Determinants of enhanced risk disclosure of JSE Top 40 Companies: the board risk committee composition, frequency of meetings and the chief risk officer

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A B S T R A C T

Risk disclosure practices have received increasing attention in the wake of the 2008 global financial crisis. This study investigated possible determinants relating to the composition of the board committee responsible for risk management, the frequency of board risk committee meetings and whether the company employs a chief risk officer, which could manifest in an enhanced level of risk-related disclosure. Based on the possible determinants identified in the literature, nine hypotheses were developed in order to investigate which of these determinants relate to an enhanced level of risk disclosure by the selected companies. The first required integrated reports of non-financial companies in the Top 40 index of the JSE Securities Exchange were investigated in this study. Regarding one area of investigation, namely the level of risk management disclosure, it was found that the disclosure of companies whose risk committee met more frequently and the disclosure of companies that employed a chief risk officer, were of a relatively higher standard. With regard to the other area of investigation, namely the level of risk identification and mitigation disclosure, no clearly significant determinant of enhanced disclosure was identified.

Key words: risk management; risk committee; risk disclosure; King III; risk identification and mitigation; board of directors; audit committee; integrated report

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Introduction

It is widely acknowledged that risk reporting prior to the 2008 global financial crisis was inadequate (ICAEW 2011; Kirkpatrick 2009). In its report on risk disclosure, the Institute of Chartered Accountants for England and Wales (ICAEW 2011) provides three possible reasons for inadequate risk reporting:

- the requirements for risk reporting were insufficient;
- the requirements for risk reporting were sufficient, but managers, who were aware of the risks, chose not to disclose them; or
- the board of directors was either unaware of the risks, or completely underestimated them.

No comprehensive set of guidelines is currently available on the disclosure of risk identification and risk management processes (Enslin, Bruwer & Viljoen 2015; Kirkpatrick 2009). With the exception of the disclosure of financial risk, which is regulated by the International Financial Reporting Standards (IFRS), the level and content of risk reporting can be determined by the board of directors of each company. Kirkpatrick (2009) has argued that limited guidance on and requirements for risk disclosure have resulted in the inadequate management of risks by boards of directors. The responsibility for risk management and disclosure rests ultimately with the board of directors of companies (IOD 2009).

As a means to assist the board of directors in fulfilling its responsibility, King III (IOD 2009) stipulates the following:

> The board should assign oversight of the company's risk management function to an appropriate board committee (for example a risk committee or the audit committee). Membership of the risk committee should include executive and non-executive directors. Members of the risk committee, taken as a whole, should comprise people with adequate risk management skills and experience to equip the committee to perform its functions.

The fact that this responsibility resides with the board of directors, and specifically the board committee to whom the responsibilities for risk management oversight are discharged, implies that the composition of the board committee on risk identification and risk management may have a significant influence on risk management and risk disclosure practices of companies.

Risk disclosure is of vital importance to investors, both equity investors as well as providers of loan capital, as these investors stand to lose money if the business in which they have invested fails. Investors do not have inside knowledge of the risks the business is facing, the tolerance levels of risk or the adequacy of risk management systems (FRC 2011). Investors require risk-related information in order to perform

their own risk assessment and calculate the return that would adequately compensate them for the risk relating to an investment in the business (Abraham & Cox 2007).

According to Maingot, Quon and Zéghal (2014), the level of risk disclosure by non-financial companies in the United States of America and Canada was only affected to a negligible extent by the 2008 global financial crisis. Hence if risk disclosure was inadequate before the financial crisis, it remains a problem that must be addressed and resolved. The problem is partly due to the fact that risk disclosure is largely unregulated. This problem of the inadequate level of risk disclosure forms the problem statement that necessitated the investigation conducted in this study.

Given the prevalence of inadequate risk and risk management disclosure, despite the importance of such disclosure, Mokhtar and Mellett (2013) stressed the need to determine the nature and determinants of risk reporting. The objective of this study was therefore to investigate determinants of risk disclosure relating to the composition of the board risk committees, the frequency of its meetings as well as a selection of company characteristics of companies listed on the JSE Securities Exchange. The factors relating to the board risk committee and other company characteristics were identified from previous research literature as possible determinants of the level of risk disclosure.

The Integrated Reporting Framework created by the International Integrated Reporting Council has set out risk and opportunities as one of the content elements of the integrated report (IIRC 2013). Accordingly, the first required integrated reports of non-financial companies in the Top 40 index of the JSE Securities Exchange were investigated in this study to identify which of the possible determinants correlated with higher quality risk reporting.

The aim of this study was to provide possible guidance to boards of directors on the optimal composition of their board risk committees, the frequency of its meetings and whether to appoint a chief risk officer. Investors could also benefit from a better understanding on determinants of enhanced risk disclosure, which could be an indication of enhanced risk management (Enslin et al. 2015).

Literature review and hypothesis development

Although risk management and risk disclosure have received heightened research attention in recent years, research into factors pertaining to quality risk disclosure remains extremely limited (Miihkinen 2012). Investors have called for improved risk disclosure (ICAEW 2011) following the financial crisis which occurred during the latter part of the previous decade. In addition, investigations have been conducted

internationally into how risk management and risk disclosure could be improved (ICAEW 2011; FRC 2011).

The literature review is divided into two sections. This first section deals with the identification of a measurement tool suited to measuring the level of risk disclosure by South African listed companies. The second section relates to literature on the possible determinants of enhanced risk disclosure and the development of hypotheses based on the literature.

Disclosure index for measuring level of risk disclosure

The Integrated Reporting Framework provides limited guidance on risk disclosure by suggesting that specific key risks should be disclosed (IIRC 2013). It also suggests that disclosure on each risk may include discussion of the source of the risk, the company's assessment of the risk and the steps taken to mitigate the risk. However, specific details on risk management disclosure are not provided.

In its statement on management commentary, the International Accounting Standards Board (IASB 2010) states the following:

> Management should disclose an entity's principal risk exposures and changes in those risks, together with its plans and strategies for bearing and mitigating those risks, as well as disclosure of the effectiveness of its risk management strategies.

The above statement of the IASB should be supplemented with other guidelines on risk and risk management disclosure, as it does not deal specifically with the detail of risk and risk management disclosure. Other guidelines on risk and risk management disclosure provide fragmented guidance on disclosure.

Based on a review of the available guidelines, Enslin et al. (2015) compiled a risk disclosure index indicating current requirements in terms of leading guidelines. They segregated risk relating reporting into two categories for the purposes of the risk disclosure index, namely risk management related disclosure (see Table 1) and risk identification and mitigation related disclosure (see Table 2). This risk disclosure index provides a tool with which to measure the level of a company's risk reporting.

Possible determinants of enhanced risk disclosure

One area of risk-related research investigates possible factors that may determine improved risk management, as well as factors that may determine improved risk disclosure. The determinants of risk disclosure have been addressed in a number of studies in developed countries, but investigation into determinants in developing

Table 1: Risk disclosure index for risk management

Disclosure	Source
Note that the full board is responsible for risk.	King III, SEC
Note how the board is involved with regard to the company's risk appetite or overall risk tolerance.	SEC, King III
Note that the company has a chief risk officer (CRO) or related position.	FRC
Note whether the CEO is responsible for risk management or how the CEO is involved.	COSO, SEC
Note whether a companywide corporate culture of risk management is being fostered.	FRC, COSO
Note whether the company has a risk committee at management level.	ISO, COSO, SEC
Disclose whether risk management is aligned with the company's strategy.	FRC, COSO
Disclose the main processes used by the risk management systems to identify risks.	IRM
Disclose the monitoring and review system in place to ensure continued comprehensiveness and relevance of the risk management system.	IRM
Disclose the board's views on the effectiveness of the company's risk management processes.	King III

Source: Enslin et al. (2015)

Table 2: Risk disclosure index for risk and risk identification

Disclosure	Source
Disclose principal risks, rather than listing all possible risks.	FRC, ICAEW
Disclose company-specific risks, rather than the reporting of general risks.	FRC
Provide a discussion on each risk itself, rather than just cryptically listing the risk.	FRC, ICAEW
Indicate the cause of each risk, even if just general.	ICAEW
Note the possible impact that the possible occurrence of the risk event may have on the company in general.	ICAEW
Support risk disclosure by quantitative disclosures.	ICAEW
Note what impact the possible occurrence of the reported risks may have, specifically on the achievement of the company's strategic objectives.	FRC
Disclose how principal reported risks are/were being mitigated.	FRC
Disclose the company's risk appetite, even if only to state whether the risk appetite is increasing or becoming more risk averse.	King III, FRC
Explain changes in the company's risk exposure over the previous 12 months as a result of changes to the strategy or business environment.	ICAEW, FRC
Indicate if the company's risk exposure might change in the future, as a result of changes to the strategy or business environment.	ICAEW

Source: Enslin et al. (2015)

countries is limited (Mokhtar & Mellett 2013). Possible determinants for proper risk management and for adequate risk disclosure as identified in previous studies, will be discussed in the remainder of the literature review. The identified determinants will subsequently provide the theoretical base for the hypotheses in this study on the possible determinants for enhanced risk disclosure by companies listed in South Africa, a developing country.

Previous research has investigated the composition of the board and risk reporting (Oliveira, Rodrigues & Craig 2011; Dobler, Lajili & Zéghal 2011; Mokhtar & Mellett 2013). Although the board of directors is ultimately responsible for risk disclosure, this duty is delegated to either the audit or the risk committee of the board. According to King III (IOD 2009), the responsibility for risk management should only be assigned to the audit committee after considering whether the audit committee has sufficient resources to deal with risk governance, as well as with its audit responsibilities. As such, it makes more sense for the specific characteristics of the board committee responsible for risk and risk management to have a stronger relationship with the level of risk reporting by listed companies, than the characteristics of the board as a whole.

Separate board risk committee

According to King III (IOD 2009), the board of directors should delegate the duty to design, implement and monitor the risk management plan of the entity to management. However, it remains the duty of the board to ensure that there are processes in place that will allow sufficient risk disclosure to stakeholders to enable them to make informed decisions (IOD 2009). Although the board of directors remains responsible for risk management, this function is delegated to a board sub-committee (either the audit committee or a separate risk committee).

King III (IOD 2009) allows the audit committee to accept responsibility for internal auditing and risk management. However, it is clear from the wording, *"this should be done with careful consideration to the resources available to adequately deal with risk governance in addition to its audit responsibilities"*, that it would be preferable for a company to have a separate board sub-committee to deal with risk management.

The Dodd-Frank Wall Street Reform and Consumer Protection Act in the United States of America and the Walker Review in the United Kingdom have highlighted the need for a board risk committee and the establishment of such a committee is increasingly becoming best practice at international level (Lawlor 2012; Ballou & Heitger 2008). Reputable frameworks for risk management, including the framework issued by the Committee of Sponsoring Organizations of the Treadway Commission

(COSO 2004), emphasise that risk management will fail in the absence of proper oversight. Brown, Steen and Foreman (2009) noted that, owing to the complexity of non-financial risks, it might not be possible for boards to rely on the audit committee alone to manage risk and that creating a separate risk management committee would be likely to improve risk management. According to Subramaniam, McManus and Zhang (2009), a board risk committee is a critical resource for boards to fulfil their responsibilities as far as risk management is concerned, but there is still a paucity of empirical evidence on the nature of these committees. It is therefore possible that the existence of a separate risk committee might be a determinant for improved risk disclosure practices.

The determinants of risk management disclosure could, theoretically, differ from those of risk identification and mitigation reporting. Risk management disclosure focuses on the processes which are largely prescribed by King III (IOD 2009) and enterprise-wide risk management systems. Risk identification and mitigation disclosure, however, are more subjective, with little directives that may serve as guidance. In the case of risk management disclosure, however, the existence of a separate risk committee is not as important, as the audit committee typically retains some risk-related duties and the internal audit function provides assurance on the risk management systems. A separate risk committee that focuses almost exclusively on risks and spends most of its time at meetings on this subject could, however, improve disclosure on risks and the mitigation thereof.

King III (IOD 2009) stipulates that the committee responsible for risk management should include both executive and non-executive directors, and should have a minimum of three members. The committee should meet at least twice a year and should consist of people with adequate risk management skills and experience.

The preferability of a separate board committee for risk management and disclosure is confirmed by various international studies (Lawlor 2012; Brown et al. 2009; Atkinson 2008; Ballou & Heitger 2008). The first hypothesis therefore tested the relationship between the existence of a separate board risk committee and the level of risk disclosure. For the purposes of this study, a value of one was assigned to companies that had a separate risk committee and a value of zero assigned to companies in which the duties relating to risk identification, management and disclosure form part of the duties of a combined committee.

H_1: *There is a positive relationship between the existence of a separate board committee for risk and risk management (RC) and the level of risk disclosure.*

Number of independent directors

Independence, according to King III (IOD 2009), refers to *"the absence of undue influence and bias which can be affected by the intensity of the relationship between the director and the company"*.

Htay, Rashid, Adnan & Meera (2012) found that a higher percentage of independent directors on the board led to higher information disclosure. This could be extrapolated to the board committee. Whether the board committee tasked with risk management is a separate risk committee or is combined with another committee, for example, the audit committee, the number of independent directors on the committee may also lead to improved risk disclosure. According to Ismail and Rahman (2011), independent non-executive directors are of vital importance in order to provide balance on the board of directors and to monitor management. These directors will enhance their own reputation by increasing the quality of monitoring in the companies where they serve on the board of directors (Fama & Jensen 1983).

Independent non-executive directors on the board, as well as on the risk committee, are beneficial in order to reduce the agency problem (Abraham & Cox 2007). Agency conflict is a key issue to address when discussing the role of directors in a company and, in this case, specifically with regard to risk management. The reason for this is that, while more disclosure on risk might be beneficial to stakeholders such as shareholders and suppliers of finance, it might prove detrimental to the management team in charge of the day-to-day running of the company, who will also be evaluated on the basis of their performance as far as risk management is concerned.

Based on the resource dependency theory, directors are beneficial to a company as they provide knowledge, skills, expertise and contacts to the company. Directors who also have a link with outsiders should have access to external resources that could enhance performance (Ismail & Rahman 2011). The presence of a company's directors on the boards of other companies can also improve access to information that could be utilised to the advantage of the company (Kyereboah-Coleman 2008). However, Ismail and Rahman (2011) found that risk management disclosure is negatively correlated with the number of independent, non-executive directors, and they could not find a significant relationship between risk management disclosure and the number of non-independent, non-executive directors.

Abraham and Cox (2007) found that the number of executive and independent, non-executive directors was positively related to the level of corporate risk reporting, but not the number of dependent, non-executive directors. Owing to their connection with the company, non-independent directors' judgements could be influenced by management. This underlines the importance of independent directors in good corporate governance.

The quality of decision making and strategic direction for the company could be influenced by outside directors (Pearce II & Zahra 1992). Rahman and Ali (2006) found that independent, non-executive directors ensure enhanced monitoring. The findings of Cheng and Courtenay (2006), that companies with a higher number of independent directors have a higher level of voluntary disclosure, provide support for the positive influence of independent directors. However, contrary to the arguments above, Haat, Rahman and Mahenthiran (2008) and Dionne and Triki (2005) found that the number of independent directors does not have an effect on risk management.

However, in this study, it was found that some companies nominated only independent directors on the specific committee charged with the responsibility of risk, but the executive directors attended all the meetings as invitees. It is thus possible that the official proportion of independent directors could be misleading, as the executive directors would certainly play a significant role in the meetings. It was therefore decided to use the number of independent directors on the board committee tasked with risk and risk management as the independent variable. It is argued that the greater the number of independent directors is, the more power these gatekeepers, who fulfil the monitoring role and protect the stakeholders' interests, should have in meetings. Boards with more independent directors are more effective in monitoring management, thus also reducing agency problems.

H_2: *There is a positive relationship between the number of independent directors on the board committee (#IndD) and the level of risk disclosure.*

Variation in experience

Diversity, as far as the skills and level of experience of directors (especially non-executive directors) are concerned, enhances the effectiveness of a committee as it provides alternative perspectives on strategy and risk (Tyson 2003). McIntyre, Murphy and Mitchell (2007) supported the view that the levels of experience of directors may influence the performance of the board, which may also be true for board committees. Accordingly, a study conducted by Xie, Davidson III and DaDalt (2003) concluded that there is a positive relationship between risk disclosure and the number of experienced directors on the board. However, Ismail and Rahman (2011) and Rahman and Ali (2006) found that there is a negative relationship between risk management disclosure and the existence of experienced directors on the board.

Experience is measured by the number of years the independent director has served on the board of the specific company. Variation in experience could be beneficial to risk reporting, as directors with different levels of experience should have different views on the quantity and quality of disclosure on risks and the management thereof.

H_3: *There is a positive relationship between the variation in the experience of the independent directors on the board committee (VarIDExp) and the level of risk disclosure.*

Variation in experience refers to the difference in experience between the various independent directors serving on the committee of the specific company. The measurement of variation is based on the standard deviation of experience.

Variation in age

McIntyre et al. (2007) also studied the average age of the directors on the board, as well as the variation in their age. Their study found that high levels of experience, but with moderate levels of variation in age and team tenure, were correlated with improved firm performance. McIntyre et al. (2007) proposed that optimal boards should, firstly, possess moderate diversity along key dimensions, such as tenure and age; secondly, only be large enough to ensure that the task required is completed with the required resources and capabilities; thirdly, have medium team tenure; and fourthly, have experienced membership.

Their findings support the view that team design is indeed necessary for the effective functioning of boards of directors. These requirements could also be made applicable to the board committee charged with managing risk. The reasoning behind this investigation into the variation in age of the directors on the committee is that disclosure should improve along with an increase in age variation, as different viewpoints and experience will be represented by a wider spectrum of ages.

H_4: *There is a positive relationship between the variation in the age of the independent directors on the board committee (VarIDAge) and the level of risk disclosure.*

Variation in age refers to the difference in age between the various independent directors serving on the committee of the specific company. The measurement of variation is based on the standard deviation of age.

Number of meetings

The number of meetings of the board (as well as those of the audit committee) is indicative of its effective functioning, as well as how often relevant issues are addressed (Dey 2008). However, Brick and Chidambaran (2010) found that the number of annual audit committee meetings is slightly negatively correlated with company value. Although Brick and Chidambaran's (2010) study related audit committee meetings to firm value, it could indicate, in contradiction of Dey's (2008)

argument that the number of committee meetings may not necessarily result in more effective functioning.

The number of meetings held by the committee charged with the responsibility of risk should influence the level of risk reporting in the integrated report. The more frequently the committee discusses these issues, the better the disclosure of risk should be.

H_5: *There is a positive relationship between the number of meetings of the board committee (#Meet) and the level of risk disclosure.*

Designated chief risk officer

King III (IOD 2009) states that the chief risk officer should be a suitable and experienced person who should have access to the board and interact with them (as well as executive management and the relevant board committees) on a regular basis with regard to strategic risk matters. In their investigation into determinants of companies' enterprise risk management adoption, Liebenberg and Hoyt (2003) found, however, that companies with a chief risk officer did not have a significantly higher adoption rate. The need for a chief risk officer may indeed be debatable as risk management capabilities should be evident across all levels of management in an entity and should be integrated throughout (KPMG 2001). However, Liebenberg and Hoyt (2003) did find that companies with higher leverage were more likely to employ a chief risk officer. They interpreted this phenomenon to be indicative of the fact that companies facing greater financial risk require a chief risk officer to, inter alia, communicate the company's risk profile effectively to external stakeholders. In accordance with the Liebenberg and Hoyt's (2003) interpretation mentioned above, having a chief risk officer in office should improve risk disclosure. A value of one was assigned to companies that had a designated risk officer, and a value of zero assigned to companies that did not indicate that they had a designated risk officer.

H_6: *There is a positive relationship between the appointment of a specifically designated chief risk officer at management level (RO) and the level of risk disclosure.*

Additional company-related factors that could be determinants of enhanced risk disclosure are discussed below.

Size of the company

Amran, Bin and Hassan (2008) argued that the larger the company is, the larger the number of stakeholders involved with the company is. The duty of disclosure thus

increases as the company grows, because the information needs of a larger number of people must be satisfied. It can also be said that the larger the company is, the more resources it has available to ensure that better risk management systems are implemented within the company. This should lead to improved information for disclosure purposes. Previous studies on risk or other voluntary disclosure proved a positive association between company size and level of disclosure. Oliveira et al. (2011), Hussainey and Al-Najjar (2011), Khodadadi, Khazami and Aflatooni (2010), Amran et al. (2008) and Beretta and Bozzolan (2004) all confirmed the positive relationship between the size of a company and risk disclosure. However, Hassan, Giorgioni and Romilly (2006) found a negative relationship between company size and improved disclosure practices, while Hassan (2009) and Mokhtar and Mellet (2013) found the relationship between the size of the company and risk disclosure to be insignificant. Mokhtar and Mellet (2013) suggest that a possible explanation for this conflict with the literature could be that the role of the size of a company differs between developed economies and developing economies, with less mature reporting systems.

According to a study by Ismail and Rahman (2011), company size (defined by the logarithm of total assets) has a significant effect on risk management disclosure. Chow and Wong-Boren (1987) also determined that company size is positively related to the level of voluntary disclosure.

In addition, agency cost is typically higher in larger companies, and increased agency cost should lead to greater monitoring and risk management (Carcello, Hermanson & Raghunandan 2005; Goodwin-Stewart & Kent 2006). The size of the company is thus a vital control variable that should be included (Subramaniam et al. 2009).

A number of studies have determined that the size of a company is an important factor as far as risk management is concerned (Oliveira et al. 2011; Subramanian et al. 2009; Meek, Roberts & Gray 1995). Many different ratios, such as the following, have been used in previous studies to provide an indication of company size:

- The natural logarithm of sales revenue was used as an indication of company size (Dey 2008).
- The book value of total assets at the end of the prior financial year was utilised (Brick & Chidambaran 2008).
- The size of the company, calculated by using the logarithm of total assets, was used. Data was logged to minimise the possible impact of extreme values (Abraham & Cox 2007; Ibrahim & Samad 2011).
- Amran et al. (2008) defined size by using the turnover of the company.

- The logarithm of total assets of the company, as well as the logarithm of annual sales, was used. Both values were logged to minimise the effect of extreme values (Mokoaleli-Mokoteli & Ojah 2010).

In this study, the logarithm of total assets was used as an indication of company size.

H_7: *There is a positive relationship between the size of a company (Size) and the level of risk disclosure.*

Profitability

Profitable firms have incentives to distinguish themselves from less profitable firms in order to motivate shareholders to invest in them, rather than in less profitable firms (Meek et al. 1995). Accordingly, profitable companies are motivated to disclose more information in order to satisfy shareholders, to enhance the image of the company and to increase the marketability of shares and justify managers' compensation. However, in their investigation into determinants of the level of voluntary disclosure by companies, Mokoaleli-Mokoteli and Ojah (2010) found that higher profitability does not necessarily lead to companies disclosing more voluntary information.

In this study on risk identification and mitigation reporting, profit (as defined by net profit after tax, as a percentage of total assets) was used as a control variable. This is because the business and operational risks that directly impact on profits are those that are identified and being reported on. More profitable companies might be more willing to disclose their major risks in more detail. However, it is also possible that less profitable companies could be motivated to reveal more relating to their risks and risk mitigation, in order to attract new investors.

Profitability was calculated by using net profit after tax/total assets, in accordance with the study by Mokoaleli-Mokoteli and Ojah (2010).

H_8: *There is a positive relationship between profitability (Profit) and the level of risk disclosure.*

Industry

Amran et al. (2008) found a significant relationship between the nature of the industry in which a company operates and its risk disclosure. The more risks an industry is exposed to, the greater the exposure will be – hence the higher the required level of risk disclosure. Mokoaleli-Mokoteli and Ojah (2010) reported

that the industry in which a company operates is a significant factor in voluntary disclosure.

In this study, a dummy variable was created in order to determine whether risk reporting was influenced by the industry in which a company operates. Owing to the limitation of the sample size, it was decided to limit the distinction between industries to companies in extractive industries and companies operating outside the extractive industries. Extractive companies are broadly defined as companies involved in the mining industry, while the rest of the population consisted of companies not involved in mining. Extractive industries are exposed to comparatively higher safety, regulatory or ecological risks (FRC 2011). A value of one was assigned to extractive companies and a value of zero to non-extractive companies.

H_9: *The level of risk disclosure depends on the industry in which the company trades (Extract).*

Research method

The level of risk reporting by the 29 non-financial companies in the JSE Top 40 index was measured using the disclosure index developed by Enslin et al. (2015). Information on the possible determinants of enhanced risk reporting, which were identified in the literature review, was collected for all the selected companies. Based on a post-positivist research paradigm, a quantitative method was used to develop statistical models to indicate which of the possible determinants explained differences in the level of risk disclosure within the sample. The results of the forward stepwise regression models indicated which of the hypotheses developed in the literature review could not be rejected. The determinants relating to the hypotheses which were not rejected, were accepted as determinants of enhanced risk-related disclosure in the sample.

Population and sampling

The population for this study included all the companies listed on the JSE Securities Exchange in South Africa. A non-random, purposive sample was selected for investigation. The sample consisted of the non-financial companies in the Top 40 index of the JSE as on 1 March 2011. Selecting a sample consisting of the Top 40 index of companies was consistent with previous studies (Barac & Moloi 2010; Marx & Voogt 2010; Enslin et al. 2015). Financial companies were excluded as they operate under different rules and regulations, including those pertaining to risk management and disclosure. The integrated reports of the sample companies for

their financial years ending on or between 31 March 2011 and 29 February 2012 were selected for the analysis. This represents the first reporting period for which each of these companies was required to submit an integrated report in accordance with King III (IOD 2009), as required by the JSE listing requirements (JSE n.d.). This is significant because King III (IOD 2009) requires risk and risk management-related disclosure in the integrated report. Investigating the first integrated reports also provides a baseline against which future investigations may be compared. This study therefore included 29 companies in total.

Dependent variable

Disclosure of risk management as one dependent variable and risk identification and mitigation as a second dependent variable were measured by means of a risk disclosure index compiled by Enslin et al. (2015) from the requirements and guidelines contained in the reports of Deloitte (2012), FRC (2011), ICAEW (2011), IASB (2010), SEC (2009), ISO (2009) and IRM (2002), as well as the requirements of King III (IOD 2009).

The requirements and guidelines for reporting on risk were categorised as follows, in accordance with the disclosure index by Enslin et al (2105): disclosure on the risk management processes (Table 1 in the literature review section), and disclosure on risks identified and mitigation thereof (Table 2 in the literature review section). For each requirement that was disclosed, a value of one was awarded, and in the absence of its disclosure, a value of zero awarded. The index score was therefore a measure of the level of reporting, but not necessarily the quality of the disclosure (Beattie, McInnes & Fearnley 2004). Owing to the fact that an ordinal scale for the presence or absence of an item was used, indicating only whether or not a company satisfied and complied with a specific requirement on the risk disclosure index, no weighting was done. Ordinal results allow categorisation of data according to a selected rank which helps to describe differences between data; in this instance, how many companies complied with each specific requirement. Weighting was not necessary, as the disclosure index in this study was not developed from the preferences of a specific group of stakeholders (Marston & Shrives 1991). Previous studies also found that weighted and unweighted scores showed similar results (Khodadadi et al. 2010; Marston & Shrives 1991). As each requirement was equally important, an unweighted approach was followed (Mokoaleli-Mokoteli & Ojah 2010).

Independent and control variables

According to Mokoaleli-Mokoteli and Ojah (2010), independent variables must, firstly, be related to the disclosure; secondly, they should be easily measured; and, thirdly, data should be available on that corporate characteristic. These requirements were considered in the development of the independent variables. The nine possible determinants of enhanced risk disclosure which were identified from the literature were selected as the independent variables to identify which possible determinants explain differences in the level of risk reporting by sample companies.

Development of models

The two dependent variables, risk management disclosure, and risk identification and mitigation disclosure could hypothetically be explained by various characteristics of the risk committee and other risk management specifics of the company. As the number of observations was small, over-fitting of the models being developed posed a real risk. Although R^2 could be made much higher by the addition of more variables, the models could not be significant as a result of over-fitting. The independent variables that were studied all had a theoretical causal association with the dependent variables and, as such, the researchers did not wish to omit any of them in the development of the models. It was therefore decided to use forward stepwise regression, limiting the number of variables that could be included in the models, so that only the independent variables which improve the various models would form part of the model. This ensured that only the dependent variables with the most explanatory power and that added the most value to the study and to the results were included in the end results.

Results and discussion

Descriptive statistics

Table 3 presents the descriptive statistics for the continuous independent variables and Table 4 for the categorical independent variables. Two companies did not report on any aspect of the disclosure index for risk identification and mitigation, and they were therefore not included in the development of the models for risk identification and mitigation. This resulted in 29 observations for risk management disclosure and 27 observations for risk identification and mitigation disclosure. From the descriptive statistics it is evident that the presence of risk management disclosure was more prevalent than the disclosure of risk identification and mitigation. The

p-values of the Kolmogorov-Smirnoff tests for the dependent variables were all larger than 20%, which indicates that there was not enough evidence to infer that the data was not normally distributed.

Table 3: Descriptive statistics of continuous independent variables

Variable	Model	n	Mean	Median	Min	Max	Standard deviation
#IndD	Risk management	29	3.690	4.000	2.000	6.000	1.198
	Risk identification & mitigation	27	3.741	4.000	2.000	6.000	1.196
VarIDExp	Risk management	29	3.327	2.887	0.500	8.958	2.324
	Risk identification & mitigation	27	3.219	2.887	0.500	8.958	2.194
VarIDAge	Risk management	29	7.564	7.348	1.247	14.500	3.460
	Risk identification & mitigation	27	7.502	7.348	1.247	14.500	3.555
#Meet	Risk management	29	4.483	4.000	2.000	9.000	1.617
	Risk identification & mitigation	27	4.556	4.000	2.000	9.000	1.649
Size	Risk management	29	10.731	10.680	9.794	11.843	0.518
	Risk identification & mitigation	27	10.738	10.680	9.794	11.843	0.529
Profit	Risk management	29	0.146	0.111	0.015	0.648	0.118
	Risk identification & mitigation	27	0.146	0.109	0.015	0.648	0.122

Table 4 contains the information on the categorical independent variables. Only 34% of all the companies had a separate risk committee at board level; the other companies combined the responsibility of risk with the audit committee's responsibilities. The majority (66%) of the companies did not have a manager appointed specifically as a risk officer. Note that the two companies that did not comply with any of the risk identification and mitigation disclosure investigated in this study did not have a separate risk committee and also did not have a specific risk officer.

Table 4: Descriptive statistics of categorical independent variables

Variable	Model	n	Number 0	Number 1
RC	Risk management	29	19 (66%)	10 (34%)
	Risk identification & mitigation	27	17 (63%)	10 (37%)
RO	Risk management	29	19 (66%)	10 (34%)
	Risk identification & mitigation	27	17 (63%)	10 (37%)
Extract	Risk management	29	15 (52%)	14 (48%)
	Risk identification & mitigation	27	13 (48%)	14 (52%)

Correlation

The Pearson correlation coefficient is indicated in Table 5. This indicates the correlation between the dependent and the independent variable. There was a positive significant correlation (at a 5% level) between risk management disclosure and the number of meetings as well as the appointment of a specific risk officer at a company level. Extractive companies had a significant correlation with risk management disclosure at a 10% level. None of the independent variables indicated a significant correlation with risk identification and mitigation disclosure.

Table 5: Correlation between the dependent and the independent variables

	Risk management	**Risk identification and mitigation**
Independent variables		
RC	-0.055	-0.034
#Ind	0.175	0.160
VarIDExp	-0.130	0.059
VarIDAge	-0.262	-0.313
#Meet	****0.504**	0.207
RO	****0.487**	-0.075
Size	0.269	0.089
Profit	0.017	0.319
Extract	***0.357**	-0.110

** Significant at a 5% level/*significant at a 10% level

The correlation between the independent variables was also tested. There was a significant correlation at a 10% level for risk management disclosure between VarIDExp and VarIDAge. These two variables also had a significant correlation at a 5% level for risk identification and mitigation. For this reason, it was decided not to use VarIDAge in the development of the regression models.

Regression models for risk and risk management disclosure

In Table 6, the two models developed for risk management (Model 1) as well as risk identification and mitigation disclosure (Model 2) are summarised. Model 1 was significant at a 1% level, with an R^2 of 0.478 and an adjusted R^2 of 0.365.

The very small p-value (0.007) and the high f-statistic of 4.218 confirm the overall significance of the model. Model 2 for risk and mitigation was not significant and resulted in an R^2 of 0.229 and an adjusted R^2 of just 0.129. The low adjusted R^2 (especially as far as risk identification and mitigation is concerned) is an indication that other factors strongly influenced disclosure with regard to risk management, as well as risk identification and mitigation.

Table 6: Forward stepwise regression models

	All companies			
	Risk management (Model 1)		**Risk identification and mitigation (Model 2)**	
Model fit				
Multiple R^2	0.478		0.229	
Adjusted R^2	0.365		0.129	
F-STAT	4.218		2.283	
p-value	***0.007		0.106	
n	29		27	
Independent variables	p-value	Coefficient	p-value	Coefficient
Intercept	-0.188	-0.359	**0.295	2.787
RC	n/a	n/a	n/a	n/a
#IndD	n/a	n/a	n/a	n/a
VarIDExp	-0.017	-1.530	n/a	n/a
#Meet	*0.031	1.830	*0.036	1.775
RO	**0.120	2.216	n/a	n/a
Size	0.065	1.292	n/a	n/a
Profit	n/a	n/a	**0.572	2.155
Extract	0.057	1.121	-0.086	-1.320

*** Significant at a 1% level/** significant at a 5% level/* significant at a 10% level / n/a – variable not included in model

Forward stepwise regression involves testing the action of a variable by the use of specific comparison criteria. The variable will only be added if it improves the model. By conducting this process, two of the independent variables, #IndD and RC, were excluded from the models as their addition did not improve the models.

Discussion of findings

Table 7: Summary of hypotheses and findings

	Hypothesis tested	**Finding**
H_1	There a positive relationship between the existence of a separate board committee for risk management and the level of risk disclosure.	Hypothesis rejected. No statistically significant relationship could be found at a 1%, 5% or 10% level of significance.
H_2	There is a positive relationship between the number of independent directors on the board committee and the level of risk disclosure.	Hypothesis rejected. No statistically significant relationship could be found at a 1%, 5% or 10% level of significance.
H_3	There is a positive relationship between the variation in experience of the independent directors on the board committee and the level of risk disclosure.	Hypothesis rejected. No statistically significant relationship could be found at a 1%, 5% or 10% level of significance.
H_4	There is a positive relationship between the variation in age of the independent directors on the board committee and the level of risk disclosure.	Not included as variation in age and experience of independent directors had a significant correlation.
H_5	There is a positive relationship between the number of meetings of the board committee and the level of risk disclosure.	*Fail to reject hypothesis. 10% level of significance for risk management.* No significant relationship for risk identification and mitigation can currently be accepted*.
H_6	There is a positive relationship between the appointment of a specifically designated risk officer at a management level and the level of risk disclosure.	*Fail to reject hypothesis for risk management. There was a 5% level of significance for risk management.* No significant relationship for risk identification and mitigation at a 1%, 5% or 10% level.
H_7	There is a positive relationship between the size of the company and the level of risk disclosure.	Hypothesis rejected. No statistically significant relationship could be found at a 1%, 5% or 10% level of significance.
H_8	There is a positive relationship between profitability and the level of risk disclosure.	Hypothesis rejected. No significant relationship for risk management at a 1%, 5% or 10% level of significance. No significant relationship for risk identification and mitigation can currently be accepted*.
H_9	The level of risk disclosure depends on the industry in which the company trades.	Hypothesis rejected. No statistically significant relationship could be found at a 1%, 5% or 10% level of significance.

* With reference to risk identification and mitigation, the number of risk committee meetings and the profitability level indicated a possible significant correlation with enhanced risk disclosure in the development of the stepwise regression model (Table 6). However, the final model on risk identification and mitigation (Model 2) did not significantly explain the independent variable, and the Pearson correlation coefficient in Table 5 also did not indicate any significant correlation between the number of risk committee meetings and profitability variables, with the level of risk identification and mitigation disclosure. The number of risk committee meetings and the profitability level of the company could not therefore currently be accepted as variables that significantly influence the level of risk identification and mitigation disclosure. Further research, possibly with larger samples, would be required in this area.

No statistically significant relationship between the dependent variables and the level of risk identification and mitigation, and risk management disclosure were found, except for the following:

- The number of board risk committee meetings had a significant influence on the level of risk reporting for risk management disclosure.
- The appointment of a designated risk officer had a significant influence on the level of risk management disclosure.

This study found no significant difference in the level of risk disclosure by companies with a separate board risk committee and those with only an audit committee also responsible for risk management. Because this study focused on JSE Securities Exchange Top 40 companies, it is possible that the audit committees of these 'larger' companies currently do have the resources available to also perform their risk identification and management responsibilities at a satisfactory level. The audit committees of smaller companies, that may only have access to limited resources, may find it more difficult to also perform risk identification and management duties. Indeed Brown et al. (2009) recommend that the risk and audit committee should be separated because of the widening of the scope and the increased importance of risk management, and changes in corporate governance.

In agreement with the findings of Dionne and Triki (2005) and Haat et al. (2008), this study did not find a significant relationship between the number of independent directors and risk disclosure. This is in contrast to the study by Abraham and Cox (2007), who reported a significant relationship between corporate risk reporting disclosure and the number of independent directors on the board.

As some companies within the sample indicated that executive directors attended all the risk committee meetings as invitees, the extent of the influence of the independent directors in the discussions of the committee could have been diluted. This dilution could be a factor contributing to the finding that the number of independent directors did not show a significant relationship with the level of risk disclosure. However, this suggestion is preliminary and warrants further investigation in future research.

There was no significant relationship between the variation in experience of directors and the level of risk management disclosure. This is in line with the findings of Rahman and Ali (2006) and Ismail and Rahman (2011). In addition, no significant relationship between variation in age of directors and risk disclosure was evident. This is in contrast with the findings of a study by McIntyre et al. (2007), who found that high levels of experience, as well as moderate levels of variation in age, were indeed correlated with firm performance. Risk management and related

risk disclosure practices are still evolving in the wake of the recent financial crisis. Accordingly, it would seem that directors have not yet had enough time to gain distinctive skills and knowledge relating to risk identification and management and the disclosure thereof.

This study indicated that the number of meetings held by the board committee responsible for risk management had a significant influence on risk management disclosure (but not conclusively for risk identification and mitigation). Dey (2008) proposed that the number of meetings was indicative of how regularly the board attended to certain issues. It was found that it is necessary for the board committee responsible for risk and risk management to meet regularly. The optimal frequency of meetings would be an area for further research.

Beasley, Clune and Hermanson (2005) found that the presence of a chief risk officer was positively related to the level of enterprise risk management in a company. This study indicated that the appointment of a chief risk officer had a significant effect on risk management disclosure. However, companies employing a chief risk officer should heed KPMG's (2001) argument that risk management should be a company-wide practice and not be deemed the sole responsibility of a designated officer or department.

In line with the findings of Mokhtar and Mellett (2013) and Hassan (2009), it was found that there is a non-significant relationship between firm size and risk disclosure. South Africa is indeed a developing economy in line with Egypt (Mokhtar & Mellet 2013) and the United Arab Emirates (Hassan 2009). However, Mokhtar and Mellet's (2013) explanation that this could be the influence of less mature reporting systems does not hold because South Africa has a mature corporate reporting system as a first global implementer of integrated reporting. The anomaly in the literature between studies in developed economies and studies in developing economies would be a possible area for further research.

Furthermore, in line with the findings of Mokolaleli-Mokoteli and Ojah (2010), no relationship was evident between the profitability of the company and its risk management disclosure. However, in contrast, Wallace, Naser and Mora (1994) and Owusu-Ansah (1998) reported a positive relationship between profitability and voluntary disclosure. Meek et al. (1995) suggested that profitable companies have incentives to distinguish themselves from less profitable companies to enhance their attractiveness as investments. The board may therefore wish to distinguish the company from others in terms of the level to which risks appear to be mitigated, by means of an increased level of risk identification and mitigation disclosure. This study found inconclusive evidence that a company's level of profitability may be

related to its level of risk identification and mitigation disclosure. Hence, owing to conflicting views in the literature on this topic, further research should be conducted.

The industry in which a company trades does not have a significant influence on risk reporting. Extract was entered as a variable in both models, indicating that the level of risk disclosure would depend on the industry. However, this variable was not found to be significant. Studies by Mokhtar and Mellett (2013), Beretta and Bozzolan (2004) and Amran et al. (2009) also reported no differences in risk and disclosure practice between different industries. However, the limited distinction in terms of type of industry in this study was a limitation and could be an indication that improved models could be developed, based on industry-specific data as some other studies found a significant relationship between risk disclosure and industry classification (Hassan 2009; Oliveira et al. 2011).

Conclusion, limitations and areas for future research

From the literature on risk disclosure, it is clear that risk and risk management disclosure has gained increased attention on account of the deficiencies exposed in this regard by the recent financial crisis. However, limited guidance is available on how companies can seek to achieve better risk and risk management disclosure, based on factors distinguishing companies with a good level of disclosure from companies with a lower level of disclosure. This study investigated the effect that the composition of the board committee tasked with risk management, the frequency of its meetings, as well as certain other company characteristics, had on the disclosure of risk management, as well as on risk identification and mitigation disclosure during the first reporting period that integrated reporting became compulsory for JSE Securities Exchange-listed companies.

The results of a forward stepwise regression indicated that the number of meetings of the board committee responsible for risk during the year had a significant effect on risk management disclosure. Risk management disclosure was also significantly influenced by whether the company had a designated risk officer. As far as risk identification and risk mitigation was concerned, the number of risk committee meetings and the level of profitability of a company indicated the possibility of significant influence. However, the evidence in this study of the significance of these two variables was inconclusive and warrants further research. These findings represent a baseline against which future research on risk and risk management disclosure in integrated reports could be compared. It is anticipated that, as companies adjust to the evolution of risk and risk management disclosure and integrated reporting,

distinguishing factors may develop that could not yet be identified in the current study.

Owing to this study's small sample size of 29 non-financial companies that form part of the Top 40 companies listed on the JSE Securities Exchange, generalisation of the results to other companies listed on the JSE Securities Exchange should be restricted.

In addition to performing longitudinal studies over time, a number of other areas for future research were listed in the discussion of the findings. These areas include investigating the optimal frequency of meetings of the board committees responsible for risk and risk management, investigating whether the number of independent directors on the board has a more significant influence on risk and risk management disclosure than the number of independent directors on the risk committee, and expanding the sample size in order to, inter alia, investigate the possible differences in risk and risk management disclosure between different industries in greater depth.

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Financial insight and behaviour of household consumers in Port Elizabeth

G.G. Rousseau & D.J.L. Venter

A B S T R A C T

Financial literacy is a crucial factor affecting individuals, households, financial institutions and the broader economy of South Africa (Oseifuah 2012: 23–24). Lack of financial literacy has been cited by various commentators (Brink 2011: 3, Schüssler 2014: 1–2; Dempsey 2015: 1–3) as the main reason for poor saving rates, increasing consumer debt and inadequate retirement planning among South Africans. The purpose of this study was to investigate the financial insight and behaviour of household consumers in Port Elizabeth. Economists have urged South Africans to start living within their means, improve their money management skills and ensure they eliminate debt, which can be viewed as the symptoms of mediocre financial insight and behaviour. Addressing these problems requires empirical evidence. A research model guided the investigation. A field survey (n = 560 consumers) was conducted in Port Elizabeth. The survey revealed six factors for financial behaviour and one for financial insight. The negative results for most factors confirmed the need for improved financial literacy of Port Elizabeth consumers. Significant relationships between demographical variables and financial behavioural factors were further observed for the sampled population. Educators and training facilitators should focus in their financial literacy programmes on financial planning, executing, vigilance, discipline, control and outsourcing personal financial services. Marketers and providers of credit should act responsibly when dealing with consumers with inadequate financial literacy.

Key words: Financial insight, behaviour, planning, vigilance, discipline, control, outsourcing, knowledge, illiteracy

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Introduction

Background

The financial literacy of consumers in South Africa is at an unacceptably low level, which puts them at risk of dire financial adversity (Dempsey 2015: 1–3). The key focus of this study was to gather empirical evidence of the actual extent of this problem by investigating household consumers' financial insight and behaviour. A heuristic model, based on the dimensions of financial literacy as determined in previous studies, guided the investigation and directed the formulation of hypotheses.

A number of studies have noted that financial literacy in South Africa is low (Tomlinson 1999: 40–43; Ramsamy 2012:16; Fatoki & Oni 2014: 409–414). Government, NGOs and aid organisations are increasingly focusing on financial literacy education as a tool for improving welfare. However, to date there is little rigorous evidence that financial education is effective (FLE 2012: 59). A pilot study commissioned by the Financial Services Board (FSB) in 2011 into the financial literacy of South Africans showed that 49% of the respondents who participated in the study (n = 3112) stated that they were unable to live within their means; 30% had encountered financial difficulty; 32% used some kind of saving system; and only 2% invested in trusts, stocks, shares, livestock or property as a form of saving (Brink 2011: 3). Another study among the youth, employing a sample of 424 final-year finance diploma students, found that they possessed a low level of financial literacy (Botha 2013: 411).

Huston (2010: 296–316) describes *financial literacy* as the measurement of how well individuals understand and use personal finance-related information to confidently make sound financial decisions. Brink (2011: 3) defines financial literacy as the ability to understand finance such as basic money principles of interest rates, and return credit management, banking, insurance and taxes. Robb and Woodyard (2011: 63) refer to four components of financial capability or literacy, namely making ends meet, planning ahead, managing financial products, financial knowledge and decision making. The Organisation for Economic Co-operation and Development (OECD 2005: 26) defines financial literacy as "the process by which financial consumers improve their understanding of financial products and concepts, and through information instruction and/or objective advice, develop the skills and confidence to become more aware of financial risk and opportunities, to make informed choices, to know where to get help and to take other effective actions to improve their financial well-being". Lusardi and Mitchell (2007:157) used the OECD definition as a basis for their review of financial literacy. It is apparent from the above definition that financial insight and behaviour can be viewed as vital components

of financial literacy. The purpose of this investigation was not only to explore the financial insight of consumers in Port Elizabeth, but also to measure their financial behaviour. Furthermore, it is hoped that applying the heuristic model may make it possible to determine possible relationships between socio-demographic variables and financial insight and behaviour variables, for the sampled population.

Literature review

Heuristic model

For the purpose of this study, a heuristic model was constructed, based on previous research (Antonides, De Groot & Van Raaij 2012: 7–8; Kasper & Bloemer 2014: 297–303). The model is depicted in Figure 1.

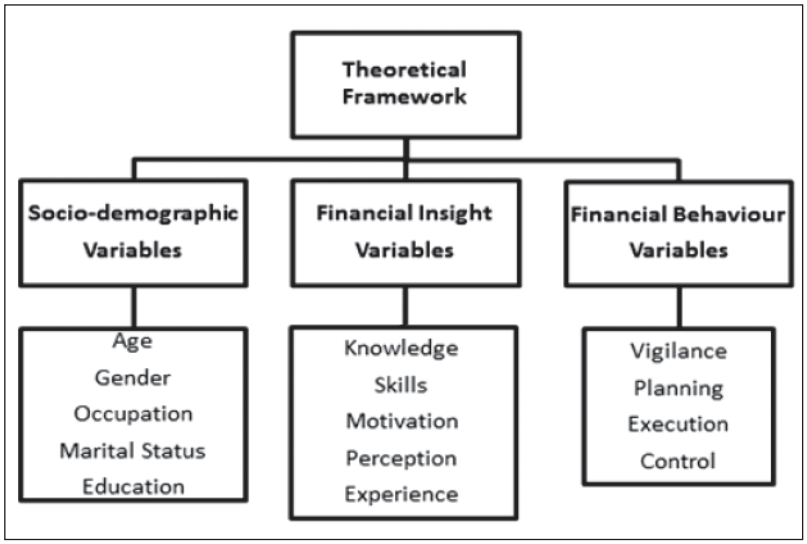

Figure 1: Heuristic model linking socio-demographic variables with financial insight and behavioural variables, adopted from Antonides et al. (2012)

Before the variables in the model are explained in detail, it is necessary to clarify the key constructs, *financial insight* and *financial behaviour*. Insight is the capacity to gain a clear, intuitive understanding or perception of a specific cause and effect in a specific context (Colman 2009: 380). For the purpose of this study, *financial insight* was defined as a deep inspection or view of personal money matters. In this study, *financial behaviour* was regarded as the financial management which an individual or family is required to perform to obtain, budget, save and spend money over

time, taking into account financial risks and future life events (Kwok, Milevsky & Robinson 1994: 109–126).

All the variables depicted in the model were derived from previous research conducted in the Netherlands by Antonides et al. (2012:7–8) and Kasper and Bloemer (2014: 297–303). Apart from guiding the study by serving as a basis for the formulation of hypotheses and the construction of an instrument for measuring financial insight, it was hoped that the model would also help to identify strong and weak points in the financial behaviour of the sampled population.

Socio-demographic variables

In the model, *age, gender occupation, marital status* and *education* were regarded as key socio-demographic variables that could impact on financial insight directly and financial behaviour indirectly.

Age: Kasper and Bloemer (2014: 297–303) focused specifically on the financial knowledge and financial behaviour of the elderly. Data from a Dutch study was extracted and showed the following three clusters of seniors among the Dutch population: financially literate seniors, having much knowledge about financial issues and appropriate financial behaviour; financially illiterate but wise older seniors, having good and simple financial knowledge, but hardly any interest in financial matters; and lastly, financially illiterate and unwise younger seniors, lacking both appropriate financial management and knowledge. The authors concluded that most elderly in the Netherlands want more and better service, wish to avoid risks and long for trustworthy financial service providers. In their studies, Hung, Parker and Yoong (2009:16–17) also included age as a significant demographic predictor of financial literacy, and found that older individuals with high income revealed greater financial literacy and insight.

Gender: Gender differences in financial behaviour have been identified in previous studies. According to Robb and Woodyard (2011: 62), women are more likely to report the use of sound financial practices and insight . However, Clark, Burkhauser, Moon, Quinn and Smeeding (2004: 1–10) observed that women, in comparison with men, are mostly unprepared for their financial situation after the loss of their spouse. In a study for the Financial Board, Roberts and Struwig (2011: 1–7) found that only 27% of the respondents who were interviewed, indicated that they assumed sole responsibility for the daily management of their households. Men were generally more knowledgeable in choosing financial products, while those older than 70 years were familiar with fewer products on average. Oseifuah (2012: 23–24) investigated financial literacy among undergraduate students at the University of Venda. The

study revealed gender differences in financial literacy, with male accounting students likely to be more knowledgeable than their female counterparts.

Occupation: In a study on occupation, Fatoki (2014: 151–158) observed low levels of financial literacy among owners of new micro-enterprises. Most of the owners did not engage in formal financial planning, budgeting and control. Furthermore, most of the respondents did not have insurance policies to cover potential risk for their business. These results indicate that micro-entrepreneurs are weak in financial insight and information-related skills. According to Schüssler (2014: 1–2), short-term unsecured loans have been rising as a percentage of South African households' total debt package. He maintains that lower occupation households are more likely to have short-term unsecured debt.

Marital status: A study on the influence of marital status on financial insight by Voya (2011: 1–6) revealed that people who are married or living as married tend to demonstrate better savings behaviour and to be more financially confident than people who are single or divorced. Three-quarters (75%) of married respondents contributed to an employer-sponsored retirement savings plan, while 58% had additional retirement savings. Another study by Xiao (1996:21–29) found that marital status had a positive effect on the chances of owning cash-value life insurance. These results suggest better financial insight and behaviour among married couples.

Education: Birkholtz and Rousseau (2001: 133–147) investigated attitudes towards credit buying among the youth in Port Elizabeth, South Africa. The authors concluded that there was a serious need for education and training in personal money management at school level. Du Plessis and Rousseau (2007:203) warned that a lack of knowledge of and insight into personal money management would give rise to a body of future debtors in South Africa. Schüssler (2014: 1–4) echoed these sentiments, stating that financial literacy is a huge problem which needs to be addressed at school level. Knowledge -ased financial education remains a main shortfall for improved financial insight in South Africa.

Financial insight and knowledge variables

Financial insight variables were categorised as follows: *knowledge* involves financial planning for the future, the importance of saving, the advantages and risks involved in borrowing money; *skills* relate to the ability to deal with money on a daily basis, responsibility in managing money mental accounting; *motivation* is the determination to provide for the future, manage personal finances and avoid debt; *perception* is awareness of the increasing cost of living, of unforeseen expenses and

of the danger of irresponsible spending; and *experience* refers to financial education, encounters with financial consultants, investment products and buying on credit.

Knowledge: Robb and Sharpe (2009: 25–43) analysed data collected from 6 520 students at a large Midwestern University in the USA and affirmed that financial knowledge is a significant factor in the credit card decisions of college students. The researchers found that students with higher levels of financial knowledge also had significantly higher credit card balances compared to those with lower levels of financial knowledge. Mitchell and Lusardi (2015:1–6) who conducted an international study at the Wharton School of Business Economics, found that almost one-third of wealth inequality can be explained by the financial knowledge gap, separating the well-to-do and the less so. Hung et al. (2009: 10–11) suggest that financial knowledge is likely to depend on skills, perceptions of knowledge, attitudes and environmental factors. These factors are of particular importance for financial insight in the South African context.

Skills: Regarding financial skills and knowledge, the above authors found that older people tended to be weaker than the younger generation, while men were more competent than women on financial matters. Nye and Hillyard (2013: 1–3) investigated the influence of quantitative literacy and material values on personal financial behaviour. Results from a diverse sample (n = 267) of consumers confirmed that quantitative literacy (the individual's confidence in applying quantitative skills) is positively related to forward-looking behaviour. The impact of materialism on financial behaviour was largely mediated by impulsive consumption, a tendency to make frequent purchases without considering the financial consequences. Other financial skills include negotiating mortgage terms, navigating investment websites and reading financial reports (Hung et al. 2009: 9).

Motivation and perception: In this regard, according to Ozmete and Hira (2011: 386–404), one of the most important decisions an individual can make is choosing a sound financial behaviour plan that will enable an individual or family to achieve their life goals. The authors analysed various financial behaviour models and concluded that changes in people's financial plans are hampered by perceived barriers such as threat, susceptibility and severity of change. Regarding e-banking adoption by rural customers in South Africa, Masocha, Chiliya and Zindiye (2011:1857–1863) found that the majority of respondents were motivated to bank with a bank that uses advanced modern banking technologies. Respondents perceived e-banking to increase service quality, which promoted the clients' propensity to advocate their banks to other clients.

Experience: Present financial literature suggests that personal involvement and experience in money management among South Africans is poor (Roberts & Struwig

2011: 1–7). In a study for the Financial Services Board, they (2011) found that only 27% of the respondents interviewed, indicated that they assumed sole responsibility for the daily money management in their households. It was found that coloured and black households were less likely than white and Indian respondents to have a budget. The findings also suggested that South Africans on average only had small reserves to draw upon in face of a sudden loss of income. Men were generally more experienced in choosing financial products than women, suggesting better financial insight.

Financial behaviour variables were categorised as follows: *vigilance,* which refers to seeing beyond tomorrow, financial risk perception and staying informed about financial matters; *planning* refers to provision for retirement, pension schemes and additional investments and insurance; *executing* refers to organising spending patterns, paying bills on time, following a household budget and savings plan; and *control* refers to knowing one's financial balance, income and expenditure and living within one's means.

Vigilance: Antonides et al. (2012: 7–8) reported on the basis of their longitudinal study in the Netherlands that Dutch consumers were generally vigilant about their financial insight and behaviour. Only a small percentage (15%) of the sample (n = 4 280) were unconcerned about financial matters. Another study by Kasper and Bloemer (2014: 297–303) found that 42% of respondents older than 50 years were highly vigilant about savings, paying bills on time and knowledge of their own financial balance. According to Xiao (1996: 21–29), households in which the head indicated willingness to take at least average risks, were more likely than their less risk-tolerant counterparts to own assets other than trusts.

Planning: The negative impact of employees' poor financial planning and behaviour on employers has been widely researched (Brown 1993: 1–5; Brown 1997: 29–38; Garman, Leech & Grable 1996: 157–168). All these authors reported that personal financial problems of workers negatively affect their employers. Because of poor financial planning by employees, employers are often forced to incur compensatory costs relating to insurance premiums, hospital bills, production down-time and additional training on personal financial management. Garman et al. (1996: 157–168) stated that among human resource executives, the financial illiteracy of workers was the most critical unaddressed workplace issue. The proportion of workers experiencing financial problems, according to the authors, could be as high as 40 to 50% in some circumstances. In South Africa, owing to restricted income, many blue-collar employees are unable to engage in future planning, resulting in poor financial behaviour (Brink 2011: 1–3).

Execution: Research in South Africa (Brink 2011: 1–3; Mishi, Vacu & Chipote 2012: 1–2) suggests that financial execution is substandard. In a study by these authors involving a sample of 3 112 respondents, 49% said they were unable to live within their means. Only 32% indicated some form of saving, while 2% invested in trusts, stocks or shares. Most rural respondents indicated reluctance to use bank services as they were not fully aware of its advantages. According to Palmer (2015:1–3), the main problem with financial execution for middle-aged adults is that they use their retirement fund to help adult children's transition to financial independence. Another demand on middle-aged adult households' financial execution is providing for ageing parents who need assistance. These trends are also becoming a serious problem in South Africa owing to stringent financial conditions for families.

Control: According to Palmer (2015: 1–5), savings need to be a priority for emergencies and retirement with at least 10% of a household's income. Xiao (1996: 21–29) maintains that financial asset ownership is determined by the effects of family income and life cycle stages. Financial control variables such as savings, bonds and trusts are also determined by family size, the household head's age and employment status, apart from income.

The present study worked within the previously adopted theoretical framework of financial insight and behaviour of consumers in the Netherlands (Antonides et. al 2008), depicted in Figure 1. Whereas the present model does not allow for the exploration of all possible variables, strides have been made in the inclusion and examination of relevant variables of financial insight and behaviour, applicable to South African conditions. Figure 2 indicates three proposed hypotheses linking variables in the model.

Hypotheses

In the model presented in Figure 2, it is hypothesised that relationships exist between *socio-demographic* variables and *financial insight* variables (H1), between *financial insight* variables and *financial behaviour* variables (H2) and between *socio-demographic* variables and *financial behaviour* variables (H3). In the model, *age, gender, occupation* and *marital status* as well as *education* were regarded as key socio-demographic variables that could impact on financial insight directly and financial behaviour indirectly.

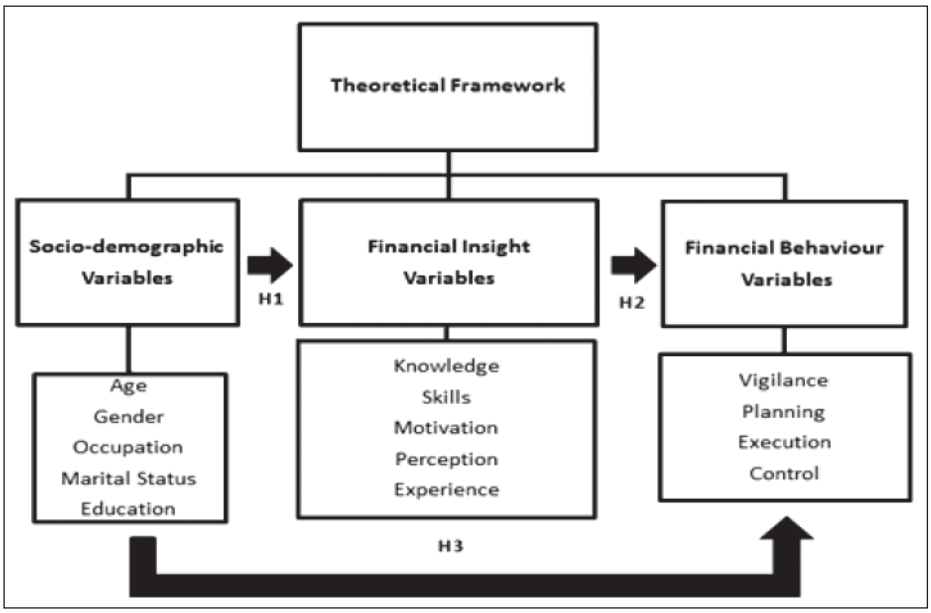

Figure 2: Variables captured in the present study with proposed hypotheses linking variables in the model

In the model presented in Figure 2, it is hypothesised that relationships exist between *socio-demographic* variables and *financial insight* variables (H1), between *financial insight* variables and *financial behaviour* variables (H2) and between *socio-demographic* variables and *financial behaviour* variables (H3). In the model, *age, gender, occupation* and *marital status* as well as *education* were regarded as key socio-demographic variables that could impact on financial insight directly and financial behaviour indirectly.

Research methodology

The study followed a quantitative non-experimental design using a self-reported survey approach to gather specific information from respondents as the primary data for empirical analysis (Malhotra 2010: 268).

Measuring instrument

A 40-item questionnaire was constructed as a measuring instrument. The items were derived from the literature and related to the variables in the research model. The first 24 items focused on *financial insight* variables, while the last 16 items related to *financial behavioural* variables. The questionnaire concluded with questions pertaining to *socio-demographic* variables as shown in the model. A verbal anchored

five-point Likert scale (ranging from disagree completely to agree completely) was used to detect respondents' views on the items in the questionnaire.

Research participants and procedure

A non-probability sample (n = 560) was drawn from respondents in the Nelson Mandela Metro during February 2015. Sixty graduate students from the Nelson Mandela Metropolitan University (NMMU) conducted the fieldwork as part of a practical assignment. All the fieldworkers received a proper briefing on sample selection and interview procedures. They were instructed to interview respondents at home, at work or at a shopping mall. Convenience sampling (willingness to be interviewed) was used to select respondents to participate in the study. Each fieldworker had the option to interview up to ten respondents from various age and gender groups. On completion of their fieldwork, they had to write a one-page report on their fieldwork experience. From these reports, it was clear that respondents did not experience difficulty answering the questionnaire as they were simple, straightforward items to answer and had undergone testing in a pilot study. The questionnaire took less than five minutes to complete.

Table 1 presents the demographic profile of the sample (n = 560). From the table it can be seen that there were slightly more females in the sample than males. The largest proportion of respondents were employed full time and single. Furthermore, the sample was relatively young (43% between the ages of 20 and 29) and most of the respondents (91%) had at least a matric certificate.

Table 1: Survey sample demographic profile

Gender (n = 552)			**Age (n = 556)**		
Male	254	46%	20–29	241	43%
Female	298	54%	30–39	87	16%
Employment status (n = 546)			40–49	101	18%
Pensioner	50	9%	50–59	62	11%
Unemployed	149	27%	60+	65	12%
Employed part time	97	18%	**Education (n = 552)**		
Employed full time	250	46%	<Matric	49	9%
Marital status (n = 551)			Matric	181	33%
Married/cohabitating	220	40%	Diploma	97	18%
Divorced/separated	31	6%	Degree	155	28%
Widowed	30	5%	Post-graduate	70	13%
Single	270	49%			

Data analysis

Microsoft Excel and the statistical software program Statistica Version 12 were used to calculate descriptive and inferential statistics and to perform exploratory factor analysis. Analysis of variance (ANOVA) was also conducted to determine the relationships between the demographic variables and financial insight and behavioural factors

Research findings

Validity

The authors achieved content validity of the survey questionnaire by ensuring that for each variable in the proposed model, a set of appropriate items was included. The face validity of the items was assessed by asking a financial expert in the Department of Industrial Psychology to evaluate the clarity and appropriateness of the items in the questionnaire.

Exploratory factor analysis (EFA)

Table 2 shows the EFA results for the financial insight and behavioural items. Seven factors were extracted from the data. The first six factors were classified as *financial behaviour*, and included *financial planning*, *financial executing*, *vigilance*, *financial discipline*, *financial control* and *outsourcing financial services*. The last factor, *financial knowledge,* was the only one relating to *financial knowledge*. The factor loadings on the indicated factors were all significant, ranged between 0.429 and 0.768, given that for a sample size of 560, factor loadings greater than 0.300 are deemed significant (Hair, Black, Babin, Anderson & Tatham 2006: 128).

Table 2: Exploratory factor analysis (EFA) results (n = 560)

Construct: Behaviour		
Factor	**Item**	**Loading**
FB1.Planning	I review my financial portfolio annually.	0.768
	I have a detailed financial plan for retirement.	0.746
	I feel competent in calculating my long-term investments.	0.727
	I complete my income tax forms on my own.	0.682
	I regard my pension scheme sufficient to provide for retirement.	0.553

Table 2 continued

Table 2 continued

FB2.Executing	I often worry about my finances.	0.715
	Come end of the month, I seldom have money left over.	0.706
	I often have to borrow money from others to make ends meet.	0.683
	The cost of living makes it difficult for my household to save money.	0.573
	I sometimes regret the financial decisions made due to lack of knowledge.	0.531
FB3.Vigilance	I am unaware of the latest investment products on the market.	0.738
	I read financial reports in newspapers and magazines to stay informed.	0.684
	I listen regularly to financial programmes on radio and television.	0.670
	In today's uncertain economic environment, I am alert to financial matters.	0.543
FB4.Discipline	I keep a strict view on my spending patterns	0.684
	I follow a strict household budget which I draw up regularly.	0.677
	I have taught myself to follow a regular savings programme in life.	0.658
	As a child I learnt to spend my pocket money wisely.	0.656
	Self-discipline helps me to refrain from impulse buying.	0.429
FB5.Control	In my experience, saving rather than borrowing money is preferable.	0.703
	One should always be aware that things can get worse in the future.	0.652
	Buying on credit can be dangerous for my financial management.	0.575
	When taking big financial decisions it is always better to sleep on it.	0.539
FB6.Outsourcing	I leave personal future planning and investments to the experts.	0.731
	It is better to use experts to manage one's investment portfolios.	0.688
	More people should manage their own financial matters.	0.562
Construct: Insight		
FI.Knowledge	Commission paid to financial consultants for managing private investments must be negotiable.	0.775
	I view investment in shares on the stock exchange as dangerous.	0.642
Total percentage variance explained = 55.5%		

Reliability of the scores

The reliability of the scores derived from the measuring instrument was assessed by calculating Cronbach's coefficient alpha for the factors emerging from the data analysis. The reliability values are depicted in Table 3 and can be regarded as good for the first four factors and FB.Behaviour, but disappointing for FB5.Control, FB6. Outsourcing and FI.Knowledge. However, bearing in mind the exploratory nature of the study, the reliability values were acceptable, although the results would need to be interpreted with caution.

Table 3: Cronbach's alpha coefficients for the factors

Factor	items	alpha
FB1.Planning	5	0.79
FB2.Executing	5	0.71
FB3.Vigilance	4	0.76
FB4.Discipline	3	0.71
FB5.Control	4	0.55
FB6.Outsourcing	5	0.38
FB.Behaviour*	–	0.70
FI.Knowledge	2	0.34
* FB.Behaviour is the average of FB1 to FB4.		

Correlations between factors

Table 4 shows the correlations between the factors. Correlations flagged red are statistically significant at the .05 significance level (absolute value greater than 0.083). Correlations greater than 0.30 (flagged in italic bold) are considered practically significant (Gravetter & Wallnau 2009).

The strong positive correlations between *financial behaviour* and the first four factors were to be expected, given that these four factors were averaged to calculate *financial behaviour.* As indicated in Table 4, *financial planning* correlated positively and significantly (both statistically and practically) with *financial vigilance* and *financial discipline*. *Vigilance* correlated positively and significantly with *financial discipline.* None of the behaviour factors correlated with *knowledge,* the sole insight factor. There was thus no evidence in support of the research hypothesis relating to a theorised positive relationship between financial insight and financial behaviour.

Table 4: Pearson product moment correlations for the factors

	FB1	FB2	FB3	FB4	FB5	FB6	FB	FI
FB1.Planning	–	.265	***.537***	***.464***	.033	.042	***.807***	.015
FB2.Executing	.265	–	.194	.238	-.131	-.012	***.568***	-.133
FB3.Vigilance	***.537***	.194	–	***.485***	.098	.066	***.778***	-.050
FB4.Discipline	***.464***	.238	***.485***	–	.216	.028	***.734***	.069
FB5.Control	.033	-.131	.098	.216	–	.131	.071	.132
FB6.Outsourcing	.042	-.012	.066	.028	.131	–	.044	.029
FB.Behaviour	***.807***	***.568***	***.778***	***.734***	.071	.044	–	-.034
FI.Knowledge	.015	-.133	-.050	.069	.132	.029	-.034	–

Descriptive statistics for the factors

Table 5 reflects the descriptive statistics for the factors. It is evident that *financial control* obtained the highest mean score, followed by *financial discipline* These two factors were the only ones for which a positive (between 3.4 and 5.0) mean score was observed. All the other factors obtained neutral mean scores, that is, between 2.6 and 3.4. *Financial planning* obtained the lowest mean score, which was an unexpected result given the abundant evidence from research pertaining to consumers' poor financial planning efforts (Roberts & Struwig 2011).

Table 5: Central tendency and dispersion statistics for the factors (n = 560)

Factor	Mean	S.D.	Minimum	Quartile 1	Median	Quartile 3	Maximum
FB1.Planning	2.87	1.02	1.00	2.20	2.80	3.60	5.00
FB2.Executing	2.91	0.85	1.00	2.40	3.00	3.40	5.00
FB3.Vigilance	3.17	0.96	1.00	2.50	3.25	3.81	5.00
FB4.Discipline	3.57	0.80	1.20	3.00	3.60	4.20	5.00
FB5.Control	4.29	0.62	2.00	4.00	4.50	4.75	5.00
FB6.Outsourcing	3.13	0.80	1.00	2.67	3.00	3.67	5.00
FB.Behaviour	3.13	0.66	1.24	2.68	3.14	3.60	4.70
FI.Knowledge	3.14	0.93	1.00	2.50	3.00	4.00	5.00

Relationships between factors and demographic variables

ANOVA was conducted to determine the significance of the relationships between the factors and the demographic variables. The results are summarised in Table 6.

Table 6: ANOVA results: factors by demographic variables–p-values (n = 529)

Effect Factor	Employment	Age	Gender	Marital status	Education
FB1.Planning	<.0005	<.0005	.131	.421	.001
FB2.Executing	.257	.029	.007	.921	<.0005
FB3.Vigilance	.008	.172	.027	.800	.001
FB4.Discipline	.143	.268	.671	.038	.057
FB5.Control	.140	.180	.088	.270	.602
FB6.Outsourcing	.129	.848	.442	.458	.819
FB.Behaviour	<.0005	.013	.028	.769	<.0005
FI.Knowledge	.343	.696	.450	.020	.010

Significant relationships ($p < 0.05$) were observed between the demographic variables and all the factors except for *FB5.Control* and *FB6.Outsourcing*. It was found, for example, that *FB1.Planning* was significantly related to employment, age and education.

Tables 7 to 11 show significant ($p < 0.05$) post hoc results for the significant ANOVAs ($p < 0.05$ in Table 6) by demographic variable for the various factors. In these tables, statistically significant differences between demographic groups are indicated by lower case letters in the "Scheffé $p < .05$" column. Cohen's d statistics reflect the practical significance of these differences and were interpreted as practically significant if d was greater than or equal to 0.20 (Gravetter & Wallnau 2009).

It is evident in Table 7 that when it comes to *financial planning,* full-time employed consumers have significantly higher scores than those who are unemployed and who are employed on a part-time basis. With regard to *financial vigilance*, the results indicate that consumers who are employed on a full-time basis are significantly more financially vigilant than unemployed consumers and those employed part time.. This could be due to the fact that unemployed consumers have given up hope of finding a job and are therefore also less financially vigilant.

Table 7: Significant post hoc results for the factors by employment status

Factor	Mean values				Scheffé p < .05	Cohen's d
	a. Pensioner	b. Unemployed	c. Part time	d. Full time		
Financial planning	3.24	2.21	2.63	3.28	ab; ac; bc; bd; cd	1.21; 0.69; 0.48; 1.18; 0.70
Financial vigilance	3.24	2.82	3.01	3.42	bd; cd	0.67; 0.44
Financial behaviour	3.35	2.81	2.97	3.34	ab	0.22

Table 8: Significant post hoc results for factors by age group

Factor	Mean values					Scheffé p < .05	Cohen's d
	a. 20–29	b. 30–39	c. 40–49	d. 50–59	e. 60+		
Financial planning	2.38	3.19	3.14	3.42	3.30	ab; ac; ad; ae	0.88; 0.83; 1.13; 1.04
Financial behaviour	2.91	3.25	3.21	3.42	3.43	ab; ac; ad; ae	0.37; 0.32; 0.56; 0.59

With regard to age, Table 8 shows that consumers in the age groups 20 to 29 scored significantly lower than those in the older age groups (30–39, 40–49, 50–59 and 60+) on *financial planning* and *financial behaviour*. These results suggest that younger respondents might be less aware of the importance of financial planning for their future. This supports the results of Botha (2013: 411) and Du Plessis and Rousseau (2007: 203).

Table 9: Significant post hoc results for factors by gender – t-test p < .05

Factor	Mean values		Cohen's d
	Male	Female	
Financial executing	3.07	2.78	0.29
Financial vigilance	3.33	3.02	0.30
Financial behaviour	3.25	3.02	0.22

The results reflected in Table 9 indicate that male consumers consistently scored higher than female consumers on *financial executing, financial vigilance* and *financial behaviour*. These results suggest that males tend to be more competent on financial matters than females. This therefore supports the findings of Clark et al. (2004: 1–10), Roberts et al. (2011: 1–7) and Mitchell and Lusardi (2015: 1–6), which suggest that women are mostly unprepared for financial matters and less knowledgeable in this regard than their male counterparts.

Table 10: Significant post hoc results for factors by marital status

	Mean values					
Factor	a. Married/ cohabitating	b. Divorced	c. Widowed	d. Single	**Scheffé p < .05**	**Cohen's d**
Financial discipline	3.71	3.55	3.91	3.42	ad; cd	0.30; 0.51

Regarding marital status, the results provided in Table 10 show that single consumers were significantly less concerned with *financial discipline* than the other three categories (married/cohabitating, divorced and widowed. This could be due to the fact that single consumers have fewer family responsibilities, directly or indirectly, compared to married, divorced or widowed consumers. These findings support those of Birkholtz and Rousseau (2001:133–147), Lusardi, Mitchell and Curto (2010:1–2), which indicate that young and, by implication, single consumers are less accountable for their financial actions and tend not to understand the consequences of their financial decisions for risk diversification, inflation and interest rates.

Table 11: Significant post hoc results for factors by education level

	Mean values						
Factor	a. <Matric	b. Matric	c. Diploma	d. Degree	e. Post-grad	**Scheffé p < .05**	**Cohen's d**
Financial planning	2.60	2.55	3.24	2.94	3.16	ac; ae; bc; bd; be	0.72; 0.58; 0.75; 0.38; 0.64
Financial executing	2.41	2.81	2.87	3.05	3.30	ac; ad; ae; be; ce	0.51; 0.60; 0.91; 0.50; 0.48
Financial vigilance	2.98	2.89	3.25	3.32	3.55	ae; bc; bd; be	0.59; 0.39; 0.42; 0.69
Financial behaviour	2.85	2.94	3.24	3.24	3.41	ac; ad; ae; bc; bd; be	0.44; 0.37; 0.58; 0.33; 0.30; 0.49
Financial insight	3.16	3.29	3.15	3.08	2.80	be	0.51

As far as education is concerned, the results in Table 11 show that consumers with a higher education (diploma, degree or postgraduate degree) were significantly more aware of the importance of *financial planning* compared to those with only a matric certificate or less than matric. Educational level is thus related to financial planning. These results support those of Schüssler (2014:1-2), which suggest that financial illiteracy should be addressed at school level.

Furthermore, the results suggest that educational level is significantly related to *financial execution, financial vigilance* and *financial behaviour.* It would seem that respondents with a degree or postgraduate degree are more competent in conducting financial planning than those with less than matric, matric or only a diploma certificate. These results once again emphasise the lack of financial literacy at school level, as reported by Birkholtz and Rousseau (2001: 133–147). This further supports the notion by Schüssler (2014: 1–2) that financial illiteracy is a huge problem in South Africa and should be addressed at school level.

Regarding *financial insight,* Table 11 indicates a strange scoring pattern among consumers. Consumers with a matric certificate seemed to exhibit significantly more *financial insight* than those with a postgraduate degree. This observation might indicate an element of arrogance about financial insight and behaviour among postgraduates, stemming from material affluence compared to the less educated "matric only" consumers. This result could support that of Robb and Sharpe (2009: 25–43) suggesting that students with higher levels of financial knowledge also had significantly higher credit card balances compared to those with lower levels of financial knowledge. This could result in more careful spending among the latter.

Hypothesis testing

In terms of the hypotheses formulated and based on the model, limited support was found for H1 (*a relationship exists between socio-demographic variables and financial insight variables*). Only one socio-demographic variable, *educational level,* differed significantly between matric and postgraduate consumers (see Table 11).

Regarding H2 (*a relationship exists between financial insight variables and financial behavioural variables*), no support for this hypothesis was observed (see Table 4).

The third hypothesis, H3 (*a relationship exists between socio-demographic variables and financial behavioural variables*), was accepted. The authors did find significant relationships between various socio-demographic variables (employment level, age, gender, marital status and education) and financial planning, financial execution and financial vigilance variables (see Table 6).

Discussion

The main purpose of this exploratory study was to investigate levels of financial insight and behaviour among consumers with various demographical backgrounds in Port Elizabeth. A conceptual model derived from previous research guided the investigation. A multi-cultural, non-probability convenience sample of 560 respondents participated in a survey, which was conducted in various suburbs and townships of the Metro during February 2015. A questionnaire adopted and modified from a previous study conducted in the Netherlands (Antonides et al. 2008: 7–8) was used for data collection. The instrument showed reasonable reliability for use in South Africa.

The results of an exploratory factor analysis revealed six factors for financial behaviour, namely planning, executing, vigilance, discipline, control, outsourcing and one for financial insight, namely knowledge. Strong positive correlations between the first four factors (financial planning, executing, vigilance and discipline) emerged from the data analysis. No support could be found for the research hypothesis pertaining to a theorised positive relationship between financial insight and financial behaviour.

The post hoc results by demographics revealed significant relationships for financial planning, executing, vigilance, discipline, outsourcing, insight and financial behaviour. These results confirmed the influence of employment level, age, gender, marital status and education on financial behaviour and insight of consumers in Port Elizabeth. Consumers who were employed full- time and elderly, married and male consumers with a postmatric qualification obtained the highest mean scores on financial behaviour.

The main conclusion drawn from the empirical research supported the literature that financial illiteracy among a large section of the population in South Africa, and specifically in Port Elizabeth, remains a main concern for the country. Lack of financial behaviour and insight is particularly prevalent among unemployed, young and single consumers with a low education. Since South Africa's population is relatively young and the unemployment level among the youth is extremely high, the need for financial education and training, especially among the youth, (tomorrows' consumers) must become a priority.

Practical implication for educators

Educators at school level and training facilitators for businesses should focus in financial literacy programmes on financial planning, financial executing, vigilance, discipline, control and the pros and cons of outsourcing personal financial services.

These factors would hopefully increase financial behaviour and insight among those exposed to such interventions.

Practical implications for marketers

Marketers promoting financial services and banks, advertising credit and loan facilities should be responsible in their dealings with clients. Owing to certain clients' lack of financial knowledge, marketers should not promote unrealistic attractive credit and loan offers to clients who cannot afford them. The poorer section of the population is especially vulnerable to unsecured loans and credit card misuse.

Limitations and implications for further research

This study is no different from others in that researchers need to be aware of limitations because they affect the generalisability and external validity of the findings. Bearing in mind the exploratory nature of the study, the measuring instrument needs to be refined in follow-up studies. Only one variable, "knowledge" emerged for the factor *insight*. More items need to be added to the questionnaire to measure the remaining variables for insight, portrayed in the model. Furthermore, "one-shot" studies usually lack generalisability – hence the need for a follow-up investigation to confirm the tentative results obtained in the present study. In terms of the sampling technique and geographic scope of this study, another limitation was that it would not be possible to generalise the results to other populations.

Conclusion

Despite its limitations, the findings of this study emphasised the serious lack of financial literacy among consumers in Port Elizabeth, based on their present financial behaviour and insight. The present findings should provide a guideline for benchmark topics that need to be addressed in future education and training programmes. Such topics should include the factors that emerged from this study.

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Interrogating antecedents to SME supplier performance in a developing country

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A B S T R A C T

The purpose of this study was to analyse the antecedents to supplier performance by examining the relationship between information sharing, information quality, institutional trust, supply chain collaboration and supplier performance in small and medium enterprises (SMEs). A quantitative design was adopted in which a survey questionnaire was administered to 400 owners and managers of SMEs based in the southern part of Gauteng, South Africa. Respondents were selected using a non-probability convenience sampling technique. Data was analysed using a combination of the Statistical Packages for the Social Sciences (SPSS version 22.0) and Analysis of Moment Structures (Amos version 22) software. The psychometric properties of the measurement scales were ascertained using confirmatory factor analysis (CFA). Hypotheses were tested using structural equation modelling (SEM). Information sharing exerted a positive influence on both institutional trust and supply chain collaboration. Information quality exerted a strong positive influence on institutional trust but had an insignificant influence on supply chain collaboration. Institutional trust was statistically insignificant, whereas supply chain collaboration was statistically significant in influencing supplier performance. The results of this study validate the roles performed by the constructs examined in facilitating the improvement of supply chain activities among SMEs and their suppliers.

Key words: SMEs, information sharing, information quality, institutional trust, supply chain collaboration, supplier performance

Introduction

The assessment of supplier performance in organisations has always been an important activity for business enterprises and other commercial organisations.

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In order to achieve long-term and sustainable competitive advantages, these organisations regularly adopt and implement plans and policies aimed at enhancing the performance of their suppliers (Millington, Eberhardt & Wilkinson 2006). Suppliers perform a strategic role in influencing the overall performance of supply chains, particularly in competitive business environments (Stouthuysen, Slabbinck & Roodhooft 2012). Without an effective and efficient supplier base, which forms the initial source of the goods and services provided by a business enterprise, the task of satisfying the needs of the customer cannot be performed (Carr, Kaynak, Hartley & Ross 2008). This makes the monitoring of the performance and capabilities of suppliers by both small and large buying firms a critical activity (Wu, Choi & Rungtusanatham 2010). The performance of suppliers is of vital importance for small and medium enterprises (SMEs) because suppliers are primary constituencies within a relatively small stakeholder base that determines the survival of such enterprises (Sarkar & Mohapatra 2006). It thus becomes critical for SMEs to ensure sound and adequate monitoring of the capabilities of their suppliers, as this is essential to maintaining optimum performance in their operations.

The aim of this study was to conduct an analysis of the antecedents of supplier performance in SMEs. In order to achieve this aim, the following six objectives were formulated; (1) to establish the relationship between information sharing and institutional trust; (2) to determine the relationship between information quality and institutional trust; (3) to establish the relationship between information sharing and supply chain collaboration; (4) to determine the relationship between information quality and supply chain collaboration; (5) to establish the relationship between institutional trust and supplier performance; and (6) to determine the relationship between supply chain collaboration and supplier performance. These objectives were tested under the auspices of South African SMEs. There is a paucity of evidence from previous studies focusing on supplier performance among SMEs in South Africa. A few studies (e.g. Parker 2007; Piderit, Flowerday & Von Solms 2011; Pooe & Mathu 2011) have focused on supplier performance, but the samples that were used ostensibly disregarded the SME industry sector. This marginalisation of the SME industry sector is surprising, given the importance conferred on this sector by virtue of its economic and societal contributions. The aim of the current study was to address existing gaps in the literature. Furthermore, the failure rate of SMEs in South Africa is high and well documented by a number of researchers (Sawers, Pretorius & Oerlemans 2008; Fatoki & Garwe 2010; Chinomona & Pretorius 2011). Since supply chain management practices form part of the central mechanisms necessary for the sound operation of a business enterprise (Ramanathan & Gunasekaran, 2013), this study is significant in that its results could be used for decision-making and problem-

solving purposes by supply chain practitioners in the SME sector, potentially resulting in a reduction in instances of business failure among SMEs in South Africa.

Theoretical overview

This section focuses on the research environment (SMEs) and the constructs under consideration in this study (information sharing, information quality, institutional trust, supply chain collaboration and supplier performance).

SMEs

It is difficult to find a standardised definition of SMEs, as noted by scores of scholars (e.g. Beyene 2002; Lukács 2005; Ayyagari, Beck & Demiguc-Kunt 2007; Chinomona & Pretorius 2011). In the context of South Africa, small enterprises are those with an upper limit of 50 employees, while medium enterprises employ between 100 and 200 employees and are characterised by the decentralisation of power to an additional management layer (Sanchez 2007; Abor & Quartey 2010). There are huge numbers of SMEs in South Africa, to the extent that at least 80% of all business enterprises in the country fall within this economic sector (Ladzani & Seeletse 2012). Owing to their massive presence in South Africa, SMEs contribute at least 50% of the country's annual GDP (Abor & Quartey 2010); are pivotal in employment creation (Fatoki & Garwe 2010; Kongolo 2010; Mafini & Omoruyi 2013); and are renowned for generating at least 40% of all economic activities in the country (Pellissier & Nenzhelele 2013). In order to survive in the harsh economic environment of today, many SMEs in South Africa have been compelled to adopt current best practices, including supply chain management, in their operations (Mafini & Omoruyi 2013). This makes it necessary to regularly review, from all frontiers including scientific research, how such best practices are implemented in this sector, in an effort to improve overall SME performance.

Supplier performance

Supplier performance refers to how well a supplier provides the required products to the buyer and is manifested as the operation's outcome in terms of quality, delivery, responsiveness, cost, and technical support (Wu et al. 2010). An adequate assessment of a supplier's performance is necessary for firms to ensure that the supplier has demonstrated the ability to meet the buyer's requirements in terms of cost, quality, delivery or service (Sarkar & Mohapatra 2006). Furthermore, supplier performance

is vital in that it has a massive impact on the maintenance of collaborative relationships based on product quality, operational support, service quality and delivery performance (Yilmaz, Sezen & Kabadayi 2004). Moreover, suppliers play a key role in influencing the overall performance in supply-performance networks, especially in a competitive business environment (Ho, Feng, Lee & Yen 2012). Hence monitoring the performance and capabilities of suppliers is critical from the buying organisation's perspective (Huang & Keskar 2007).

Information quality

Gorla, Somers and Wong (2010) define information quality as a concept that is related to the quality of information system outputs, which can be described in terms of outputs that are useful for business users, relevant for decision making, and easy and to understand, as well as outputs that meet users' information specifications. Quality of information also refers to the accuracy, timeliness, adequacy and credibility of the information exchanged (Moberg, Cutler, Gross & Speh 2002; Feldmann & Müller 2003). The satisfactory flow of quality information in an organisation is of prime importance as it represents a crucial value in the effectiveness of the firm's operations. As acknowledged by Li, Sikora, Shaw and Woo (2006), organisations need to view their information as a strategic asset and ensure that it flows with minimum delay and distortion. Furthermore, information quality influences the running of businesses (Gorla et al. 2012) while the provision of quality information is widely regarded as a key predictive factor contributing to the use of electronic data between organisations (Nicolaou, Ibrahim & Van Heck 2013). In addition, according to Gao, Zhang, Wang and Ba (2012), information quality plays a significant role in positively influencing customer satisfaction. Hence the quality of the information organisations share is a pre-eminent factor contributing to their overall success.

Institutional trust

Institutional trust is defined as the confidence or beliefs that exchange partners have for each other's reliability and integrity (Cavusgil, Deligonul & Zhang 2004). Trust between institutions has been identified as a key relationship variable in some studies in different fields (Krishnan, Martin & Noorderhaven 2006; Robson, Katsikeas & Bello 2008). Mutual trust between partners is a vital component of the exchange relationship because it enables the firm to exchange information and enrich the firm's opportunities to access resources (Norman 2004). Trust has been described as one of the most critical success factors of a firm's ability to establish

successful interorganisational relationships such as alliances (Robson *et al.,* 2008). Effective partnerships characterised by mutual trust between organisations and their partners may facilitate more open communication, information sharing and conflict management, which are all essential for organisational success (Seppanen, Blomqvist & Sundqvist 2007).

Supply chain collaboration

Ang (2008) defines supply chain collaboration as a working relationship between organisations, which involves the exchange, sharing of information and joint development of products, technology and services. Osarenkhoe (2010) also defines supply chain collaboration as similar, complementary, coordinated activities performed by firms in a business relationship in order to produce superior mutual outcomes. Supply chain collaboration is characterised by the level of interdependence and complementarity between a firm's partners in order to establish and develop effective collaboration which may potentially result in the reduction of product costs and the improvement of technology in the supply chain (Ranganathan, Teo & Dhaliwal 2011). Effective supply chain collaboration can be reflected in a strategic supplier partnership, which is the long-term relationship between the organisation and its suppliers (Hsu, Kannan, Tan & Leong 2008). It is designed to influence the strategic and operational capabilities of individual participating organisations to help them enjoy significant ongoing benefits (Li et al. 2006). According to Hoegl and Wagner (2005), collaboration has a positive effect on the firm's ability to provide quality products to its customers. This indicates the importance of coordinated work between firms and their suppliers for the competitiveness of a firm's supply chain.

Information sharing

Information sharing is the extent to which a firm openly communicates important and sensitive information to its partners (Shou, Yang, Zhang & Su 2012). Li, Ragu-Nathan, Ragu-Nathan and Subba Rao (2006) also define information sharing as the extent to which critical and proprietary information is communicated to one's supply chain partner. Information sharing is a key factor in that supply chain management (SCM) depends on what information is shared, when and how it is shared and with whom, since this determines the degree of relevance and usefulness to organisations' supply chain members (Holmberg 2000). Furthermore, its relevance has also been underscored in in the findings of several scholars (Childhouse & Towill 2003; Li & Lin 2006) who suggest that the key to smooth supply chain effectiveness resides in

making available undistorted and up-to-date marketing data at every node in the supply chain.

Theoretical framework and hypotheses development

The theoretical framework illustrated in Figure 1 below was conceptualised, highlighting the causal relationships under investigation. This framework essentially comprises two distinct predictor constructs, namely information sharing and information quality, with supplier performance being the outcome construct, while institutional trust and supply chain collaboration act as antecedents to supplier performance.

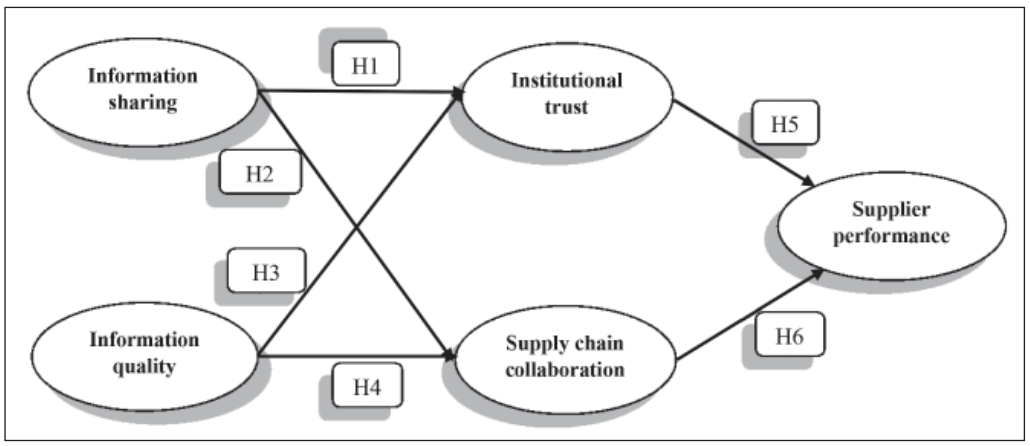


Figure 1: Theoretical framework

In the formulation of hypotheses, Ho indicates the 'null hypothesis' and Ha the 'alternative hypothesis'. Accordingly, a null hypothesis and an alternative hypothesis were formulated for each relationship.

Information sharing and institutional trust

A number of scholars (Mohr & Spekman 1994; Kulp, Lee & Ofek 2004; Devaraj, Krajewski & Wei 2007) consider information sharing to be a key driver of effective supply chain activities. In their study on the role of trust in improving supply chain competitiveness, Handfield and Bechtel (2002) advocate that sound and adequate trusting relationships between supply chain partners, contribute significantly to their ability to exchange key and vital information. The linkage between information

sharing and trust was further extended by Nyaga, Whipple and Lynch (2010) who postulate that the existence of these two concepts plays a decisive role in enhancing buyer-supplier relationships. On the basis of the aforementioned empirical evidence, the following hypotheses were formulated:

Ho_1: There is no relationship between information sharing and institutional trust among SMEs and their suppliers.

Ha_1: There is a positive and significant relationship between information sharing and institutional trust among SMEs and their suppliers.

Information sharing and supply chain collaboration

The literature (e.g. Daugherty, Richey, Genchev & Chen 2005; Whipple & Russel 2007) describes the adequate sharing of critical information between business partners as the backbone of operational efficiency and success. Moreover, supply chain systems characterised by the effective exchange of sensitive and up-to-date information, are widely regarded as efficient in achieving proper collaboration attributes within their chain of activities (Yu, Yan & Cheng 2001; Sandberg 2007). This view is further supported by Derocher and Kilpatrick (2000) and Mentzer, Foggin and Golic (2000) who posit that the greater the volume of information shared among supply chain partners, the more likely the partners will be inclined to synergistically coordinate their activities in a collaborative manner. On the basis the aforementioned literature, the following hypotheses were formulated:

Ho_2: There is no relationship between information sharing and supply chain collaboration among SMEs and their suppliers.

Ha_2: The sharing of information among SMEs and their suppliers has a positive influence on supply chain collaboration between SMEs and their suppliers.

Information quality and institutional trust

Organisations that are engaged in collaborative supply chain activities and strategies require a significant level of quality information to be processed across each unit of activities (Chen, Yen, Rajkumar & Tomochko 2011). This emphasises the key role of information quality in contributing to the optimum functioning of supply chain activities within firms. As mentioned by Fawcett, Osterhaus, Magnan, Brau and McCarter (2007), the ability of business partners to build and establish an acceptable degree of trust resides in their willingness to share critical, sensitive and crucial strategic information. Furthermore, Nicolaou et al. (2013) suggest that an

increase in the quality of information exchanged between organisational members has a positive effect on enhancing the level of trust that business associates have with one another. This highlights the critical role that quality information exchanged in a firm's supply chain environment plays in its overall productivity. Kwon and Suh (2004) add that inconsistencies in the provision of quality information may impair the production process in firms, thus negatively affecting buyer-supplier trusting relationships. On the basis of the aforementioned information, the following hypotheses were formulated:

Ho_3: There is no relationship between information quality and institutional trust among SMEs and their suppliers

Ha_3: The quality of information exchanged between SMEs and their suppliers positively influences the institutional trust existing between them.

Information quality and supply chain collaboration

Information quality is a major factor impacting on the overall performance of supply chains (Wiengarten, Humphreys, Cao, Fynes & McKittrick 2010). This implies that the effective exchange and transfer of up-to-date customer information in all sections of a firm's supply chain units may enable each link to better coordinate its strategic actions and respond to customers' final orders more effectively. In his study on economic satisfaction, Sahadev (2008) suggests that collaborative communication built through the efficient sharing of quality information may result in the establishment of trust and sound cooperation between each member of a supply chain network. This describes the major role that the transfer of quality information may fulfil in contributing to the smooth operation of a business. In addition, supply chain parties' abilities and capabilities to continuously exchange strategic decisions and key information may result in developing a certain level of trust, which ultimately enables supplier partners to collaborate synergistically (Zhou, Shou, Zhai, Li, Wood & Wu 2014). Moreover, according to Li and Lin (2006), buyer-supplier relationships characterised by attributes such as trust, commitment and shared vision through collaborative practices, enable firms to successfully engage in sharing quality information with their business partners. Based on the above-mentioned evidence, the following hypotheses were formulated:

Ho_4: There is no relationship between the quality of information and supply chain collaboration.

Ha_4: The quality of information shared between SMEs and their suppliers has a positive influence on supply chain collaboration.

Institutional trust and supplier performance

Organisations that demonstrate effective trusting behaviour are able to improve their overall supply chain's activities and performance. Trust between buyer-supplier institutions is essential to achieve supply chain proximity, which is characterised by strategic practices such as just in time (JIT) (Narasimhan & Nair 2005). Furthermore, supply chain partners' abilities and willingness to collaborate in a trusting environment are regarded as a key factor that enables them to maintain and enhance their performance through sound and effective supplier integration (Al-Abdallah, Abdallah & Hamdan 2014). Trust also has a positive and significant influence on organisations' competitive performance and is a central predictor factor promoting supply chain performance (Ireland & Webb 2007). In terms of the above-mentioned literature, the following hypotheses were formulated:

Ho_5: There is no relationship between institutional trust and supplier performance.
Ha_5: The institutional trust existing between SMEs and their suppliers has a positive influence on supplier performance.

Supply chain collaboration and supplier performance

Supply chain collaboration has a major influence on improving buyer-supplier relationships (Sheu, Yen & Chae 2006). Effective collaborative practices among business partners has a significant impact on increasing profitability, reducing costs and improving technical cooperation (Ailawadi, Farris & Parry 1997). Moreover, sound and efficient supply chain collaboration between buyer-supplier parties results in better inventory reduction, improved quality and delivery, costs and lead time reduction, higher flexibility, faster product-to-market cycle times, increased responsiveness to market demands and customer service (McLaren, Head & Yuan 2002). In addition, Cao and Zhang (2011) posit that efficient and effective collaborative practices are a fundamental determinant of performance enhancement among suppliers. In the light of the aforementioned discussion, the following hypotheses were formulated:

$Ho_{6:}$ There is no relationship between supply chain collaboration and supplier performance.
Ha_6: Supply chain collaboration among SMEs has a positive influence on supplier performance.

Research methodology

Research design

A quantitative approach was applied in this study, since the study was intended to test the relationships between various constructs. The cross-sectional survey technique, which refers to the collection of data or information for a specific investigation or study from any given sample of population elements (Moutinho & Hutcheson 2011), was used to collect data from the population in this investigation. The cross-sectional survey technique was chosen because it affords the researcher the opportunity to include a larger number of relevant respondents, which helps to obtain accurate and reliable results (Creswell 2009).

Participants

The targeted population for this study consisted of the managers and owners of SMEs based in the towns of Vereeniging, Vanderbijlpark and Sasolburg in the southern part of Gauteng Province, South Africa. From this population, a sample size of 400 SME managers or owners was selected using the convenience sampling technique. The justification for selecting this sample size was a similar study conducted by Inayatullah, Narain and Singh (2012) which had a sample size of 425. Furthermore, as recommended by Wolf, Harrington, Clark and Miller (2013), larger samples are preferable when conducting structural equation modelling. In convenience sampling, respondents are selected on the basis of their accessibility (Bryman & Bell 2007). This technique was suitable because of its cost-saving attributes, which facilitated the collection of data from the nearest and most accessible SMEs. The actual collection of data involved the physical distribution of questionnaires in which the researchers, with the assistance of a trained assistant, personally distributed the questionnaires and explained some of the questions where necessary. Respondents were given a week to complete the questionnaire. Initially, a total of 550 questionnaires were distributed, of which 530 were returned with 400 correctly completed. This provided an acceptable response rate of 73%.

Measurement scales and procedures for data collection

Measurement scales were operationalised by means of previously validated instruments. Information sharing was measured using a six-item scale adapted from Li et al. (2006). Information quality was measured using five items, also adapted from Li et al. (2006). Institutional trust was measured using six items

adapted from Ketkar, Kock, Parente and Verville (2012). Supply chain collaboration was measured using four items adapted from Ranganathan et al. (2011). Supplier performance was measured using a five items adapted from Prajogo, Chowdhury, Yeung and Cheng (2012). All the measurement items were measured on five-point Likert-type scales that were anchored by 1= strongly disagree to 5= strongly agree to express the degree of agreement.

Data analysis

The data analysis procedure involved the use of the Statistical Packages for Social Sciences (SPSS version 22.0) to ascertain the reliability and validity of the instruments and confirmatory factor analysis (CFA) as well as structural equation modelling analysis using Analysis of Moment Structures (AMOS version 22) statistical software.

Research results

The results section discusses the profile of the participating SMEs, the psychometric properties of measurement scales, the correlations between constructs, model fit analysis and the structural equation modelling results.

Profile of participating SMEs

The profile of SMEs that participated in the study is indicated in Table 1.

An analysis of the profile of SMEs as reported in Table 1 indicates that most of the SMEs were either sole proprietors (25%: n = 100) or private companies (34%; n = 136). In terms of the nature of business conducted, the largest number of participating SMEs (39%; n = 156) were in the retail sector. With reference to the number of people employed, it emerged that a majority of the SMEs employed fewer than 100 individuals (58%; n = 232). With regard to the number of years in business, the majority of SMEs (78%: n = 312) had been in operation for less than five years.

Psychometric properties of measurement scales

The psychometric properties of scales were ascertained using confirmatory factor analysis (CFA). The results of the CFA are reported in Table 2.

Table 1: Profile of participating SMEs

Variable	Category	n	%
Type of business	Cooperative	24	6
	Sole proprietor	100	25
	Close corporation	60	15
	Private company	136	34
	Partnership	80	20
	Total	400	100
Nature of business	Mining/quarrying	28	7
	Manufacturing	68	17
	Retail	156	39
	Construction	32	8
	Transport	44	11
	Community/personal service	36	9
	Tourism	8	2
	Finance/tourism	28	7
	Total	400	100
Number of employees	21–50	132	33
	51–100	100	25
	101–200	92	23
	201–500	76	19
	Total	400	100
Number of years in business	< 2 years	136	34
	2–5 years	176	44
	5–10 years	52	13
	>10 years	36	9
	Total	400	100

Table 2: Accuracy analysis statistics

Research constructs Mean		Descriptive statistics		Cronbach's test		CR	AVE	Factor loading
		SD	Item-total	α Value				
Information sharing	I_{S-1}	4.251	0.797	0.838	0.910	0.91	0.89	0.80
	I_{S-2}			0.845				0.82
	I_{S-3}			0.852				0.84
	I_{S-4}			0.861				0.89
	I_{S-5}			0.855				0.90
	I_{S-6}			0.864				0.81
Information quality	I_{Q-1}	4.240	0.986	0.862	0. 900	0.90	0.87	0.87
	I_{Q-2}			0. 861				0.86
	I_{Q-3}			0. 876				0.90
	I_{Q-4}			0. 847				0.87
	I_{Q-5}			0.811				0.70
Institutional trust	It_{-1}	4.287	1.034	0. 828	0. 916	0.8	0.79	0.93
	It_{-2}			0. 882				0. 89
	It_{-3}			0. 812				0.90
	It_{-4}			0. 916				0.81
	It_{-5}			0. 820				0.80
	It_{-6}			0. 792				0.91
Supply chain collaboration	Scc_{-1}	4.291	1.022	0. 798	0.920	0.86	0.83	0.92
	Scc_{-2}			0. 987				0.89
	Scc_{-3}			0. 891				0.90
	Scc_{-4}			0. 902				0.91
Supplier performance	S_{p-1}	4.333	1.019	0. 804	0.950	0.86	0.82	0.87
	S_{p-2}			0. 863				0.80
	S_{p-3}			0. 815				0.91
	S_{p-4}			0. 846				0.93
	S_{p-5}			0. 832				0.84

Note: IS = information sharing; IQ = information quality; ST = institutional trust; SSY= supply chain collaboration; SP = supplier performance; CR: composite reliability; AVE: average variance extracted
Scale: 1 = strongly disagree; 2 = disagree; 3 = no opinion; 4 = agree; 5 = strongly agree

The reliability (internal consistency) of the measurement scales for all constructs was measured using three indicators, namely the Cronbach alpha, composite reliability (CR) and average value extracted (AVE). Regarding the Cronbach alpha, the minimum threshold of 0.7 was used (Bagozzi & Yi 1988; Nunnally & Bernstein 1994). As resported in Table 2, all the constructs (IS = 0.91; IQ = 90; IT = 0.91; SSC = 0.92 and SP = 0.95) had reliability values above the recommended threshold of 0.7, which attests to their internal consistency. Likewise, the minimum threshold of 0.7 was used to determine the composite reliability (CR) index value (Nunnally 1978; Hair, Anderson, Tatham & Black 2006). Table 2 shows that all the average values of the respective constructs (IS, IQ, IS, SCC and SP) met this prescription, since they were beyond the 0.7 mark. Furthermore, greater values of the AVE estimate (greater than 0.40) showed that the indicators adequately represented the latent construct (Fraering & Minor 2006; Chinomona 2011). All AVE values in the scales were above the recommended threshold of 0.40, thereby confirming the acceptability of the reliability of all individual scales.

In this study, validity was determined by considering the values of convergent as well as discriminant validities. Convergent validity was ascertained by assessing the factor loadings (Table 2) of the constructs to determine if they were above the recommended threshold of 0.5 (Anderson & Gerbing 1988). The factor loadings for all measurement scale items were above the recommended 0.5, which indicates that the instruments were acceptable and valid and converged well on the respective constructs they were supposed to measure. In addition, more than 50% of each item's variance was shared with its respective construct. This indicates the adequacy of the convergent validity of all scale items. Discriminant validity was ascertained by confirming that the average variance extracted (AVE) for each multi-item construct was larger than the shared variance between constructs, as prescribed by Fornell and Larcker (1981). This was indeed the case, as indicated in Table 2, which shows that all the pairs of constructs had an adequate level of discriminant validity.

Model fit analysis

The acceptability of the model fit was measured by calculating the chi-square value divided by the degrees of freedom (χ^2/df), of which the resultant value should lie between 1 and 3 (Schreiber, Stage, King, Nora & Barlow 2006); the values of the goodness-of-fit index (GFI), comparative fit index (CFI), incremental fit index (IFI) and Tucker-Lewis index (TLI) should be superior or equal to 0.90 (Bollen 1990; Hu & Bentler 1995; Chinomona 2012); and the root mean square error of approximation (RMSEA) value to be equal to or below 0.08 (Browne & Cudeck 1993). The results of the model fit assessment provided the following values: the chi-square value over degree of freedom of was 2.864 (x^2/df = 670.126/234) and the GFI, CFI, IFI, NFI and RMSEA were 0.932, 0.967, 0.967, 0.951 and 0.078

respectively. All of the values in these indicators met the recommended thresholds, which indicates that the data was able to fit the structural model.

Structural equation modelling results

In order to ascertain that the data was suitable for the hypothesis tests, model fit analysis for the structural model was conducted. As previously mentioned, the measurement of model fit in this study was conducted using the following indices; chi-square value over degree-of-freedom, GFI, CFI, IFI, NFI and RMSEA. Regarding the chi-square over degree-of-freedom, the value was below the required upper threshold of 3 ($x^2/df = 600.210/234 = 2.565$). Furthermore, the GFI, CFI, IFI, NFI and RMSEA provided respective ratios of 0.91, 0.95, 0.94, 0.911 and 0.07, which indicates that all the indicators met the acceptable thresholds of equal to or greater than 0.9 for the GFI, CFI, IFI, NFI and equal to or less than 0.08 for RMSEA. The data therefore confirmed the acceptability of the model fit, which ascertained that it was appropriate to test all hypotheses proposed in the study. The results of the hypotheses tests are reported in Table 3.

Table 3: Results of structural equation model analysis

Path coefficients	Null hypothesis	Alternative hypothesis	Factor loading	Decision
Information sharing → Institutional trust	Ho_1	Ha_1	0.345***	Reject null hypothesis
Information sharing → Supply chain collaboration	Ho_2	Ha_2	0.662***	Reject null hypothesis
Information quality → Institutional trust	Ho_3	Ha_3	0.740***	Reject null hypothesis
Information quality → Supply chain collaboration	Ho_4	Ha_4	0.135	Accept null hypothesis
Institutional trust → Supplier performance	Ho_5	Ha_5	0.124	Accept null accepted
Supply chain collaboration → Supplier performance	Ho_6	Ha_6	0.896***	Reject null hypothesis
Structural model fits: $\chi^2/df = 2.56$; GFI = 0.91; IFI = 0.94; CFI = 0.95; NFI = 0.91; RMSEA = 0.07 Significance level < 0.05; * significance level < 0.01;*** significance level < 0.001**				

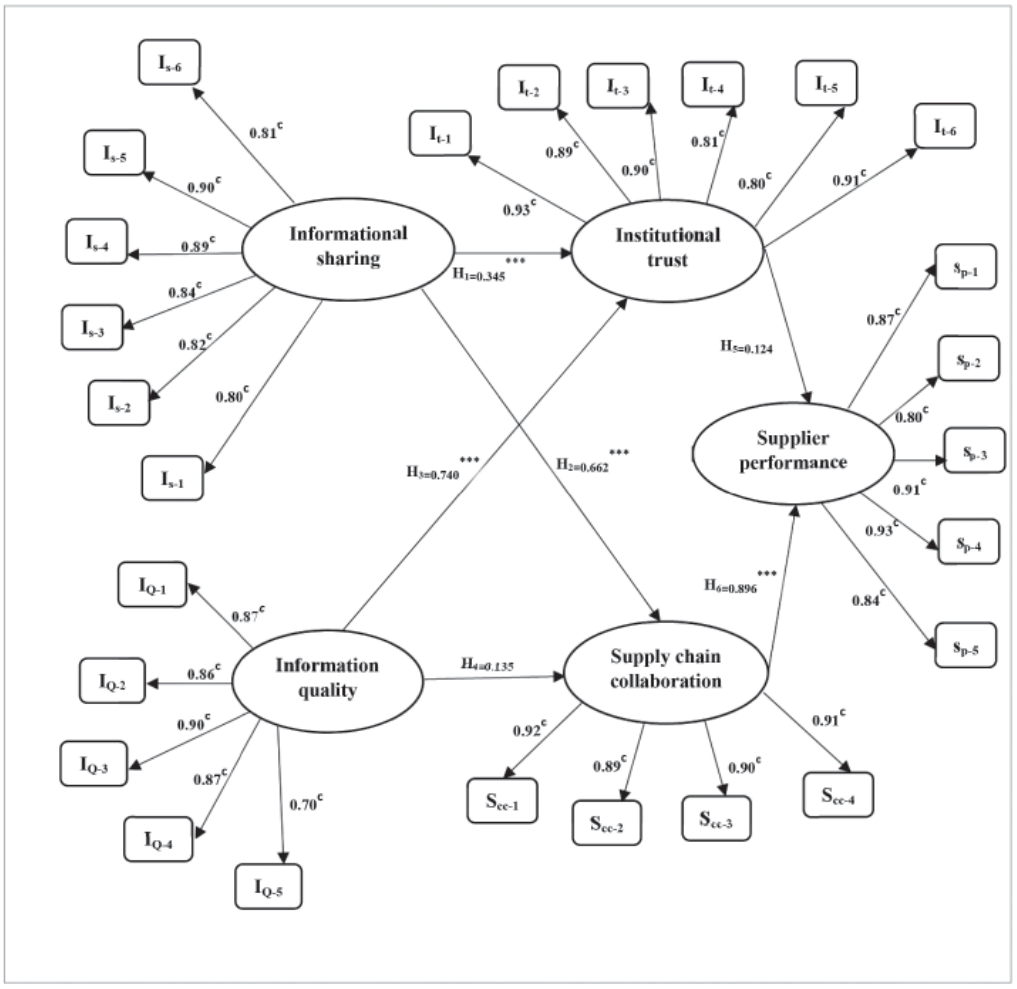
Table 3 indicates that the path coefficients for all the hypotheses were statistically significant at a level of $p < 0.01$, with the expection of Ho_4 and Ho_5, which were statistically insignificant. These two were subsequently accepted, while four null hypotheses (Ho_1, Ho_2, Ho_3 and Ho_6) were rejected. A discussion of the above results is provided in the discussion and conclusion section.

In addition to the above-mentioned, a structural model (Figure 2) was developed after testing the hypothesis. The model shows the strength and the significance levels of the relationships that existed between the five constructs. Information sharing had a moderate but significant association ($r = 0.3345$; $p < 0.01$), with institutional trust and a weak positive but significant association ($r = 0.262$; $p<0.01$) with supply chain collaboration. The model also indicates that information quality had a strong positive and significant relationship ($r = 0.740$; $p < 0.01$) with institutional trust and a weak and insignificant relationship ($r = 0.135$; $p < 0.01$) with supply chain collaboration. Another result reported in the conceptual model was that institutional trust had a weak positive but insignificant relationship ($r = 0.124$; $p < 0.01$) with supplier performance. However, supply chain collaboration had a strong positive and significant association ($r = 0.896$; $p < 0.01$) with supplier performance.

Discussion and conclusions

The first alternative hypothesis ($Ha_{1)}$ which stated that there was a positive and significant relationship between information sharing and institutional trust among SMEs was supported and accepted in this study. This decision was premised on the presence of a moderately positive and significant relationship between information sharing and institutional trust ($r = 0.345$; $p < 0.01$). This result indicates that the adequate enhancement of the degree of information shared among SMEs and their supply chain partners could stimulate their degree of mutual trust. This result is consistent with the results of previous studies conduted by a number of researchers (e.g. Gosh & Fedorowicz 2008; Kui-ran, Ji-ning & Ping 2012), which concluded that the sound exchange of critical information between business partners is paramount to their abilities and capabilities to embark on and adopt strong trusting relationships. The notion of information sharing per se is further regarded by a number of academics (e.g. Kwon & Suh 2004; Nyaga et al. 2010) as an essential prerequisite in determining strong and sustainable trust in buyer-supplier relationships. Thus, by implication, the transfer and exchange of information and knowledge among SMEs and their partners has a stimulus effect on the free establishment and creation of a strong and trustworthy rapport.

The second alternative hypothesis ($Ha_{2),}$ which suggested that there is a positive and significant relationship between information sharing and supply chain collaboration among SMEs, was supported and accepted. As a rationale for accepting this decision, the result of the structural model analysis revealed a positive and significant relationship ($r = 0.262$; $p < 0.01$) between information sharing and supply chain collaboration. This result illustrates that information sharing exerts



Significance level < 0.05; * significance level < 0.01; *** significance level < 0.001**

Figure 2: The structural model

some positive, *albeit* weak, yet significant influence on supplier collaboration. This result was validated by Barratt (2004) who found that the ability of an organisation to effectively collaborate and engage in mutual problem resolutions resides in its willingness to exchange strategic information with external parties. Further support for this result was found in a study by Prajogo and Olhager (2012) who observed that supply chain units are characterised by a constant flow of inputs, which contributes strategically and enables each chain to perform in a collaborative and synergistic manner. These assertions give credence to the central role performed by the efficient

sharing of information among SMEs and their suppliers in defining their synergistic abilities to work together.

The third alternative hypothesis ($Ha_{3),}$ which postulated that information quality has a positive and significant relationship with institutional trust among SMEs, was supported and accepted in this study, since a strong positive relationship ($r = 0.740$; $p < 0.01$) was observed between the two constructs. This result demonstrates that an improvement in the quality of information exchanged and conveyed between SMEs and their suppliers contributes significantly to enhancing the level of mutual trust existent between them. This result is congruent with other studies by Chen et al. (2011) and McDowell, Harris and Gibson (2013), in which it was observed that the continuous and sustained exchange of relevant information and other sensitive data between supply chain partners results in the establishment of a greater level of trust within SMEs' supply chain environment. Fawcett et al. (2007) add that one of the key factors that promotes the willingness of supply chain partners to build strong and long-standing trusting relationships is their capacity to continually share sensitive and strategic information. Hence the effective and efficient exchange of core and crucial strategic information and the knowledge base between SMEs and their suppliers remain critical components of the success of their supply chain activities as demonstrated by supplier competence.

The fourth alternative hypothesis (Ha_4), which proposed that there is a positive and significant relationship between information quality and supply chain collaboration among SMEs, was not supported and thus rejected, based on the statistically insignificant result ($r = 0.135$) observed in the structural modelling analysis. This result implies that the exchange of quality information between SMEs and their suppliers does not necessarily culminate in more robust collaboration between them. It should be noted that this result contradicts the results of a number of studies (e.g., Squire, Cousins, Lawson & Brown 2009; Nagarajan, Savistkie, Raganathan, Sen & Alexandrov 2013) in which a positive interplay between information quality and supply chain collaboration obtained the opposite results. This unorthodox result could perhaps be attributed to the idea that the greater the volume and quality information shared, the higher the possibility that the one of the parties may use that information to their unfair advantage, causing a possible breach of contract and conflict situation (Sahadev 2008). It is possible that in such scenarios, information is exchanged but does not enhance collaboration between the parties involved until trust is adequately established between the parties. Hence the adequate sharing of quality data and other proprietary information between SMEs and their suppliers does not essentially enhance the synergy between them.

The fifth alternative hypotheses (Ha_5), which postulated that institutional trust has a positive and significant relationship with supplier performance was rejected since the relationship was statistically insignificant ($r = 0.124$). This result indicates that the existence of trust between SMEs and their suppliers does not automatically lead to improved supplier performance. This result appears to present a different reading of the general consensus of previous studies conducted by a number of researchers (Dirks & Ferrin 2001; Zhang, Cavusgil & Roath 2003; Corsten & Kumar 2005; Jain, Khalil, Johnston & Cheng 2014), which concluded that trust is the backbone of and a prerequisite factor for supplier performance appraisal. The current study also contradicts a study by Nielsen (2007), which found that supplier trust is a key determinant factor that enables businesses to conduct their transactions openly and freely through the sharing of strategic inputs and outputs from their inbound and outbound supply chain activities. This improves the overall performance of suppliers. Thus, according to the results of this study, SMEs need to be vigilant in their supply chain activities, since the presence of trust between them and their suppliers may not inevitably lead to improved supplier performance.

The sixth alternative hypothesis (Ha_6), which postulated that there is a positive and significant association between supply chain collaboration and supplier performance among SMEs was supported and accepted, since the relationship was statistically significant ($r = 0.896$; $p < 0.01$). This result exemplifies the key and more central role performed by supply chain collaboration in improving supplier performance. This result was substantiated by Parker (2007) and Cao and Zhang (2011), who found that effective and efficient collaborative efforts among business partners contributes significantly to enhancing their overall performance level, ultimately resulting in greater levels of profitability. It is thus clear that SMEs seeking to improve the performance of their suppliers should, among other things, expedite their collaborative efforts in supply chains.

Limitations and implications for further research

Apart from the relevance of its findings, this study was limited in a number of areas which might be further addressed in future research. Some of these limitations could reside in the possibility of sampling bias because of the use of convenience sampling, which may have had the effect of reducing the accuracy of the results. Future studies could be conducted using probability sampling techniques, which would reduce the risk of sampling bias. The limitations associated with the small sample size sample size (n = 400) and the restricted geographic context (Southern Gauteng, exclusively) might make it difficult to generalise the results to other

contexts. Similar studies could be conducted in the future, using amplified sample sizes and an enlarged geographic scope. Furthermore, tangible resources could be used in future studies as opposed to intangible ones in the light of the constructs selected in this study, with a view to providing other significant and interesting insights which were not covered in this study. In addition, refining the results by testing the framework in industry-specific SME categories such as manufacturing, retail and mining SMEs could also contribute to further meaningful results. It might also be fruitful to expand the framework to include other sectors of the economy such as larger companies in order to compare results.

Managerial implications

In terms of the results obtained, it is essential for managers and other decision makers in SMEs to adopt strategies and policies focusing on improving relationships that were found to be supportive in this investigation. Supply chain collaboration could be improved by establishing strong partnerships with third-party logistics companies, engaging in mutual and joined forecast activities and adopting collaborative planning, forecasting and replenishment (CPFR) which enables supply chain partners to collaboratively align their supply- and demand-based activities through the effective exchange or flow of information (Liu & Kumar 2003). These initiatives could facilitate the development and strengthening of synergistic processes between business partners, leading to improved supplier performance

To ensure that information quality leads to enhanced institutional trust, SMEs could introduce recent technologies such as point-of-sale (POS) systems and just-in-time (JIT) systems, which refer to the ability of businesses to share real-time information on customers' needs with their partners in order to limit or reduce demand variability and prevent any unnecessary forecasting decision (De Villiers, Nieman & Niemann 2008). To ensure that institutional trust supports supplier performance, SMEs could focus on developing their own supplier bases by training staff and acquiring the necessary skills and competences. Furthermore, it might be necessary for SMEs to select one specific and reliable supplier with which to conduct their business and implement strategies that could that enable both parties to nurture and develop a strong relationship based on the mutual aspects of problem sharing and other resolutions. This would foster some level of trust between these partners because they would confidence in the fact that these suppliers would be able to meet their expectations and demands on time.

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Supply chain risks and smallholder fresh produce farmers in the Gauteng province of South Africa

A. Louw & D. Jordaan

A B S T R A C T

A survey of 52 smallholder fresh produce farmers was conducted in the Gauteng province of South Africa to grasp how risk and its management affect the mainstreaming of smallholder farmers into formal, high-value markets. The study employed a supply chain analysis approach, which focused on the functions and risks that occur along the fresh produce chain. The results highlight the risks that impede the participation of smallholder farmers in formal, high-value chains. At the production level, risk is prominent from input procurement through to the post-harvest stage of the chains. At the retail and consumption level, risks are linked to the adherence to quality and quantity standards, including prescribed packaging, grading, labelling and traceability and transport requirements. As a result of these risks across the formal chain, smallholder farmers often resort to distributing their products in low-value informal markets. The consequence is that smallholder farmers tend to remain trapped in poverty, in part, because of their risk appetites and their ability to bear risk.

Further research is required in the areas pertaining to smallholder farmers' risk appetite and risk-bearing ability and mechanisms to deal with the particular risks in the value chain that impede their all-round ability to escape the "smallholder dilemma".

Key words: Smallholders, supply chain risks, fresh produce, high-value markets

Introduction

In the region of 1.5 billion people are estimated to be engaged in smallholder agriculture globally. They include 75% of the world's poorest, whose food, income

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and livelihood depend on agriculture in one way or the other (Ferris et al. 2014). The South African context is no different – with up to 20% of all households in South Africa described as agricultural households most of whom depend on subsistence or small-scale agriculture for part or all of their sustenance and livelihoods (KPMG, 2013).

There is general consensus that economic participation continues to be the best approach to address the smallholder's challenge and to improve the livelihood prospects for most rural households. The supposition is that growing populations, urbanisation, and improved communications and infrastructure globally generate opportunities to expand domestic and export markets for those farmers who can consistently link production with sales (Ferris et al. 2014).

Despite the opportunities offered by economic development, a general view of smallholder farmers' prospects globally, however, reveals a more discouraging situation. Ferris et al. (2014) notes that studies show that the majority of smallholders do not transition from subsistence to commercial operations. Obi, Van Schalkwyk and Van Tilburg (2012) confirm this observation in the South African context by noting that too little visible change in the circumstances of the rural, small-scale producers of South Africa is observable, despite far-reaching efforts by government to address the plight of these producers. A reasonable inference is therefore that most smallholder farmers face challenges that perpetually leave them locked in poverty.

The primary and ongoing themes in addressing the 'smallholder dilemma' globally focus on market access, capacity building and access to resources and institutions (Lyne & Martin 2008). Similar themes have been identified in the South African context by Obi et al. (2012). These themes are seemingly the primary stumbling blocks for typical smallholder farmers in making the transition to commercial status and transforming their economic outlook.

This paper adds to the discussion of the 'smallholder dilemma' in the South African context and offers further points of view in terms of the underlying reasons for their battle to access profitable and sustainable markets. The paper does not therefore aim to restate the well-known struggles that smallholder farmers face in accessing markets or which measures are generally recommended in addressing their dilemma. The approach is rather to posit whether supply chain risks influence smallholder farmers' success or lack thereof in accessing markets. To this end the influence of supply chain risks for smallholder fresh produce farmers in the Gauteng province of South Africa was studied in order to probe the idea.

Smallholder farmers typically face numerous challenges such as the following: production yields that tend to be low; post-harvest risks that are high; many barriers to market access with consistency of quality, inadequate volumes, spoilage, lack and

cost of transport and storage (Baliyan & Kgathi 2009; Hewett (2012); Humphrey 2006; Munyeche, Story, Baines & Davies 2011; Murray-Prior 2011; Shepard 2007; Torero 2011). Furthermore, with current trade liberalisation and globalisation trends prominent in agricultural food chains, the agri-food sector has become more concentrated, with increased vertical integration between sectors. This increase has raised issues of food safety, quality and traceability, which have become important requirements for market entry. Owing to these global changes, farmers are increasingly challenged to compete in markets that are far more demanding in terms of quality and food safety, more concentrated and integrated and much more open to international competition (Albert & Spinger-Heinze 2006). This set of demands causes smallholder farmers to forego market share to commercial producers who have the appetite for and the capacity to bear and manage the risks associated with producing 'commercial' volumes of good-quality produce on a consistent, long-term basis.

This study sought to identify the risks that create challenges for smallholder farmers to grow and distribute their produce in South Africa in a provincial setting with the focus on fresh produce in the Gauteng province. The study was conceptualised with the proposition that the range of risks along the fresh produce chain, and particularly those faced by smallholder producers, are the major contributors to the entrapment of these producers and of the consequences for them failing to sustainably engage mainstream markets.

Owing to the contentious nature of defining smallholder farmers, it is suggested that for the purposes of this discussion, smallholder farmers should be considered as those farmers who are somewhat land constrained, poorly linked to markets and more vulnerable to risk than larger farmers in the same area (Chamberlin 2008). Although this definition also has limitations, it is known that smallholder farmers are usually only associated with limited land availability, whereas many other aspects of smallness are just as important in characterising resource-poor, small farmers. In the specific case of this research, it implied black farmers with new and/or small farms who were on the database of the Gauteng Department of Agriculture and Rural Development (GDARD) and who were known to produce vegetables.

Literature review

Risk and agriculture

Jaffee, Siegal and Andrews (2010) succinctly describe the changing risk landscape in agriculture and agricultural value chains. They (2010: p vi) note that 'risk and

uncertainty are ubiquitous and varied within the agricultural context and are as a result of a range of factors'. These include the vagaries of the weather, the unpredictable nature of biological processes, the pronounced seasonality of production and market cycles, the geographical separation of production and end uses, and the unique and uncertain political economy of food and agriculture. Cervantes-Godoy, Kimura and Antón (2013) confirm this view by noting that agriculture is characterised by highly variable returns and is associated with unpredictable circumstances that determine the final output, value and cost of the production process. According to Chuku and Okoye (2009), shocks in agriculture are triggered by a system of multi-scalar stressors or risks. They (2009: p 1525) also note that 'these stressors interact in complex and messy ways to increase the vulnerability of agricultural role players and reduce their resilience to effects of disasters'.

Jaffee et al. (2010) highlight the fact that in light of the omnipresence of risks and massive structural changes in global and national agri-food systems, farmers, agribusiness firms and governments face new challenges in the design of risk management strategies. In terms of this, it is becoming increasingly important to understand and appreciate the risks and their impacts on the agri-value chain and to develop strategies and policies to overcome these perils. The value of characterising risk from an agri-supply chain perspective is therefore clear both for policymakers and stakeholders in order to shape policy and decision making. Torero (2011) emphasises the influence of risk by noting that the high risks of production and cycles of oversupply and price depression create financial risks throughout the distribution chain that inhibit investment and access to capital.

Table 1 summarises the general categories of major risks that the agricultural chain faces, with overviews of such risks. This summary contextualises risks in agriculture as a point of departure in analysing and understanding the impact of these risks for smallholder farmers in the Gauteng province of South Africa.

Smallholder farmers and the impact of risk

Although agriculture is generally associated with risk, a factor to consider is the impact of the different dimensions of risk on smallholders and their ability and appetite to participate in the agricultural chain. According to Cervantes-Godoy et al. (2013), smallholder farmers are most likely to be disproportionately vulnerable to the impacts of risk. Owing to this vulnerability, the consequences of these risks can be extreme, usually trapping smallholder farmers in a poverty trap or pushing them into deeper poverty. Eakin (2005) notes the relationship between risk and the fortunes of smallholder farmers, Torero (2011) also mentions the impact of risk along

Table 1: Categories of major risks facing agricultural supply chains

Type of risk	Examples
Weather-related risks	Periodic deficit and/or excess rainfall or temperature, hail, storms, strong winds
Natural disasters (including extreme weather events)	Major floods and droughts, hurricanes, cyclones, typhoons, earthquakes, volcanic activity
Biological and environmental risks	Crop and livestock pests and diseases; contamination related to poor sanitation, human contamination and illnesses; contamination affecting food safety; contamination and degradation of natural resources and processes contamination and degradation of production and processing environment
Market-related risks	Changes in supply and/or demand that impact domestic and/or international prices of inputs and/or outputs; changes in market demands for quantity and/or quality attributes, market demands for quantity and/or quality attributes; changes in food safety requirements, changes in market demands for timing of product delivery; changes in enterprise/supply chain reputation and dependability
Logistical and infrastructural risks	Changes in transport, communication, energy costs, degraded and/or undependable transport, communication, energy infrastructure, physical destruction, conflicts, labour disputes affecting transport, communications, energy infrastructure and services
Management and operational risks	Poor management decisions in asset allocation and livelihood/enterprise selection; poor decision making in use of inputs; poor quality control; forecast and planning errors; breakdowns in farm or firm equipment; use of outdated seeds; lack of in-farm or firm equipment; lack of preparation to change product, process, markets; inability to adapt to changes in cash and labour flows
Public policy and institutional risks	Changing and/or uncertain monetary, fiscal and tax policies; changing and/or uncertain financial (credit, savings, insurance) policies; changing and/or uncertain regulatory and legal policies and enforcement; changing corruption); weak institutional capacity to implement tenure system; governance-related uncertainty (e.g., market policies; changing and/or uncertain land policies and and/or uncertain trade and regulatory mandates
Political risks	Security-related risks and uncertainty (e.g., threats to property and/or life) associated with politico-social instability within a country or in neighbouring countries, interruption of trade due to disputes with other countries, nationalization/confiscation of assets, especially for foreign investors

Source: Jaffee et al. (2010:p 10)

with high transaction costs, which has a snowballing detrimental effect on their ability to get markets to work for them. Chamberlin (2008: pp 1) highlights the fact that 'most smallholders in most developing areas are probably somewhat land constrained, poorly linked to markets, and more vulnerable to risk than are larger farmers in the same areas. However, not all smallholders are equally land constrained, market oriented, or vulnerable to risk.

In the sub-Saharan setting, Livingston, Schonberger and Delaney (2011) observed that smallholders in disbursed supply chains (cereals, rice, vegetables) are exposed to a larger number of business risks and lower returns than those operating in integrated markets (fair trade cocoa, specialty coffee) where risks are more widely shared among chain actors. The result is that smallholder farmers generally remain constrained by their capacity to manage their risk-return trade-offs, which curbs their ability to exchange stable crop production for intensified agriculture.

Harvey et al. (2014) studied the vulnerability of smallholder farmers to agricultural risks and climate change in Madagascar. Malagasy farmers were found to be particularly vulnerable to any shocks to their agricultural system owing to their high dependence on agriculture for their livelihoods, chronic food insecurity, physical isolation and lack of access to formal safety nets. Unless well managed, risks in agriculture slow development and hinder poverty reduction.

The significance of risk to smallholder farmers is obvious, as it pertains to global, regional and local dimensions in the South African context. The difficulties that smallholder farmers have to navigate are likely to drive them into deeper vulnerability and trap them in a state of underdevelopment if there are no mechanisms to manage risks. These aftermaths can be ill-afforded in the South African setting where the development of smallholder farmers is a huge imperative for rural expansion, economic development and social cohesion.

Risk and the poverty trap

In light of their precarious situation, many smallholder farmers tend to be risk adverse and they are thus less inclined than non-poor groups to move up the 'risk-return' ladder towards potential higher incomes and returns. According to Livingston et al. (2011), this contributes to the growing income disparities in developing countries.

The consequences of the difficulties that smallholders face can be explained by the distinctive 'poverty trap' (Figure 1) as described by Dorward, Kirsten, Omamo, Poulton and Vink (2009). The 'poverty trap' is a typical, self-enforcing cycle in which the poverty stricken are inescapably caught. This trap is caused by a weak institutional and infrastructural environment where smallholder farmers' strategies

result in low economic activity, thin markets, high transaction costs and risks and high units cost that limit access to markets and development, which in turn result in constrained economic development of those farmers. The premise is that a change in smallholder farmers' risk-bearing or management capability is critical to escaping from the poverty trap. It is postulated that the central 'market access' theme as a stumbling block to the development of smallholder farmers is actually the result of farmers' inability to endure or manage risks rather than a superficial view of market access independently.

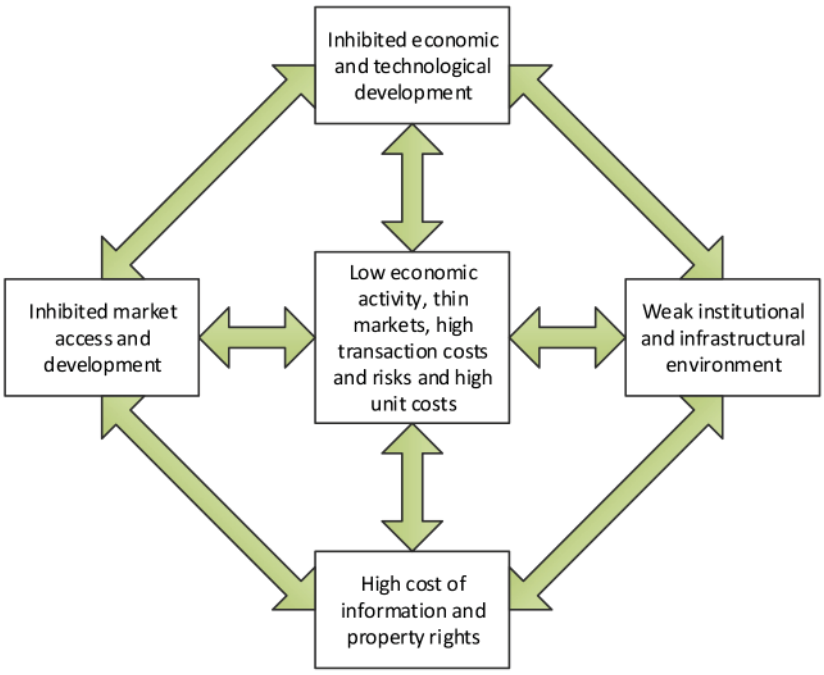

Figure 1: The classic poverty trap (adapted from Dorward et al. 2009)

The South African fresh produce sector

The South African fresh produce sector is economically significant and contributes 25% of the gross value of the country's agricultural economy. The main vegetables produced in South Africa include potatoes, tomatoes, onions, green maize and pumpkins. Vegetable production in South Africa has also been increasing generally, with a 2.7% annual growth in vegetable production over the past 28 years. This growth has tracked population growth but is also ascribable to, respectively, a 19% and

7% increase in the per capita consumption of potatoes and other vegetables during the past ten years (Department of Agriculture 2014). Fresh produce production and distribution in South Africa reflects the dualistic economic system of the country where a sophisticated, developed economy exists alongside a developing economy.

Fresh produce is produced by a small number of relatively large, established commercial producers, on the one hand, and a multitude of small-scale producers, on the other. Smallholder farmers who produce crops valued at no more than R100 000 (± US$ 8 500) per annum, have a small market share in the formal fresh produce chain, accounting for only 3% of total supplies to the Johannesburg Fresh Produce in 2009 (Louw & Geyser 2009). In the same year, large-scale producers accounted for 16% of total supplies with harvests valued in excess of R10 million (±US$ 850 000). Producers supplying produce falling in the R1 million to R10 million (±US$ 85 000 – 850 000) category accounted for 60% share of total produce supplied.

Fresh produce in South Africa is marketed through formal channels (consisting of a relatively small number of large players) and informal channels (consisting of a relatively large number of small role players). The bulk of fresh produce in South Africa is marketed through formal channels mostly through fresh produce markets (FPMs). Direct marketing of fresh produce has been popular across South Africa because it offers producers security of payment, lower marketing costs, a better bargaining position for producers, lower prices for wholesalers and retailers, convenience, less handling and better quality (HSRC 1991). Historically, the direct marketing of fresh produce is also influenced by the quality, freshness and the availability of specialised farmers' facilities (Mollen 1967). Informal trade continues to play a part in the distribution of fresh produce in South Africa. Informal trading in South Africa is largely influenced by the history of the country, with many consumers in townships where informal shops (shebeens & spaza shops) and street traders (hawkers) generate large volumes of product sales on a national scale. Stalls situated along the roadside are a common phenomenon in South Africa, on roads where there are large volumes of traffic and that are situated close to urban consumer markets and the product source area. The marketing of fresh produce in South Africa is influenced mainly by transportation and storage, as well as the grading and packing of fresh produce (HSRC 1991).

Fresh produce in South Africa is distributed through the following channels: FPMs, export channels and direct sales to wholesalers, retailers, hawkers, processors, institutional buyers and consumers. A portion is also held back for producers' own consumption and for seed for the coming seasons. The distribution channel that is used to market fresh produce is largely influenced by the nature of fresh produce. A large proportion of fresh produce is distributed through FPMs. Statistics released by

the Department of Agriculture, Forestry and Fisheries (DAFF 2011) show that 48% of fresh produce in South Africa was distributed through FPMs in 2011, with direct sales and own consumption accounting for 42% of the fresh produce distributed, while processors and exports accounted for 7% and 3% of the fresh produce sold in South Africa respectively (Figure 2).

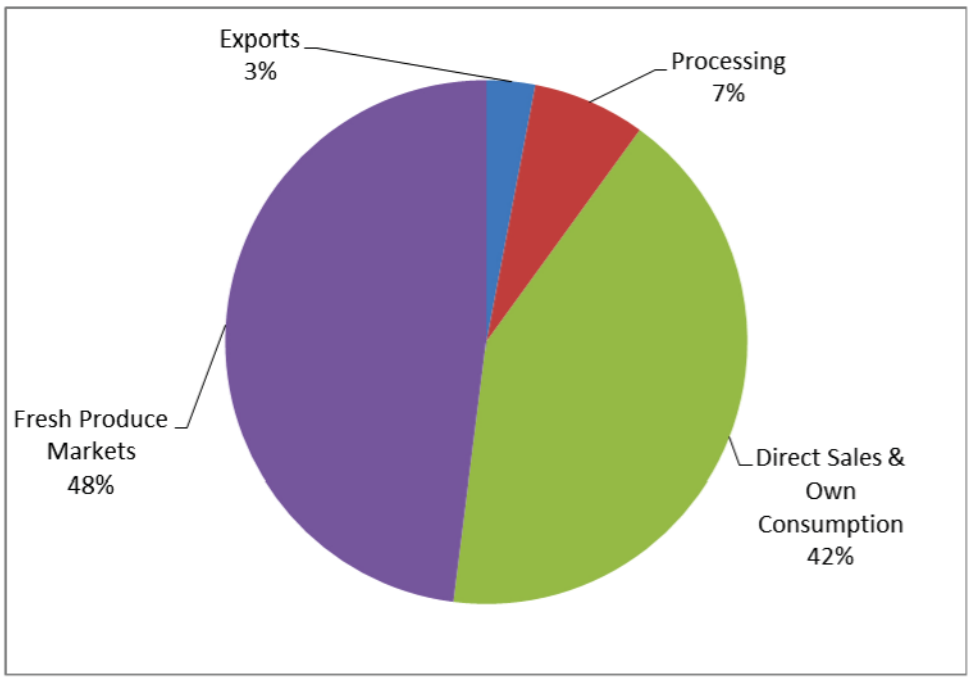

Figure 2: Distribution of fresh vegetable sales according to distribution outlet (2010/1) (compiled from DAFF 2011)

Methodology

This study employed the supply chain analysis approach (Rich, Baker, Negassa & Ross 2009) and made use of both primary data to conduct the supply chain risk assessment. Data was collected through individual interviews with the supply chain participants involved in the relevant chains. Sources of data that were used in the study included the following: farmer surveys, structured interviews with FPMs (markets and agents), supermarkets, processors, representatives of local/regional government departments and institutional buyers. Structured questionnaires were administered to a total of 52 smallholder farmers in the three farming regions of the Gauteng province by way of visits to these farms and one-to-one interviews.

These farmers were randomly identified from a database provided by the Gauteng Department of Agriculture and Rural Development (GDARD). The regions included in the study were Randfontein, Germiston and Pretoria. Semi-structured interviews were used to gather information from the other chain stakeholders pertaining to the demand attributes for farmers to compete in their various markets, as well as their perceptions of the risks affecting smallholder farmers and their ability to participate in formal markets. The country's two fresh produce markets (Johannesburg & Tshwane), one wholesaler, three supermarkets, one institutional buyer and one processor who procures produce, among others, from producers in Gauteng, were interviewed.

The number of smallholder farmers in the survey ended up being somewhat less than ideal owing to the limitations in interviewing more farmers. However, assuming a smallholder farmer population of 10 000 in the province, a 95% confidence level and an 87.5% confidence interval yielded the minimum sample of 52 that was required. Despite the fact that the confidence interval for the particular sample was suboptimal, it was deemed tolerable in light of the general homogeneity of issues and responses among the farmers.

A supply chain risk assessment was conducted for farmers as well as various end markets, with risk being assessed at key transaction points along the supply chain. These transaction points were input supply, production and marketing. Activities that formed the supply chain risk assessment are indicated below.

- *Supply chain analysis*: This section used the supply chain mapping technique for the smallholder fresh produce industry using baseline data gathered from the field survey. Mapping techniques were used to trace the flow of fresh produce from the smallholder farmers to the end markets and the various intermediaries along the chain, together with their functions and value-adding activities.
- *Risk analysis*: This section was conducted from both the demand and supply side, identifying and characterising the range of risks faced by the players operating in the supply chain. The demand side focused on the risks faced by end markets when procuring produce from smallholder farmers, while the supply side focused on the risks affecting farmers' fresh produce business that are likely to limit their participation in formal value chains.
- *Risk management and vulnerability assessment*: This section focused on identifying the existing risk management strategies and measures undertaken by supply chain participants and third parties, such as government institutions and private companies.

Results and interpretation

Farmers' socioeconomic characteristics

Part of the study considered the socioeconomic characteristics of the smallholder farmers in order to understand the context of the various characteristics of the farmers that could have an impact on the risks that influence their business, as well as their ability to mitigate or manage the various risks (Table 2).

Table 2: Socioeconomic and demographic variables of 52 respondents

Socioeconomic or demographic variables	**% of respondents**
Ownership structure of enterprise	
• Private	83%
• Cooperative	9%
• Partnership	6%
• Company	2%
Gender	
• Male farmers	44%
• Female farmers	56%
Age	
• Percentage younger than 35 years	19%
• Percentage older than 35 years	81%
Highest level of education	
• Completed primary education	8%
• Completed secondary education	58%
• Completed tertiary education	35%
Access to finance	
• Self-financed	77%
• External finance	23%
Types of finance	
• Commercial banks	4%
• Mining companies	6%
• Local government institutions	8%
• Family and friends	3%
• Self-financed	77%
Complementary farming enterprises	
• Livestock	58%
Access to farming infrastructure and equipment	
• Access to greenhouse	56%
• Privately owned tractors	15%
• Hired tractors	40%
• Hand implements	46%

Source: Survey conducted by authors

Supply chain and distribution channels for smallholder fresh produce

The smallholder fresh produce supply chain is characterised by various distribution channels used by the farmers who were surveyed. These include FPMs, retail supermarkets, hawkers, local consumers, greengrocers and institutional buyers such as government hospitals.

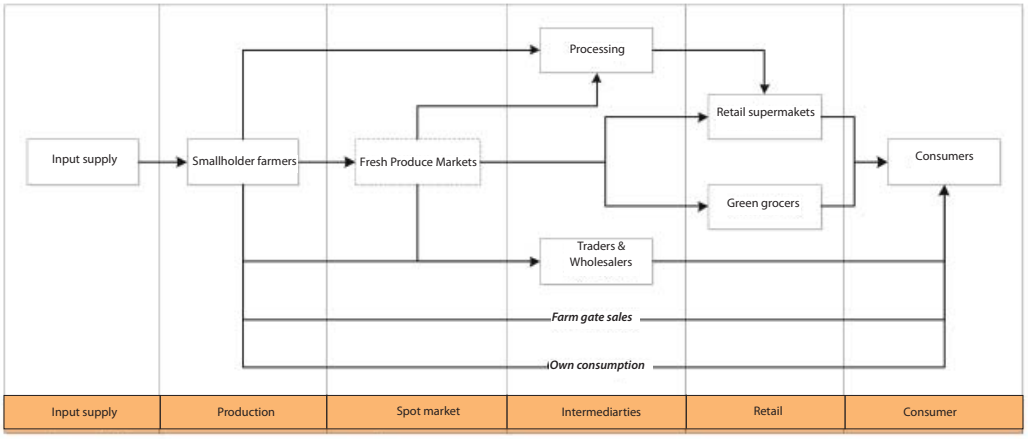

Figure 3: Smallholder fresh produce supply chain

According to information supplied by the farmers, markets are selected on the basis of the highest prices offered, as well as markets that have the lowest marketing costs and that offer security and swiftness of payment. Marketing channels were classified into formal (FPMs, greengrocers, institutional buyers and supermarkets) and informal markets (hawkers and farm-gate sales to local consumers). Farmers do not distribute all their produce through one channel, but use various markets, depending on demand and accessibility. Figure 4 shows the distribution channels used by the farmers to sell their fresh produce. Because farmers can use multiple channels for the marketing of their produce, it was possible to note one or more channels. The percentage value indicates the percentage of farmers who use the particular marketing channel.

Most smallholder farmers sell their produce in informal markets. The primary informal channels include sales to informal traders or hawkers (62%) and direct sales to local consumers (52%) through farm-gate sales. Although the informal channel is synonymous with low prices, its marketing costs were far lower since this channel does not require produce to be graded, packaged and labelled, and there are no transport requirements since products are sold directly at the farm gate. In addition, farmers reported that farm-gate sales to traders and local consumers offered more

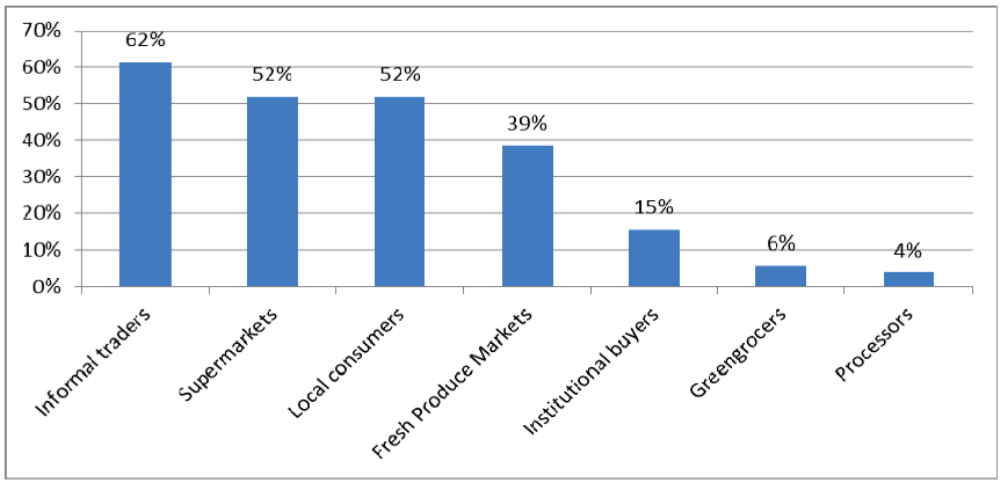

Figure 4: Fresh produce distribution channels

security and swift payments, as they received payment at the point of sale as opposed to selling through FPMs, where payments were received several days after the produce had been delivered. In some instances, farmers also failed to receive payment if their produce could not be sold.

Wholesale FPMs

Wholesale FPMs are the primary spot market for fresh produce in South Africa. South Africa's FPMs function as commission markets with agents who trade farmers' produce on their behalf. Prices for the produce are determined by market forces and farmers receive payment after their produce has been sold, which may take two to three days after delivering their produce to the market. FPMs have various requirements for farmers, which include sorting, grading, packaging and labelling of their produce to provide for traceability. These requirements are legally determined by the Agricultural Product Standards Act 119 of 1990. Farmers are also required to deliver their produce under clean and hygienic conditions that will maintain the quality of the produce. Deliveries are often required to be done under specific temperatures to avoid spoilage and to maintain the freshness of the produce. Farmers were again required to make consistent deliveries and to make sure that they delivered their produce on time.

Institutional buyers

The role of institutional buyers was assessed through interviews with the Gauteng Shared Service Centre (GSSC) procurement department, which was responsible for procuring fresh produce for government hospitals and social development entities in Gauteng. Smallholder farmers who sell to government institutions do so through contract arrangements set up by the GSSC. Farmers enter into a contract with the GSSC whereby they commit themselves to deliver fresh produce to public hospitals around Gauteng against a specified purchase order.

Under the contract, with the exception of the winter season, farmers are compelled to deliver 80% of the vegetables harvested from their farms. The products delivered are required to meet packaging requirements, which take into account the absence of damage or deterioration resulting from transportation and/or storage. Farmers are also supposed to produce a R918 certificate from the Provincial Department of Health, which states that produce from the farms is acceptable on the basis of the following: the hygienic conditions of the farm; produce being delivered in closed clean transport; the provision of records of their production, pest control and packaging processes; and the farm having access to a pack house. Notwithstanding these requirements, GSSC procurement is increasingly leaning towards freshly cut, processed, ready-to-cook vegetables delivered under specific temperature conditions. This additional requirement introduces further impediments to smallholder farmers accessing this channel.

Processors

A structured interview was conducted with a major South African fresh produce processor who processes 75% of South Africa's processed fresh produce. The business model adopted by the processor that was interviewed is that growers are contracted to grow produce for processing for the particular grower. Processors source their produce directly from smallholder farmers and indirectly from FPMs.

Retailers

Retailers generally operate from a system of central procurement where a national or regional procurement division is responsible for the acquisition of the necessary fresh produce for distribution. The primary procurement channels that retailers employ from a central procurement point of view are directly from farmers through growing programmes or via the FPMs. Through this approach, retailers seek to secure appropriate quantities of a variety of fresh produce within minimum quality parameters.

Smallholder producers, however, are not the major suppliers for retail channels that largely rely on commercial production for obligatory volume and quality demands. Some supermarket groups have significant numbers of smaller suppliers and encourage smaller producers to become suppliers within the confines of their requirements.

Nevertheless, most retailers have pilot programmes with smallholder producers, the aim of these programmes being to mainstream these producers. These vary in success because retailers aim to find workable models. Some have become sceptical about such programmes as a result of financial losses and vast numbers of man hours, funding and other investments made into such programmes. In many instances it was reported that the initial planning and conceptualisation of these programmes does not match what happens in reality.

Supply chain risk analysis

Farmers provided information on the key risks that affect their fresh produce businesses at the input supply stage, during production and at the post-harvest and marketing stages. A demand-side analysis took into account the risks faced by various end markets when they procure fresh produce from farmers. The analysis investigated the perspectives of the stakeholders further along the chain with regard to the risks impacting on smallholder producers that prevent the mainstreaming of smallholder farmers into formal high-value markets.

Supply-side risks: farmers

Input supply risks

According to information supplied by the farmers, two major risks are encountered during the input supply stage, namely the costs and quality of the inputs. Most of the farmers in the sample (62%) complained about the costs of the inputs, citing that they were too expensive. Hence farmers were forced to cut back on their input purchases and reduce their levels of production. The yield and income realised also declined. In addition, the low production levels may exclude farmers from selling to formal markets that require consistent deliveries to the market. A number of farmers (15%) reported that some of the inputs they purchased were of poor quality, that seed germinated poorly and often produced vegetables of poor quality, which failed to sell in formal high-value markets.

Production risks

During the production stage, farmers reported inclement weather (e.g. frost, hail and drought), pests, diseases and wild animals, water shortages and unskilled labour

as the major risks affecting their fresh produce business. Over 72% of farmers cited weather-related risks; 79% reported pests and diseases; 27% reported the shortage of water; and 15% reported the lack of skilled labour.

Weather-related risks, pests and diseases were reported to affect both the quantity and quality of the produce, thus creating challenges for farmers to sell to the high-value markets. A shortage of water was reported by farmers who use municipality water for irrigation. They stated that because of the high cost of water, they had reduced the amount of land cultivated to reduce water consumption. This reduction in land cultivated resulted in farmers producing a limited quantity of produce. Farmers who reported unskilled labour as a challenge indicated that some of their workers lacked the knowledge on how to apply chemicals properly, and in some cases, workers were reported not to weed properly, which affected the quantities harvested and the quality of the produce.

Post-harvest and marketing risks

Post-harvest and marketing risks that were identified in the study were low market prices, lack of access to markets, lack of transport, competition, poor produce quality and a lack of packaging material. Several farmers in the sample (32%) reported low market prices as the major challenge they faced in marketing their produce. These farmers associated low prices with the informal market as a result of oversupply to the specific market. Closely related to this risk was the significant competition between the farmers. Farmers who highlighted competition as a challenge reported that competition leads to the oversupply of produce in the market, which results in farmers receiving low prices for their produce. Some of the farmers (19%) reported that they were faced with a challenge in accessing markets to sell their produce. Failure to access markets was found to be related to other challenges cited by the farmers, which included an oversupply of produce in the market, poor quality produce (10%) that failed to sell on the market and lack of transport to deliver produce to the market (15%). Lack of packaging material was mentioned by 17% of farmers, who reported that this limited their ability to sell their produce to high-value markets.

Demand-side risks: formal end markets

FPMs

It emerged from the interviews that the main risk faced by FPMs when facilitating the sale of fresh produce from smallholder farmers related to the quality of produce

delivered by the farmers. FPMs reported that as a result of poor storage and transport facilities and, in most cases, poor packaging and grading, farmers often delivered poor-quality vegetables to the market, which failed to sell. Poor quality was also ascribed to poor agricultural practices by smallholder farmers. Another challenge for FPMs when facilitating the sale of fresh vegetables from smallholder farmers related to the untimely delivery of produce. Produce often arrived at the market late after the market had closed, and producers therefore had to wait for their produce to be sold the next day. Inconsistent delivery was also reported as a challenge for FPMs as they failed to secure sufficient produce from farmers. Farmers often choose not to sell through FPMs because of the packaging and labelling requirement, which requires all fresh produce to be branded, labelled and graded at the farm to enable traceability and to comply with the requirements of the Agricultural Product Standards Act. Packaging and labelling often come at a high cost for these farmers, as they have to purchase the packaging material and seldom have ready access to infrastructure to facilitate sorting, grading, packaging and labelling.

Institutional buyers

Interviews with the GSSC revealed the various challenges and risks faced by public hospitals and institutions in sourcing fresh vegetables from smallholder farmers and their perspective on the challenges facing smallholder farmers. The following challenges and risks were identified:

- failure to invoice quantities correctly
- contracted farmers opting to purchase produce from other farmers in order to meet their contractual obligations, which is against the stipulations of the contract
- poor farming capability and production skills
- transport and logistics problems, as some farmers are located far away from the hospitals
- poor quality produce
- inconsistent supply

Processors

Interviews with the processors revealed general challenges and risks for producers and processors in relation to the sourcing of fresh produce from smallholder farmers. The processors identified the following challenges and risks:

- *Location*: Firstly, from a processor's perspective, the location of the fresh produce in relation to the location of the processing facilities is of critical importance. Moreover, sufficient volumes are required to constitute a commercially viable location.

- *Water and irrigation rights and infrastructure*: Processors noted that without access to water and irrigation, the producers of vegetables are unlikely to be able to produce vegetables that meet commercial processing requirements. These requirements are essential to ensure that fields grow and ripen evenly so that fields can be harvested at one time and within a short space of time. In addition to the availability of water, it was also noted that water quality is a significant risk in terms of fresh produce production. The risk factors, in terms of water quality, relate to biological, heavy metal and uranium contamination.
- *Safety and quality*: In light of the significant risks that accompany food products, the processor highlighted the need for food safety and quality. This is a non-negotiable dimension in production and is one of the significant risks in the value chain. The processors tend not offer growing contracts to producers who are unable to maintain a minimum food safety and quality standard. Most farmers, irrespective of their background, battle to produce within the guidelines of Good Agricultural Practices (GAP). In this regard, the processor was working with all its suppliers towards GAP certification.
- *Import competition*: Competition from cheap, imported processed vegetable products poses a direct threat to the feasibility of food-processing enterprises in South Africa. Anecdotally, these imported products are predominantly from China and Brazil. The result is that local processing companies struggle to remain viable because they find it difficult to compete with such imports.
- *Infrastructure*: The processor noted that local, regional and national infrastructure plays a key part in the fresh produce sector. Transport infrastructure in particular fulfils a major role in the distribution of inputs and the collation of produce. Quality efficiency and cost are thus challenges and a risk for the fresh produce value chain. The poorer and the more costly the repairs required to the infrastructure are, the greater the detriment is to the whole fresh produce chain.
- *Support to emergent and/or small farmers*: Emergent and/or small farmers face specific challenges over and above those faced by established producers. These mainly include support from government agencies, which tends to be uncoordinated and a general lack technical know-how and advice. Both these factors limit producers' ability to produce to expectations, which in turn, results in producers remaining in the poverty trap.

Retailers

The interviews with retailers revealed general challenges and risks from both a producer's and a retailer's perspective. These challenges and risks were classified into the following three primary groups:

Production

The fact was emphasised that access to pollution-free good-quality water is an absolute requirement for successful food production. Access, together with water infrastructure (including reliable irrigation systems), was highlighted as a key success factor for commercial vegetable production.

The input costs to produce a commercial quantity of good-quality vegetables of the desired variety are significant. Depending on the crop, these costs can run into many hundred thousands of rand per hectare. The challenge highlights the difficulties for most resource-poor smallholder farmers to produce fresh produce commercially.

Smallholder farmers, as individuals, struggle to produce sustainably and continuously to meet the requirements of scale required by market agents or the procurement divisions of retailers. Smallholder farmers produce too little, too inconsistently and in a too uncoordinated manner for retailers to be interested in procuring from them. Retailers are unable to accommodate inconsistent deliveries and/or inadequate products and consequently limit their exposure to smallholder producers. In principle, when farmers enter into growing programmes with retailers, they are expected, within reasonable limits, to deliver what they are required to deliver. Failure to do so will result in the relationship with the retailer not growing and eventually being terminated.

The retailers generally agreed that individual, uncoordinated production on landholdings of one, three or five hectares (ha) will not enable producers to enter formal markets, and the extent of these landholdings is insufficient to ensure sustainable, commercially oriented production. The more accurate and reliable the deliveries are, the better the chance of producers growing their business with retailers.

Post-harvest

Food safety and quality are non-negotiables for retailers, who have a legal and moral obligation towards consumers to offer high-quality, safe and authentic food for sale. Moreover, adherence to food safety and quality standards and other regulations is required and imposed by law. Supermarket representatives thus mentioned that they could not accept raw material that is not temperature controlled and that hazard analysis and critical control point (HACCP) compliance would become a non-negotiable throughout the chain.

To varying degrees, supermarkets now require producers to adhere to the South African Good Agricultural Practices (GAP) framework. In time, compliance with this framework will become mandatory for those producers wishing to delivery to supermarkets.

The introduction of the Consumer Protection Act 68 of 2008 has also prompted retailers to draw a 'line in the sand' in terms of product quality and safety for suppliers. Given the risks that the above Act effected for retailers, their approach to procurement is more calculated and has influenced the requirements that producers need to comply with.

The general consensus among the supermarket representatives in terms of the port-harvest challenges that smallholder farmers face was that adherence to the quality and safety aspects of a product is the main challenge. Retailers stated that is particularly difficult to comply with the food safety and quality standards for fresh vegetables. Notwithstanding these challenges, many smallholder producers are engaged in vegetable production as a cash crop.

Marketing

It was the general view of retailers that most emergent farmers would not succeed in selling to them because of the continuity, transport and quantity shortcomings on the producers' part and the range of strict requirements on the retailers' part. In terms of the marketing options for small or emergent growers, if producers wish to enter the formal market, the obvious first step would be to link producers into the national fresh produce market system and to develop from there.

The rationale is that many farmers lack infrastructure, transport and the ability to coordinate activities. The concept of a coordinated receipt, sorting, grading and packaging facility is currently being supported by the national government and the private sector.

In terms of transport, retailers were able and willing to collect produce, but the majority required the produce to be delivered to the retailer's distribution centre. It is therefore essential for producers to have this capacity. Not having access to transport or the ability to deliver produce are significant impediments in terms of accessing formalised markets. Retailers also require refrigerated transport to ensure maintenance of the cold chain throughout the process, from production to consumption. The transport requirements to access formalised markets are therefore significant and continue to grow in complexity and the number of requirements.

Retailers emphasised that a number of general challenges in the South African market impact on the fresh produce sector in general. These constraints were reported to stretch across the sector. Two constraints are discussed below.

– The production of fresh fruit and vegetables in South Africa is facing deteriorating conditions because of the challenging production environment, including declining water quality and availability, an unstable labour environment, detrimental climate change and increasing production costs and uncertainty.

– Many government initiatives are making the fresh produce industry increasingly difficult, especially for new entrants and role players. These initiatives include stricter hygiene and quality requirements, packaging, sorting and grading standards.

Major impediments for small farmers include exposure to all of the above-mentioned challenges and unfavourable terms of payment, both of which are problematic. Retailers are also not organised to handle hundreds of small suppliers and the possibility of success in this regard is therefore limited. At the same time, marketing avenues like the FPMs are well suited to handle large numbers of small suppliers, provided that the minimum requirements are met.

Risk management strategies

The study considered the capability of smallholder farmers to manage risks affecting their fresh produce business. Strategies that were reported include the following:

Input supply risk management mechanisms

Those farmers who reported that high input prices are a challenge seek inputs from cheaper markets and in some cases reduce input purchases as a means to avoid paying too much for inputs. Farmers who reported poor input quality as a challenge did not have any risk mitigation strategies to address the challenge. The lack of a mitigation strategy was mainly because farmers can only determine that their inputs are of poor quality after germination and the only option is for them to purchase other inputs.

Production risk-coping strategies

Farmers reported using pesticides and chemicals to address the problem of pests and diseases. These chemicals, however, are reported to come at a high cost and farmers thus tend to apply less than the required amounts, and in some instances, they fail to apply any pesticides. For weather-related risks, farmers reported using greenhouses to protect their produce from harsh weather conditions such as hail and frost. The challenges of unskilled labour are addressed by mentoring the workers and demonstrating how to apply chemicals.

Marketing risk-coping strategies

Farmers reported that they prefer to hold on to their crop until prices are more favourable in the market and when a strong demand for their produce arises.

However, only 24% of the farmers reported having access to a storage facility either through private or shared ownership.

In other cases, farmers resort to selling to hawkers and local consumers if their produce fails to sell to formal markets, either because of failure to meet quality standards or to access packaging material. Farmers who were involved in livestock production reported that when their produce fails to sell they feed the produce to their livestock.

Risk management assistance

The majority of farmers (54%) reported receiving external support from various institutions, which include farmer organisations, government, neighbouring farmers and private companies to help them with their risk management (Table 3).

Table 3: Institutions offering risk management assistance to farmers

Institution	Risk management assistance
Government	Extension services Input support Pack houses Boreholes and water tanks Access to markets
Farmer organisations	Collective marketing Production advice Tractors Receive government support Credit
Neighbouring farmers	Transport Marketing Credit
Agricultural Research Council	Inputs
Mining companies	Access to markets

Source: Survey (2013)

Government support, farmer organisations, neighbouring farmers, private companies and FPMs are discussed below.

- *Government support*: The most common support offered by government is through extension services where farmers obtain information on good agricultural practices to assist them with their production. Although all farmers reported that they are regularly visited by extension workers, 21% of the farmers reported that they

did not find the extension services helpful. Government also supports farmers by providing inputs for their various agricultural practices, with 23% of farmers reporting having received inputs from government to help them. Government was also reported to offer infrastructural support to farmers in the form of pack houses, greenhouses, boreholes and water tanks. In addition, government also support farmers and help them to access markets through contract arrangements through the GSSC, where farmers supply to government institutions. Farmers also receive financial support through local government programmes like the Gauteng Enterprise Propeller which offers loans and enterprise and skills development support.

- *Farmer organisations*: Farmers also receive risk management support from farmer organisations where they receive a range of support, including funding, labour, farming equipment (tractors) and extension support. Farmers receive better assistance from government when they were in groups. Farmers also receive access to transport and markets by selling in groups, which helps them to reduce the transaction costs of selling their produce to the markets. However, not all farmers are members of a farmer organisation or union. The majority of these groups are informal and not registered.
- *Neighbouring farmers*: Farmers often receive external support from neighbouring farmers who provide support mainly through credit facilities and transport.
- *Private companies*: Private companies, which include mining companies and the Agricultural Research Council (ARC), also support farmers in coping with risk by offering input support and access to output markets.
- *FPMs*: These markets extend risk management support to smallholder farmers mostly through their market agents who offer farmers advice on quality and quantity requirements. Furthermore, FPMs advise farmers on suitable modes of transport and educated farmers on which products to transport together in order to avoid spoiling the products.

Conclusions and recommendations

This research, based on a limited sample and geographic area in South Africa, confirmed the well-known and usual problems faced by smallholder farmers in this particular context. This study also suggested that risk in the value chain affects the quantity and quality of farmers' produce in their specific supply chains and ultimately their ability to participate and compete in formal, high-value markets. These risks were categorised as input procurement, production, post-harvest and market risks. The impact of these risks is potentially severe and adversely affects

smallholder producers in particular, who probably have a limited appetite for and ability to manage or bear these risks or their consequences. The surveyed farmers' current risk management strategies are also underdeveloped with risk avoidance being a primary strategy. Ultimately, the inability of smallholder farmers to manage or bear risks and their general preference for rather avoiding risk results in decision making and outcomes that are not conducive to accessing markets feasibly and sustainably.

Based on the research and the conclusions, a number of specific recommendations can be made. These recommendations primarily relate to policies for developing smallholder farmers in the Gauteng province of South Africa. Broadly speaking, creating an enabling environment for the province's smallholder farmers will provide the foundation for their economic development and overcoming their challenges, including the influence of risk. Christy, Mabaya, Wilson, Mutambatsere and Mlanga (2009) propose essential, important and useful enablers for such economic development. Access to infrastructure, risk management tools, value chain coordination mechanisms and human resource development are among the noteworthy elements of enabling environments relevant to smallholder farmers in the Gauteng province. Torero (2011) adds that accompanying institutions that can reduce the marketing risk and transaction costs in the process of exchange between producers and consumers are a further requirement for creating an environment for economic development.

In light of the findings of this study and the broad recommendations, a number of specific recommendations include the following broad guidelines:

- Develop programmes and funding models to improve access to infrastructure for smallholder farmers. This should include the following:
  - production infrastructure (water and irrigation infrastructure, green houses, etc.)
  - post-harvest infrastructure (sorting, grading, packaging and storage facilities)
  - supporting infrastructure (roads, fences, etc.)
  - equipment, human capital development
- Develop or improve access to risk mitigation mechanisms with specific consideration of insurance and disaster relief tools designed to ensure business continuity in response to risky events.
- Expand extension services to provide farmers with information on GAP as well as how to best produce, handle, harvest, store, sort, grade, package, label, transport and market their produce as per the market requirements and to reduce post-harvest losses.

- Support the development of collective institutions for farmers to reduce transaction costs in their activities. This would include planning, financing and implementing programmes or schemes in collaboration with retailers and FPMs to forge closer relationships with smallholder farmers. A collective fresh produce hub falls within this sphere and would be an ideal platform from which to achieve economies of scale.
- Pursue closer relationships in the value chain to encourage more formalised relationships such as contracting, which is an inherent tool to manage specific dimensions of risk throughout the whole supply chain.
- Support smallholder farmer development in terms of capacity building in all aspects of agricultural production and management.
- In addition to the specific measures that are suggested, a culture of the well-developed ex-ante and ex-post risk management approaches should be fostered among smallholder farmers and stakeholders in their value chain.

In conclusion, it is recommended that further research should be conducted in a number of areas pertaining to smallholder farmers' risk appetite and risk-bearing ability and their mechanisms to deal with the particular risks in the value chain and how this impedes their all-round ability to graduate from small-scale to commercially oriented production.

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