraction process is to establish the linear components within the data set (the eigenvectors) by calculating the eigenvalues of the R-matrix (Field, 2009). In the first model in Table 4.2, the eigenvalues associated with each factor represent the variance explained by that particular linear component. It should be clear that the first few factors explain comparatively large amounts of variance (particularly factor 1) while subsequent factors explain merely small amounts of variance. SPSS extracted all factors with eigenvalues greater that 1, which left us once again with 18 factors.

Table 4.2: Total variance explained (18 factors)

Factor	Variance Explained	Total Variance Explained (%)	Cumulative Proportion (%)
1	22.885	27.909	27.909
2	5.09	6.207	34.116
3	4.226	5.154	39.27
4	2.695	3.286	42.556
5	2.409	2.938	45.494
6	2.158	2.632	48.126
7	2.052	2.503	50.629
8	1.768	2.156	52.784
9	1.709	2.085	54.869
10	1.563	1.906	56.775
11	1.551	1.892	58.667
12	1.507	1.838	60.505
13	1.306	1.593	62.098
14	1.275	1.555	63.652
15	1.129	1.377	65.03
16	1.058	1.29	66.32
17	1.035	1.263	67.582
18	1.001	1.221	68.804

***** ***Only eigenfactors above 1 are displayed***

The analysis in Table 4.2 above indicates 18 factors with eigenvalues above 1 and an accumulative variance of 68.80%. Hayton et al. (2004) state that no general consensus exists, but propose that it appears reasonable for a decent model to retain as many common factors as may be required to explain at least 50% of the variance in the variables. Hair, Anderson, Tatham, & Black (1998) report that as many factors as there are eigenvalues larger than 1 of the correlation matrix should be taken. They further recommended that retaining factors with a loading greater than 1 is a good rule if there are 20 to 50 variables, but that it tends to take too many if there are more than 50 variables.

After deleting all the negative items, items with a loading < .3, and items that cross-loaded, 65 items remained. A second round of EFA was conducted, and a final 10-factor model was generated comprising 44 items.

4.5 Scree plot (10 factors)

The scree plot for the second round factor analysis is displayed in Figure 4.2. Figure 4.2 clearly indicates the break at 10; therefore the researcher extracted 10 factors.

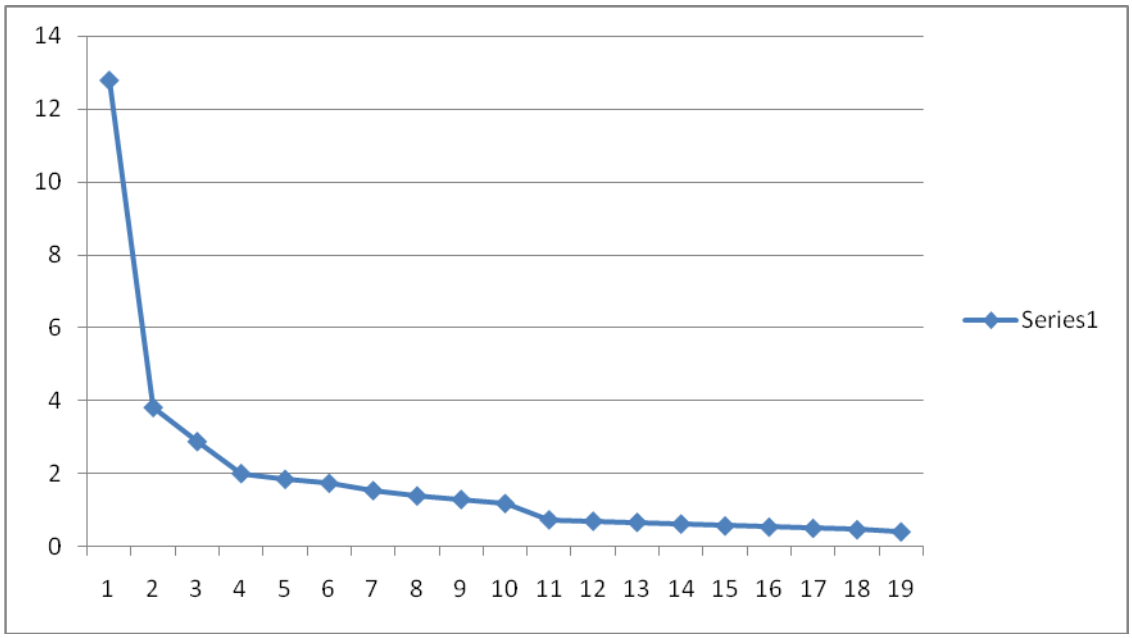

Figure 4.2: Scree plot (10 factors)

Based on the results of the scree test, figure 4.2 indicates 10 significant factors with eigenvalues above 1. A clear break can be observed in the scree plot between factors ten and eleven.

4.6 Total variance explained (10 factors)

In the final (second) round of the factor analysis, SPSS extracted 10 factors with eigenvalues larger than 1. In table 4.3 below it is evident that factor 1 explains the largest amount of variance, followed by the other 9 factors with relatively smaller amounts of variance. These 10 factors were the final factors, as all remaining items (44 items) loaded high and positive on the 10 factors. It is clear from table 4.3 that the 10 factors explain 59.29% of the variance.

Table 4.3: Total variance explained (10 factors)

Factor	Variance Explained	Total Variance Explained (%)	Cumulative Proportion (%)
1	12.7759	27.15	27.15
2	3.82614	7.2	34.35
3	2.89209	5.22	39.57
4	2.01659	4.4	43.97
5	1.85977	3.28	47.25
6	1.75091	2.97	50.22
7	1.55091	2.83	53.05
8	1.40523	2.27	55.32
9	1.30741	1.96	57.28
10	1.19622	2.01	59.29

***** ***Only eigenfactors above 1 are displayed***

4.7 Rotated factor analysis

The pattern matrix for these data shows all the loadings for the 10 factors that seem to have emerged after the second round of EFA. Hair et al. (1998) recommend that variables should have correlations of at least .30, and preferably of .50, to be considered as significant. Table 4.4 contains the rotated factor loadings that were extracted for the ten-factor model, which consists of 44 items. In this model the oblique

(correlated) factor rotation was used, because the researcher assumed that the underlying constructs were dependent, and would therefore correlate.

Items that cross-loaded and had significant loadings on multiple factors became candidates for removal. However, the final option of removal was based on the researcher's understanding of the theoretical underpinnings of the construct measured. The pattern matrix contains values representing the unique contribution of each factor to the variance in the variables (Tabachnick & Fidell, 2001).

The extracted rotated pattern matrix demonstrates that all ten factors have at least three variables with loading of .30. Johnson (1998) and Stevens (2002) suggest that at least three variables with loadings of .30 on a factor are required for the factor to be accepted.

Table 4.4: Rotated factor matrix

Items	Factor1	Factor2	Factor3	Factor4	Factor5	Factor6	Factor7	Factor8	Factor9	Factor10
Item51	0.613	-0.039	0.009	0.046	0.047	-0.081	-0.043	0.171	0.075	0.012
Item52	0.78	0.039	0.065	0.029	-0.044	-0.043	0.133	-0.036	-0.017	-0.022
Item53	0.601	0.023	0.071	-0.08	0.018	0.047	0.061	0.098	0.126	0.011
Item54	0.86	-0.018	0.057	0.012	0.05	0.054	0.025	-0.044	-0.021	0.033
Item55	0.892	-0.013	0.002	0.064	0.025	0.012	0.017	-0.069	0.009	0.06
Item74	-0.018	0.716	0.015	0.081	-0.064	0.062	-0.01	0.051	-0.05	-0.116
Item75	-0.06	0.754	0.073	-0.006	-0.079	-0.032	-0.04	0.06	0.047	0.106
Item76	0.085	0.814	-0.11	-0.009	-0.005	0.054	0.012	-0.022	-0.123	-0.015
Item77	0.04	0.652	0.084	-0.104	0.054	-0.087	-0.029	0.019	-0.039	-0.024
Item78	-0.014	0.727	0	0.055	0.01	-0.006	0.061	-0.005	0.111	0.053
Item56	-0.018	-0.008	0.758	0.133	0.035	-0.066	0.045	-0.069	0.01	0.006
Item57	0.032	-0.035	0.776	0.03	0.034	-0.073	0.016	0.088	0.04	-0.029
Item58	0.062	-0.074	0.652	-0.002	0.039	0.055	-0.023	0.07	-0.024	0.083
Item59	0.071	0.099	0.649	0.012	0.008	0.062	0.042	-0.019	-0.043	0.001
Item60	0.022	0.064	0.648	-0.017	-0.008	0.06	0.044	0.003	0.04	-0.014
Item12	0.06	0.047	0.014	0.638	0.072	-0.043	0.043	-0.066	-0.028	0.086
Item13	0.051	-0.144	0.079	0.472	0.006	0.041	0.098	0.096	0.021	0.048
Item14	-0.021	-0.011	0.032	0.555	-0.096	0.028	0.096	0.162	0.085	-0.04
Item15	0.007	0.034	0.105	0.795	0.032	0.003	-0.106	-0.026	0.084	-0.008
Item16	0.033	-0.009	-0.027	0.704	0.091	-0.066	0.118	0.05	-0.013	0.041

Item36	0.015	0.074	-0.018	0.062	0.834	-0.03	-0.004	0.055	0.042	-0.005
Item37	0.033	-0.001	0.136	0.111	0.635	-0.005	0.061	-0.001	0.041	-0.004
Item38	0.008	-0.119	-0.035	-0.016	0.756	-0.002	0.045	0.05	0.089	0.02
Item79	-0.062	0.074	-0.105	0.057	0.568	-0.055	-0.006	-0.031	-0.024	-0.151
Item46	-0.037	-0.096	0.035	0.023	0.036	0.603	-0.027	-0.068	-0.021	-0.032
Item48	-0.038	0.03	-0.013	0.009	0.076	0.846	0.018	0.084	-0.053	-0.045
Item49	0.056	0.127	-0.008	-0.018	0.026	0.719	-0.065	-0.055	0.017	0.072
Item50	0.042	-0.026	0.031	-0.057	-0.167	0.634	0.003	0.042	0.108	0.063
Item3	0.041	0.016	0.097	0.048	0.019	-0.053	0.652	-0.041	0.117	-0.03
Item4	0.081	0.001	0.028	-0.018	0.011	-0.039	0.793	0	-0.047	0.011
Item5	0.014	-0.033	0.025	0.055	0.039	-0.045	0.67	0.113	0.006	0.018
Item6	0.123	-0.054	0.039	0.137	0.042	0.047	0.56	0.041	-0.01	0.058
Item17	-0.055	-0.083	0.189	0.044	0.088	-0.062	0.003	0.627	-0.04	0.08
Item18	0.073	0.016	0.086	0.057	0.09	-0.037	0.012	0.496	0.109	0.06
Item19	-0.07	0.018	0.029	-0.028	-0.062	0.002	0.112	0.479	0.068	0.135
Item20	0.148	0.061	-0.021	0.118	0.088	0.05	-0.034	0.567	-0.014	-0.047
Item21	0.085	-0.004	-0.055	0.047	0.088	-0.017	0.064	0.705	0.049	-0.027
Item69	0.091	0.007	0.031	0.05	-0.01	0	-0.117	0.038	0.739	0.039
Item70	0.117	-0.104	0.008	0.094	0.037	-0.098	-0.015	0.102	0.575	-0.029
Item72	-0.021	0.007	0.001	0.017	0.093	0.04	0.086	-0.026	0.772	-0.027
Item73	-0.017	0.016	0.004	-0.002	0.145	0.131	0.238	-0.031	0.507	0.069
Item65	0.076	0.03	-0.103	0.018	0.089	0.053	0.052	0.077	-0.03	0.663
Item67	0.032	-0.004	0.097	-0.013	-0.011	-0.039	-0.073	-0.022	0.054	0.734
Item68	-0.042	-0.013	0.004	0.069	0.006	0.023	0.043	0.003	-0.035	0.848

The rotated factor matrix for the ten factors in this model shows no correlation between the factors, indicating that each factor measures its own unique construct. As stated previously, item 79 was the only item that loaded on another – unexpected – factor (factor 5). Therefore out of the four items that “make up” factor five, only three are theoretically relevant, and therefore the researcher deleted item 79. If item 79 is deleted, all other significant loadings make theoretical sense, and can be seen as different factors or scales.

4.8 Inter-correlation matrix

According to Worthington and Whittaker (2006), factors should not inter-correlate with one another, to ensure the uniqueness of the construct. However, according to Patterson et al. (2003), factors within the same quadrant are generally expected to correlate. As previously stated, the OCM was developed and validated following a four-quadrant theoretical model. The researcher investigated each factor together with the quadrant it fell on, and found that most of the factors with high inter-correlations fell within the same quadrant. It is evident from Table 4.5 that factor 1 correlates with factors 3, 6, 9 and 10. The researcher found that all of these factors belong to the Rational Goal quadrant, and are therefore acceptable. Factor 4 correlates with factors 7 and 8, and these are all for the Human Relations quadrant. Factor 2 was the only factor that remained in the Internal Process quadrant, and factor 5 the only one in the Open Systems quadrant. It is clear that no other factors correlate with these two factors. Factors that display scores of (r >.30) on the inter-correlation matrix are considered as high scores (Worthington & Whittaker, 2006).

Table 4.5: Inter-correlation matrix of the 10 factors of the OCM

	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5	Factor 6	Factor 7	Factor 8	Factor 9	Factor 10
Factor 1	1									
Factor 2	0.017	1								
Factor 3	0.477	0.076	1							
Factor 4	0.26	-0.062	0.231	1						
Factor 5	0.131	-0.227	0.108	0.168	1					
Factor 6	0.344	0.067	0.357	-0.126	-0.044	1				
Factor 7	0.042	-0.149	0.267	0.432	0.229	-0.116	1			
Factor 8	0.216	-0.092	0.289	0.379	0.215	-0.105	0.359	1		
Factor 9	0.351	-0.153	0.286	0.246	0.158	0.092	0.32	0.258	1	
Factor 10	0.368	-0.053	0.291	0.173	0.212	0.134	0.244	0.226	0.257	1

4.9 Internal consistency

The 10 scales' Cronbach's alpha coefficients were determined in order to establish the internal consistency of the scales. The researcher wanted to determine to what extent

the items that made up the scale “hung together”. One of the most generally used indicators of internal consistency is Cronbach’s alpha coefficient, preferably with a score above .70 (Pallant, 2005). The Cronbach’s alphas for each scale in the 10-factor model are displayed in Table 4.6.

Table 4.6: Cronbach’s alpha coefficients

	Cronbach's Alpha	N of Items
Factor 1	0.915	5
Factor 2	0.853	5
Factor 3	0.863	5
Factor 4	0.852	5
Factor 5	0.211	4
Factor 6	0.797	4
Factor 7	0.864	4
Factor 8	0.82	5
Factor 9	0.825	4
Factor 10	0.815	3

The Cronbach’s alpha value for the scales within the 10-factor model are all above .70, except for factor 5, which shows a score of .221 when leaving the scale with the four items that loaded high. Deleting one of the items (item 79) gives us an alpha value of .869. Item 79 was the only item that loaded high on a different factor from the original dataset and therefore it did not make theoretical sense to leave it there. The researcher decided to delete item 79 from factor 5, and therefore factor 5 consisted of 3 items with very high loadings. The researcher could conclude that all 10 scales in the OCM could be considered reliable with the sample used in this study, and that one item should be removed from the final model. Table 4.7 shows the alpha coefficients for the 10 factors after item 79 was deleted from factor 5, and one can clearly see that all alpha values are now above .80.

Table 4.7: Final Cronbach’s alpha coefficients

	Cronbach's Alpha	N of Items
Factor 1	.915	5
Factor 2	.853	5
Factor 3	.863	5
Factor 4	.852	5
Factor 5	.869	3
Factor 6	.797	4
Factor 7	.864	4
Factor 8	.820	5
Factor 9	.825	4
Factor 10	.815	3

4.10 Descriptive statistics

The skewness and kurtosis were analysed for the 10 extracted factors of the Organisational Climate Measure instrument in order to understand the symmetry and peakedness of the data distribution. Skewness evaluates the degree to which a distribution of data is asymmetrical, while the kurtosis evaluates the peakedness of the data distribution (Hair et al., 1998). Table 4.8 shows the descriptive statistics of the Organisational Climate Measure instrument for the 10 extracted factors.

Table 4.8: Descriptive statistics (10 factors)

	N	Minimum	Maximum	Mean		Std. Deviation	Skewness		Kurtosis	
	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Statistic	Std. Error	Statistic	Std. Error
Factor 1	301	5.00	20.00	14.4651	.18411	3.19421	-.394	.140	-.025	.280

Factor 2	301	5.00	20.00	13.2492	.18094	3.13917	.216	.140	-.299	.280
Factor 3	301	5.00	20.00	14.6013	.17337	3.00786	-.245	.140	-.269	.280
Factor 4	301	7.00	20.00	15.3422	.12741	2.21040	-.355	.140	1.053	.280
Factor 5	301	6.00	15.00	10.6844	.09810	1.70198	-.229	.140	.175	.280
Factor 6	301	4.00	16.00	10.8173	.13805	2.39510	.020	.140	-.142	.280
Factor 7	301	4.00	16.00	11.5880	.13821	2.39786	-.407	.140	-.161	.280
Factor 8	301	8.00	20.00	14.5947	.15646	2.71450	-.112	.140	-.478	.280
Factor 9	301	4.00	16.00	12.5316	.11280	1.95700	-.425	.140	1.451	.280
Factor10	301	3.00	12.00	7.3355	.11836	2.05354	-.191	.140	-.623	.280

The variability of the means, standard deviation, skewness and kurtosis reflect how the participants responded to the different scales. From the table it is evident that the scores of the sample on the 10 factors are not normally distributed, with a tendency towards negative skewness. The statistics indicate that the distribution of factors 1, 3, 4, 5, 7, 8, 9 and 10s measure of the Organisational Climate Measure instrument was negatively skewed. According to Fabrigar, Wegener, MacCallum, & Strahan (1999), the maximum-likelihood extraction method is favoured when skewness is larger than two (>2) and kurtosis larger than seven (>7). The descriptive statistics for the 10 factors of the Organisational Climate Measure instrument indicated that only one of the ten factors was within the norms indicated by Fabrigar et al. (1999).

4.11 Confirmatory Factor Analysis (CFA)

The Confirmatory Factor Analysis (CFA) procedure in structural equation modelling (SEM) was conducted as an added measure to legalise the constructs of the measurement model (Garson, 2006; Rigdon, 1995). A CFA procedure was used to verify that the observed variables sorted themselves into factors matching the latent variables (Garson, 2006). A CFA was also used to examine the overall quality of the explanation and the exact factor loadings that constitute the measurement model (Kelloway, 1998). The observable variables in this research study are the sub-scale scores of the Organizational Climate Measure instrument. The latent variables are the

hypothesised factors that underlie the scores for the observable variables. This study tested one model; and this hypothesised model will therefore be discussed below.

The Confirmatory Factor Analysis was conducted using the SAS Proc Calis program with maximum likelihood (ML) estimation, as described by Garson (2006). The Proc Calis program presented a number of goodness-of-fit indices (GFIs). For the rationale of this study the following goodness-of-fit indices established in Table 4.9 were used to study the degree of likeness between the covariance matrices of the latent variables and the observed variables.

Table 4.9: Fit indices

GOODNESS OF FIT ANALYSIS	10 Factor Model
Goodness of Fit Index (GFI)	.852
GFI Adujsted for Degrees of Freedom (AGFI)	.828
Square Root Mean Residual (SRMR)	.054
Chi-square	1143.027
Chi-square DF	774
Chi-square / df ration	1.477
Pr > Chi-square	<.0001
RMSEA Estimate	.040
RMSEA 90% Lower Confidence Limit	.035
RMSEA 90% Upper Confidence Limit	.045
Bentler's Comparative Fit Index (CFI)	.941
Bentler & Bonett's (1980) Non-normed Fixed Index (NNFI)	.935
Bentler & Bonett's (1980) (NFI)	.840

The Chi-square statistical calculation output was 1143.027 on 774 degrees of freedom (p=.001) for the sample measured against the 10-factor model. Chi-square statistics were used, as recommended by Tabachnick and Fidell (2001), in an attempt to make it less dependent on the sample size. The findings specify that the Chi-square for the 10-factor model was statistically significant (p=.001). According to Garson (2006), the Chi-square value should not be significant to indicate good model fit. A significant Chi-square indicates that the model's covariance structure is

significantly different from the observed covariance matrix. According to Garson (2006), a model with a Chi-square <.05 is significant and should be rejected.

Carmines and McIver (as cited in Garson, 2006) state that virtual Chi-square reaches suitable modular tolerance in a range of 2:1 to 3:1. Kline, as well as Ullman (cited in Garson, 2006) support this ratio and specify 2 or less as a good fit, and 3 or less as an adequate fit. The Chi-square ratio was 1.48 for the ten-factor model and therefore demonstrates a good fit for the 10-factor model.

The root mean squared error of approximation (RMSEA) was estimated at .040 for the 10-factor model. The RMSEA is based on an analysis of residuals and it estimates the lack of fit in a model compared with a perfect model. The RMSEA value sustains the argument of a good model fit. A value of less than or equal to .05 indicates a superb fit (Cudeck & Browne, 1992; Kelloway, 1998). Hair et al. (1998) consider RMSEA values between .05 and .08 as pinpointing an adequate fit, while Steiger (1995) would consider RMSEA values of less than .10 as adequate. The 90% lower confidence interval of the RMSEA indicated .035 for the 10-factor model, while the 90% upper confidence interval of the RMSEA indicated .045 and confirmed the adequate fit of the measurement model to the data.

The standardised squared root mean (SRMR) residual estimated .054 for the 10-factor model. According to Garson (2006), a SRMR closer to 0 is a better model fit. Based on the criterion by Garson, the SRMR estimate indicates the 10-factor model to be an adequate fit. Some of the other comparative fit indices also indicated suitable values that were within the required limits for an adequate model fit. The NFI, CFI and GFI indices are based on the ratio of the sum of the squared inconsistencies to the observed variance, and they are normed to defer numbers that range from 0 to 1. Values above .90 indicate a good fit with the data (Kelloway, 1998). According to Garson (2006), a common principle for the interpretation of the GFI, NFI and CFI is that values of .90 and higher indicate a reasonable fit between the hypothesised model and the observed data. According to Bentler (1990) and Steiger (1995), values

closer to 1 demonstrate a perfect fit. The CFI (.941), NNFI (.935) and NFI (.840) values of the 10-factor model indicate an adequate model fit, with only the NFI being slightly lower than the required value. The CFI and NNFI are within the required range and therefore indicative of an adequate good model fit. The objective of the CFA is to evaluate the factor structure for the Organisational Climate Measure instrument. The results from the CFA indicated that the 10-factor model had a reasonable fit with the sample data, based on the Chi-square ratio, the RMSEA and the SRMR residual. When looking at the other comparative fit indices (CFI, NNFI, and NFI), it is also clear that the 10-factor model is an adequate model fit. However, one should remember that when conducting factor analysis it is important to look at both the model fit and the theory behind the different factors of the models (Worthington & Whittaker, 2006).

In further theoretical examination of the 10-factor model, it became apparent that the variables that formulate the different factors made theoretical sense. When looking at the 10-factor model and its remaining items, the same items loaded on the same factors that were first developed by Patterson and colleagues (2006). This is another indication that the 10-factor model would be significant (valid and reliable) when used in a Belgian context.

4.12 Chapter summary

This chapter summarised the results of the statistical analysis that was performed on the sample. Exploratory factor analysis was conducted on the data obtained from the respondents on the OCM in the present study. The scree plot, total variance explained and the rotated factor analysis all form part of the EFA. Thereafter inter-correlation matrix, internal consistency and descriptive statistics were presented, followed by the confirmatory factor analysis.

The next chapter contains the conclusions of the research project. The limitations and influences thereof are also described and recommendations for further research provided.

CHAPTER 5

CONCLUSIONS, LIMITATIONS AND RECOMMENDATIONS

5.1 Introduction

This research study contains 5 detailed chapters, with **Chapter 1** presenting the background and rationale behind the current study. In **Chapter 2** the effects and outcomes of different organisational climate studies were explained with a detailed discussion and presentation of the literature relating to the different constructs of the Organisational Climate Measure. **Chapter 3** followed by discussing the research approach, design and methodology. Theoretical standpoints and justification for the chosen methodology were provided in detail, with all considerations made during the study design being highlighted. An indication was also given of the sample and respondents identified and the procedure for collecting and analysing the data obtained. The ethical issues of the study were then comprehensively discussed. The results of this study were explained in **Chapter 4** where the findings obtained were reported, consolidated and summarised. In the final Chapter, the conclusions of the findings of the study are provided as well as the limitations and recommendations for future research.

5.2 Conclusions

The research results generated one Factor Analytical Model (ten factors) of the OCM questionnaire that was applied in the Belgian context. After several statistical analyses on the 10-factor model, the model's items loaded equally on the different factors and made theoretical sense. The fit indices were also examined and it was concluded that the data of the 10-factor model reflected an adequate model fit.

It can be concluded that the instrument has reasonable construct validity and that the results provided statistical support for the 10-factor model. The inter-correlations between the different factors appeared to load either low or negatively among factors,

thus indicating that the items measure a very substantial construct and that factoring into more than the one identified organisational climate factor is not necessary.

It is clear that the first approach has the most utility for understanding employees' perceptions, attitude and ultimately intentions towards organisational climate. Understanding the measurement of employees' perceptions of the work environment in terms of the components offers a way to target areas for training and addressing the problems associated with organisational climate.

The findings from the study provided enough evidence to show that the Organisational Climate instrument can provide valid data to convince management to address any unfounded perceptions, attitudes and beliefs regarding the work environment in a Belgian (Flemish) context. The data collected by means of the OCM instrument can also be disseminated for discussion, to create an awareness of environmental perceptions in the operational context and to improve the culture/climate of the organisation. Knowing and understanding people's attitudes, beliefs, perceptions and intentions toward the work environment can do much to advance the development of better targeted training interventions in order to increase positive attitudes and perceptions.

The following factors are highlighted and discussed as possible limitations that could have influenced the research results of the current study in various ways.

5.3 Limitations

5.3.1 Participant responses

Because most participants do not participate passively in a research project, there might be a possibility that some guessed what the purpose of the project was and based their responses on their perceptions. This could have had an impact on the validity and therefore on the outcome of results.

Many people are anxious about testing and measurement situations. Although the questionnaire was completed anonymously and voluntarily, some participants might have completed the questions in a certain manner in order to look good. This would have affected the outcome of the measures.

5.3.2 Language

According to Foxcroft and Roodt (2001), the process of developing a psychological test is very complex and extensive. In developing the OCM, Patterson and colleagues focused on the mother-tongue language of the UK, and therefore focused on one population only. Although Patterson et al. (2005) took care in designing the questionnaire for use at all levels of the workforce; its purpose was not to measure organisational climate in a multicultural context.

In designing such an instrument focusing on one population only, Patterson and colleagues did not need to pay attention to the cultural relevance (and potential bias) or the basic issues related to cultural diversity in the test samples. These include, for example, which methods of test administration might be appropriate for certain cultural groups and in which language to develop the test.

Normally, a test preparation consists of the following aspects:

(a) indicating the purpose and rationale for the test as well as the intended target population;

(b) defining the construct (content domain) and establishing a set of test specifications to guide item writing;

(c) selecting the test format;

(d) selecting the item format; and

(e) specifying the administration and scoring methods (McIntire & Miller, 2000).

However, when a test is developed for a multicultural target population, some expansion and elaboration of the typical aspects of a test plan is required to ensure that cross-cultural aspects are added to the structure of its design. This, however, was not necessary in the development of the Organisational Climate Measure in the UK.

McIntire and Miller (2000) point out that a statement of the purpose of a test should include an indication of the construct to be measured (e.g. identity, personality or self-esteem) as well as how the results (outcome) of the test will be used (e.g. to make a diagnosis, predict a performance criterion, or to compare individuals with a norm group). In addition, the context in which the test will be used (in this instance, the Belgian context) should also be included in the purpose statement. The rationale for this is that, just as the nature of the construct to be measured and the intended use of the test have implications for the development of the test specifications, the fact that the test is to be used in multicultural settings will have implications for the planning related to the design of the test. Belgium can be seen as a multicultural country, with a 60% Dutch, 30% French, 1% German and a 9% other foreign languages speaking population. However, the 301 respondents were all of Dutch origin, and therefore represent only 60% of the country's language group.

It is recommended that the test developer make a list of the characteristics of the proposed test-takers and focus on those characteristics that could affect how they will respond to the test items as well as their performance on the test. In addition, one would need to consider the more important characteristics that might need to be taken into account when developing a test for a multicultural context. For example, age is generally one of the key parts of the intended target population that needs to be explained and clarified. Whether the test is developed for children, teenagers or adults will have an impact on the character of the format and items.

The OCM was developed and designed for the use at all levels of the workforce, and the researchers in the UK therefore assumed that all the participants had the ability to read, write and speak the national language, English. However, according to Ammon (2001) it is remarkable that English is barely used in Belgium, and this could therefore have had a huge influence on the interpretation and understanding of the questions in the OCM conducted in the Belgian context.

Nell (1994) argues that language is the most important mediator variable of test performance, particularly in a multilingual civilisation. If a test is managed in a language in which test-takers are not proficient, it will be hard to determine whether poor performance on the test is a result of language or communication problems or due to the fact that test-takers have a low level of the construct being measured. Based on this, studies by Meiring, Van de Vijver, Rothmann, and Barrick (2003) and Abrahams and Mauer (1999) show that English concepts in personality tests were challenging for black test-takers and biased the construct comparability of the tests across cultural groups. Because of the limited use of the English language in Belgium as a whole, the results of the OCM questionnaire might not be a true reflection of the assessment of organisational climate in the Belgian context.

According to the guidelines of the International Test Commission' (ITC) for adapting educational and psychological tests, "test developers/publishers should provide evidence that language use in the directions, rubrics, and items themselves …are appropriate for all cultural and language populations for whom the instrument is intended" (Hambleton, 1994, p. 232). Following this, if it is decided that a test will only be developed and designed in one language but it is intended for use with multilingual participants, it is recommended that the test preparation should specify how the language proficiency of participants with regard to the test language will be determined. It is also necessary to describe the level of proficiency required to make sure that language aspects do not infect the test results. However, test developers may wish to develop a multilingual test. In this case, the test preparation should specify available

versions. Additionally, it should be specified in which language the test content will at first be developed (source language) prior to translating to the other language versions.

According to Hambleton (1994), the source language version is sometimes irrationally complicated and as a result rather complex to translate correctly. This is one of the reasons for the lack of cross-cultural tests of sufficient quality. Another issue identified by Hambleton (1994) is the problem with the translation of concepts and idiomatic expressions from the source language version, which do not have equivalents in the other languages. A team of experts in the cultural, content and language fields should therefore be included right from the planning phase to examine the content being developed to reduce probable translation difficulties.

Where it is decided to develop more than one language version of the test, the test preparation should also indicate the methodologies that will be used, to justify the systematic gathering of judgemental and empirical evidence that the various language versions are equivalent (Hambleton, 1994). Readers are referred to Bracken and Barona (1991), Brislin (1970), Hambleton (1994), Kanjee (2001), Van de Vijver and Leung (1997) and Van Ede (1996) for a broad discussion of the issues and methods associated with translating tests into various languages and establishing the correspondence of the translations.

Usually, test developers present with a range of sources to obtain support in succinctly defining and operationalising a construct in terms of observable, measurable behaviours when a construct is to be defined in a test preparation. When the desire is to develop a test to be used with a diversity of cultures and language groups, there is a crucial aspect that needs to be measured prior to the construct being defined and operationalised in this way. Taking into account the evident differences between various cultural and language groups relating to their customs, values, traditions and diverse world views, the same construct could be interpreted and understood in very different ways by various cultural and language groups (Hambleton, 1994).

Besides, according to the International Guidelines for Test Use (ITC, 2001) when a test is to be used with participants from different cultural groups, the tester should ensure that the constructs being measured are meaningful for each group. In other words, the construct to be assessed should be investigated not only as to the way different cultural and language groups conceptualise it, but also to whether the construct is meaningful for them. Developing a test for a specific cultural group that do not perceive the construct to be relevant or of value for them would be questionable.

The home language and ethnic background of the respondents might have an influence on their responses due to different understandings of certain words used. Thus, the effect of language could have a direct impact on the reliability of the scores obtained in the statistical analysis. For this study, the OCM questionnaire was only available in one language: English. The descriptive statistics show that only one ethnic group with one home language completed the questionnaire; however, the language was not their home language. For future studies, it might be advisable to translate the questionnaire to enable all the respondents to answer the questions in their home language. This will ensure comprehensive understanding of the questions and therefore provide more reliable research findings and conclusions for statistical analysis.

5.3.3 Tests, items and response modes

A test consists of items to which the participant needs to respond by using a particular response mode. There are a variety of modes in which a test can be presented (e.g. paper-based or computer-based); various item formats (e.g. multiple-choice or performance tasks), and various response modes (e.g. verbal, written or typing on a computer keyboard). For administering an instrument in a multicultural context, Hambleton (1994) stresses that instrument developers must ensure that the choice of their testing techniques, item formats, test gatherings and procedures are known to the proposed populations. It is not sensible simply to assume that the selected presentation

and response modes or item formats are equally familiar to and appropriate for all the intended cultural groups.

The OCM was changed to a web-based format. Some of the participants might not have been familiar with the computer-based mode and with selecting their responses using a Likert-type format, due to their cultural backgrounds. Although the response group were all of Dutch-speaking origin, it is unclear whether all of the respondents were comfortable with using a computer while answering a questionnaire. Many cross-cultural psychologists recognise that between-culture mean comparisons using Likert-type scales are risky. The reason is that conclusions can be affected by remaining measurement inequivalencies, and by cultural differences in response styles and reference groups (Heine, Lehman, Peng, & Greenholtz, 2002; Smith, 2004).

5.3.4 Sample size

Another limitation could be the fact that the sample size was not large enough for the determination of construct validity, as the questionnaire consisted of 82 items. Hair et al. (1992) explain that the total items in a questionnaire should be multiplied by 5 in order to have a reliable sample size. The sample size for this study was 301 and therefore not sufficient for the purpose of construct validity. This could have had an implication on the results of this study.

So this study included an insufficient number of respondents, according to most guidelines for factor analysis. However, Fabrigar et al. (1999) suggest that such guidelines do, regrettably, have serious drawbacks. These guidelines involve establishing a sample size based on the number of calculated variables included in the analysis – with more calculated variables requiring larger sample sizes. This could, however, have been a limitation on the reliability and validity of the study, as the sample size represents only 60% of the population.

The aim of this study was to measure the construct validity of the OCM in a Belgian context, and not on only 60% of the population. Due to the fact that the questionnaire was distributed in the Dutch-speaking regions of Belgium, only one cultural group completed the questionnaire. This limitation impacts on the external validity of this research study, as it therefore represents only the Flemish region in Belgium and excludes the French and German regions.

To improve the validity and reliability of research results by assessing construct validity of measuring instruments, the following empirical recommendations are proposed and discussed for further research studies.

5.4 Empirical recommendations

It is recommended that further research should explore this organisational climate measure questionnaire using all the representative groups of Belgium, in order to conduct a fairly reliable and valid study in a Belgian context. Therefore the stability of the factors and the relationship to various sample groups could be examined.

As the measuring instrument used in this study were only available in English, it is recommended that for future multicultural studies this instrument be adapted and translated into other languages as well, to be able to establish more clarity and understanding of the content for the language groups, to achieve more reliable results in the end.

It is also recommended that a larger sample size be used in future studies, due to the general rule of research that “the bigger the sample, the more reliable the findings”. This would allow the researcher to understand and explain the research findings in a more confident and reliable manner.

5.5 Chapter summary

The outcome of the current factor analytic study generated a model with ten factors consisting of 44 items, and concluded that the research results indicate a reasonable model fit of the data. The chapter discussed the limitations in terms of participant responses, language, item/ response modes and sample of the study that could influence the reliability and validity of the research outcomes in different ways. Several empirical recommendations in terms of group representation and multicultural questionnaire development were also discussed, as well as the need for larger sample sizes in construct validity studies.

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APPENDIX A:

OCM questionnaire

Organisational Climate Measure (OCM) E

The purpose of this inventory is to permit you to assess certain characteristics of the organisation where you are working. There are no "right" or "wrong" responses; the inventory will reflect your own perceptions of the organisation. Do not spend too much time on any one item; generally, your first reaction is the most accurate.

The Organisational Climate Measure consists of several statements. You have to respond to each one by indicating the extent to which you regard the statement as true or false for your organisation. To register your response you must use one the following options: "Definitely false", "Mostly false", "Mostly true", "Definitely true", next to each statement.

There are 86 questions in this survey.

A Note On Privacy

This survey is anonymous. The record kept of your survey responses does not contain any identifying information about you unless a specific question in the survey has asked for this. If you have responded to a survey that used an identifying token to allow you to access the survey, you can rest assured that the identifying token is not kept with your responses. It is managed in a separate database, and will only be updated to indicate that you have (or haven't) completed this survey. There is no way of matching identification tokens with survey responses in this survey.

Consent

I hereby give my informed consent to take part in the research project

- Yes, I give my consent/ Ja, ek gee toestemming
- No, I do not give my consent/ Nee, ek gee nie toestemming nie

Biographical

Please indicate you gender

- Female

- Male

Please indicate your home language by typing it into the space below

---

Please indicate your nationality by typing it into the space below

---

OCM Statements

For each of the statements in this section, respond by indicating the extent to which you regard the statement as true of false, for the organisation where you are working: Use the following keys to answer the questionnaire

Definitely False	1
Mostly False	2
Mostly True	3
Definitely True	4

1. Information is widely shared	
2. There are often breakdowns in communication here	
3. Management involve people when decisions are made that affect them	
4. Changes are made without talking to the people involved in them	
5. People don't have any say in decisions, which affect their work	
6. People feel decisions are frequently made over their heads	

7. Management let people make their own decisions much of the time	
8. Management trust people to take work-related decisions without getting permission first	
9. People at the top tightly control the work of those below them happening in the market place	

10. Management keep too tight a reign on the way things are done around here
11. It is important to check things first with the boss before taking a decision

12. Supervisors here are really good at understanding peoples' problems	
13. Supervisors show that they have confidence in those they manage	
14. Supervisors here are friendly and easy to approach	
15. Supervisors can be relied upon to give good guidance to people	
16. Supervisors show an understanding of the people who work for them	

17. People are suspicious of other departments	
18. People in different departments are prepared to share information	
19. There is very little conflict between departments here	
20. Collaboration between departments is very effective	
21. There is very little respect between some of the departments here	

22. This company pays little attention to the interests of employees	
23. This company tries to look after its employees	
24. This company cares about its employees	
25. This company tries to be fair in its actions towards employees	

26. People are not properly trained when there is a new machine or bit of equipment	
27. People receive enough training when it comes to using new equipment	
28. People are strongly encouraged to develop their skills	
29. The company only gives people the minimum amount of training they need to do their job	

30. In this organisation, the way people work together is readily changed in order to improve performance	
31. The methods used by this organisation to get the job done are often discussed	
32. There are regular discussions as to whether people in the organisation are working effectively together	
33. In this organisation, objectives are modified in light of changing circumstances	
34. In this organisation, time is taken to review organisational objectives	

35. New ideas are readily accepted here	
36. This company is quick to respond when changes need to be made	
37. Management here are quick to spot the need to do things differently	
38. This organisation is very flexible; it can quickly change procedures to meet new conditions and solve problems as they arise	
39. Assistance in developing new ideas is readily available	
40. People in this organisation are always searching for new ways of looking at problems	

41. This organisation is quite inward looking; it does not concern itself with what is	
42. Ways of improving service to the customer are not given much thought	
43. Customer needs are not considered top priority here	
44. This company is slow to respond to the needs of the customer	
45. This organisation is continually looking for new opportunities in the market place	

46. People are expected to do too much in a day
47. In general, peoples' workloads are not particularly demanding
48. Management require people to work extremely hard
49. People here are under pressure to meet targets
50. The pace of work here is pretty relaxed

51. People have a good understanding of what the organisation is trying to do
52. The future direction of the company is clearly communicated to everyone
53. People aren't clear about the aims of the company
54. Everyone who works here is well aware of the long-term plans and direction of this company
55. There is a strong sense of where the company is going

56. People usually receive feedback on the quality of work they have done
57. People don't have any idea how well they are doing their job
58. In general, it is hard for someone to measure the quality of their performance
59. People's performance is measured on a regular basis
60. The way people do their jobs is rarely assessed

61. This company is always looking to achieve the highest standards of quality
62. Quality is taken very seriously here
63. People believe the company's success depends on high-quality work
64. This company does not have much of a reputation for top-quality products

65. Time and money could be saved if work were better organized
66. Things could be done much more efficiently, if people stopped to think
67. Poor scheduling and planning often result in targets not being met
68. Productivity could be improved if jobs were organised and planned better

69. People here always want to perform to the best of their ability
70. People are enthusiastic about their work
71. People here get by with doing as little as possible
72. People are prepared to make a special effort to do a good job
73. People here don't put more effort into their work than they have to

74. It is considered extremely important here to follow the rules
75. People can ignore formal procedures and rules if it helps get the job done
76. Everything has to be done by the book
77. Its not necessary to follow procedures to the letter around here
78. Nobody gets too upset if people break the rules around here

79. Changes in the way things are done here happen very slowly
80. Senior management like to keep to established, traditional ways of doing things
81. The way this organisation does things has never changed very much
82. Management are not interested in trying out new ideas

APPENDIX B:

Information letter

Information Letter for Research Study: Construct validation of the Organisational Climate Measure in the Belgian workplace

This letter serves to provide you with a background of the proposed study. It is important that you read through this letter to familiarise yourself with the purpose of the research so as to better inform your understanding as you answer the questionnaire.

'Organisational climate' can generally be seen as perceptions of the work environment and is central to most models of organisation behaviour (Rousseau, 1988). Mostly understood as a prevailing variable between the context of an organisation and the behaviour of its employees, and trying to understand how employees experience their organisations, the concept has inspired many images and operationalizations. Regardless of the level of interest surrounding organisational climate, nevertheless, there are few well-validated measures of the construct. (Patterson *et al*., 2005).

The aim of this study is to explore the construct validity of the OCM (The Organisational Climate Measure) developed by Patterson and Colleagues (Patterson *et al*., 2005) in Belgium. Thus the researcher wants to conclude whether at any time you translate a construct of the OCM, it is generalizable to other samples and constructs.

The OCM measures organisational climate on 17 scales. The measure is designed to assess a broad range of organisational, rather than psychological variables that comprise the organisational context for individual actions (Patterson *el al*., 2005). The validity of a measurement is very important when you want so generalize the results of previous studies on other populations. This represents a substantial need for the proposed study in order to explore the construct validity of the OCM in the Belgian workplace. The study will be employing a quantitative research method, with data being gathered through the distribution of electronic questionnaires. The accumulated data will then be analysed with the intent of discovering general statistical patterns, and a final report thereafter written to make the findings available to the public.

The researcher is readily available to address any concerns or attend to any queries you may have, please feel free to contact him.

Researcher: Willie van Tonder

Cellular phone number: 048 447 0173

Email address: w.vantonder@searchselection.com

APPENDIX C

Letter of consent

Letter of consent

I the undersigned hereby give my informed consent to participate in the study on the construct validation of the Organisational Climate Measure in the Belgian workplace. I have read and understand the information letter regarding the study and I realise that the purpose of this study is to explore the variables among constructs of the OCM in order to conclude if generizability of previous studies is possible. The main purpose therefore is to determine weather the OCM could be used to test organizational climate in a Belgian context.

I understand that the study is exploratory and no judgements will be made about me as an individual and that only the researcher will have access to my results. I also understand that as a research participant utmost confidentiality and anonymity will be maintained and no results will be linked to me personally in any manner whatsoever. I realise that no records of personal details or identifying factors will be used in the analysis. In addition, neither individual results nor profiles will be examined in isolation and therefore no individual will be identified in the final report. In line with this I understand that the data collected will only be used for the stated purpose of the research and that no personal information related to me will be discussed or shared with anyone without consent.

I furthermore realise that I have the right to withdraw from the study at any time.

I hereby state that I have not been coerced into consenting to participate in this study by the researcher, any of his affiliates or by any aspect of the organisational setting in which the research is being conducted.

I understand that I will not be able to gain access to my individual results. Should I have any queries or concerns I am aware that the researcher, Willie van Tonder, is readily

available should I wish to contact him via email (w.vantonder@searchselection.com) or telephonically (048 447 01 73).

Signature_____ Date_____