# CHAPTER 4:
# DEVELOPING A MODEL OF MARKET-DRIVING ABILITY IN CORPORATE ENTREPRENEURSHIP

## 4.1 INTRODUCTION

"Theory development typically focuses on relationships among theoretical constructs, placing little emphasis on relationships between construct and measures. In most cases, constructs are treated as causes of their measures …" (Edwards & Bagozzi, 2000:155).

Considerable attention has been paid over the past 25 years to the scale development process in order to improve validation of constructs. However, these procedures are grounded in classical test theory, which assumes that the constructs cause their measures (reflective perspective) and do not consider that there are cases in which the indicators cause the latent construct (formative perspective) (MacKenzie, Podsakoff & Burke Jarvis, 2005:710).

It is observed that most researchers in social sciences assume that indicators of latent constructs are reflective, despite the fact that formative indicators are appropriate (Diamantopoulos *et al*., 2008:1204). Reasons for this situation may be the convenience factor in analysing models under the reflective view. A number of programmes are available for the analysis of covariance-based structural equation modelling (Law & Wong, 1999:156).

However, researchers argue that technical convenience should not guide the research and the adoption of the type of measurement model (Law & Wong, 1999:159). Furthermore, model misspecification has a serious impact on the conclusions on and interpretation of models (Diamantopoulos *et al*., 2008; MacKenzie *et al*., 2005; Podsakoff, MacKenzie, Podsakoff & Yeon Lee, 2003).

The purpose of this chapter is threefold. First, it will provide a literature review of measurement instruments that have been used in past research relating to the various constructs defined in chapter three.

Second, it will present in a literature review various types of measurement models and their characteristics. Third, it will develop a model for market-driving ability and outline propositions.

## 4.2 LITERATURE REVIEW ON MEASURING INSTRUMENTS

In order to prepare the conceptual model of market-driving ability developed in chapter three for measurement, an analysis of selected measuring instruments that have been used in previous research is presented. The following paragraphs outline the dimensions of each measurement instrument and its reliability and validity.

Reliability is a measure to assess the extent to which measures provide consistent results (Cooper & Schindler, 2008:292). Reliability can be estimated by internal consistency, the split-half approach or the test-retest method. Internal consistency is a predominant measure in research studies. It is measured by Cronbach's alpha, which reflects the correlation of the number of items and their average correlation (Nunnally & Bernstein, 1994:251,254). Cronbach's alpha can achieve values between zero and one, whereby the closer the value is to one the more reliable the scale (Santos, 1999:2). Nunnally (1978 in: Santos, 1999:2) indicates that values at 0.7 represent acceptable reliability.

Reliability is considered as a necessary, but not sufficient, contribution to validity (Cooper & Schindler, 2008:292). Validity measures comprise measures for external and internal validity. External validity is concerned with the generalisability of research results. Internal validity refers to the ability of the research instrument to measure what it is supposed to measure (Cooper & Schindler, 2008:289). Within internal validity three types can be distinguished: content validity, construct validity and criterion-related validity (Cooper & Schindler, 2008:290-292; Nunnally & Bernstein, 1994:108).

To ensure content validity it is necessary to have a well-formulated plan on how to measure certain items before the test is applied. The items can also be presented to a panel of persons to assess the validity of the items (Cooper & Schindler, 2008:290; Nunnally & Bernstein, 1994:102-103).

Construct validity considers theory and the measurement instrument. Construct validity considers aspects of convergent and discriminant validity. Convergent validity can be assessed by correlating the developed scale with other scales that purport to measure the same construct. Discriminant validity is determined by relating the developed scale to measures that are supposed to measure different constructs (Cooper & Schindler, 2008:291-292).

Criterion-related validity considers how well the measures can be used for estimation or prediction (Cooper & Schindler, 2008:291). To estimate whether a specific item serves as a valid measure for the scale, the item needs to be correlated with two groups that are supposed to be different. If no difference between the two groups regarding the item can be established, concurrent validity is not achieved (Bryman & Bell, 2007:165).

Most of the presented scales have been developed as a part of a broader study which often relates the scales to other constructs. However, for the purpose of this study only the scales that can potentially be used to measure market-driving, antecedents and consequences of market-driving ability are presented.

### 4.2.1 Measuring instruments for market driving

In chapter three market driving was outlined as a specific firm behaviour. Certain abilities such as market sensing, influencing customer preferences and alliance formation characterise market driving (Barlow Hills & Sarin, 2001, 2003; Ghauri *et al*., 2008; Harris & Cai, 2002; Jaworski *et al*., 2000). However, no measurement instrument for market driving has been developed so far.

Market sensing has been defined as capturing aspects of forward-looking firm activities that consider all relevant stakeholders. This aspect is closely related to

influencing customer preferences, which also needs a forward-looking approach, as well as an information component in order to educate customers about new products and services (Barlow Hills & Sarin, 2001, 2003; Ghauri *et al*., 2008; Harris & Cai, 2002; Jaworski *et al*., 2000).

The following measuring instruments are considered to capture aspects of the concepts of market sensing and influencing customer preferences.

Narver *et al*. (2004:336) developed a scale entitled MOPRO (proactive market orientation) which consists of items that capture customer's latent needs by monitoring customer behaviour and exceeding customer expectations. Furthermore, a proactive market orientation involves leading the customer.

The MOPRO scale consists of 34 items. After exploratory factor analysis was conducted, 11 items remained with a Cronbach's alpha of 0.892. In confirmatory factor analysis it was found that the construct was not unidimensional. Reducing the items to eight resulted in a unidimensional measure with satisfactory fit indices. Convergent, divergent and discriminant validity were demonstrated, using the responsive market orientation scale as a comparison (Narver *et al*., 2004:339-341).

A similar activity has been described as "scanning intensity" by Barringer and Bluedorn (1999:423). Environmental scanning refers to activities aimed at learning about events and trends in the firm's environment. The information that is obtained from scanning can be further used to recognise opportunities or reduce uncertainty.

A 12 item scale for scanning intensity was developed, focusing on the efforts taken towards environmental scanning and the comprehensiveness of the scanning process (Barringer & Bluedorn, 1999:428). Six items measured the effort towards scanning and included modified items from Miller and Friesen's (1982) effort dedicated towards a scanning scale. The comprehensiveness was also measured by six items asking for the scanning elements that are used in the firm. A mean score over the 12 items constituted the scanning intensity (Barringer & Bluedorn, 1999:428).

Reliability was assessed by Cronbach's alpha, which showed acceptable values (alpha = 0.83). Discriminant validity was established by exploratory factor analysis. Two modified items from Miller and Friesen's (1982) measures did not load high on any factor. However, for conceptual reasons the two items remained in the scale (Barringer & Bluedorn, 1999:429-430).

The scales developed by Narver *et al.* (2004) and Barringer and Bluedorn (1999) demonstrate high reliability values, with Cronbach's alpha scores of 0.89 and 0.83 respectively. Hence, items of these scales can be used in further studies. However, it needs to be considered that the scales have not been assessed on a longitudinal basis or across countries and industries (Narver *et al*., 2004:344).

Alliance formation represents the third concept in the market-driving construct.

In the literature strategic alliance is described as a voluntary agreement between independent firms for exchange, sharing or co-development (Gulati, 1999:397; Ireland *et al*., 2002:413; Kale *et al*., 2000:218; Rothaermel & Deeds, 2006:430).

The use of strategic alliances is most often operationalised as an independent variable indicating a specific number of alliances in the areas of research and development, marketing, licensing agreements or cross-licensing. The duration of strategic alliances is also measured (Deeds & Hill, 1996:48; Dickson & Weaver, 1997:411; Gulati, 1999:405; Hitt, Dacin, Levitas, Arregle & Borza, 2000:457; Kale *et al*., 2000:226).

Alliance management capability refers to a firm's ability to effectively manage multiple alliances. It is argued that alliance management capability is built through alliance experience and the alliance type (Rothaermel & Deeds, 2006:430-431).

Alliance type was measured through the number of research and development alliances the firm had entered. Alliance experience considered the firms alliance duration. Alliance management capability was measured by the number of alliances a firm was able to manage productively (Rothaermel & Deeds, 2006:441-442).

Discriminant validity for alliance management capability was established (Rothaermel & Deeds, 2006:445).

Kale *et al*. (2000:220) measured the aspects of trust which develops between firms based on close interaction at a personal level with the construct "relational capital". A five item measure was used to capture mutual trust between alliance partners (Kale *et al.,* 2000:237). Reliability was assessed using Cronbach's alpha, which was very satisfactory (alpha = 0.906). Content validity was established by pre-testing the survey instrument (Kale *et al*., 2000:226).

Rothaermel and Deeds (2006) and Kale *et al*. (2000) provide valid aspects for the measurement of alliance. Rothaermel and Deeds (2006) focus on the management aspect of alliances, whereas Kale *et al*. (2000) research the concept of trust that needs to be present in alliances. Both aspects are considered to be important in the measurement of alliance formation.

### 4.2.2 Measuring instruments for entrepreneurship

The following paragraphs present selected studies that developed or replicated measuring instruments for entrepreneurship and corporate entrepreneurship.

#### 4.2.2.1 Entrepreneurial orientation measuring instruments

The following paragraphs outline several scales for measuring entrepreneurial constructs.

One of the most widely used measurement instruments in entrepreneurship is the construct of entrepreneurial orientation, which was originally developed by Miller and Friesen (1982) and subsequently developed further by Covin and Slevin (1986) (Kreiser *et al*., 2002:71).

Entrepreneurial orientation is considered to be a multidimensional construct that encompasses a firm's activities regarding innovation, risk-taking and proactiveness (Miller & Friesen, 1982:7,17-24; Miller, 1983:770-771).

Miller and Friesen (1982:7-10) analysed innovation and risk-taking together with other strategic and environmental variables. Good construct reliability for innovation and risk-taking (Cronbach's alpha = 0.77; 0.91 respectively) was achieved. The concept of proactiveness was not explicitly included in the study.

Covin and Slevin (1986:629-631) developed a measurement scale of entrepreneurial behaviour taking into consideration items developed by Miller and Friesen (1982) and Khandwalla (1977). A total of 10 items was used to measure entrepreneurial behaviour. Risk-taking consisted of six items that were taken from Khandwalla (1977). Product innovation consisted of two items adapted from Miller and Friesen (1982). Proactiveness consisted of two self-constructed items considering Miller and Friesen's (1982) description of the concept.

Factorial validity was assessed to determine unidimensionality. The analysis showed that four items loaded poorly on a single factor. These were items from the risk-taking dimension. The remaining six items showed acceptable results. Reliability was assessed using Cronbach's alpha for the six items, which showed satisfactory results (alpha = 0.79). Finally an entrepreneurship index was calculated, using the mean score of the six items (Covin & Slevin, 1986:632-634,638-639).

Considering the fact that four items out of 10 did not represent the entrepreneurship construct it needs to be questioned whether sufficient validity of the construct has been established. Furthermore, a validation of the scale compared with other scales would have been beneficial, to establish more confidence in the entrepreneurship index.

Since innovation was measured subjectively on the scale by Miller and Friesen (1982:922), Jennings and Young (1990:54) developed an objective measure of product innovation and compared their scale with the subjective measures.

The objective measures were developed based on five financial ratios which served as indicators for product innovation. The subjective measure consisted of three items developed by Miller and Friesen (1982) to measure innovation activities with regard to new product development (Jennings & Young, 1990:57).

Construct reliability was demonstrated for the objective and subjective measures (Cronbach's alpha = 0.75; 0.92 respectively). Correlation analysis for both measures was performed and resulted in a significant relationship between the two measures (Jennings & Young, 1990:58-61). Jennings and Young (1990:62) concluded that objective and subjective measures of product innovation can be used interchangeably.

Besides the well-known three concepts of innovation, risk-taking and proactiveness to measure entrepreneurial orientation, Lumpkin and Dess (1996:140,148) conceptually defined entrepreneurial orientation consisting of five dimensions: the three dimensions developed by Miller and Friesen (1982) and also autonomy and competitive aggressiveness.

In a separate study, Lumpkin and Dess (2001:439,441-443) operationalised entrepreneurial orientation using four concepts, namely risk-taking, innovation, proactiveness and competitive aggressiveness. Items for risk-taking, innovation and proactiveness were taken from scales developed by Khandwalla (1977), Miller (1983) and Covin and Slevin (1986,1989) and partly adapted. Competitive aggressiveness was measured by two items. One was taken from Covin and Slevin (1989) and one was self-constructed. It was found that the four concepts of entrepreneurial orientation represent distinct factors. Reliability was reported for proactiveness and competitive aggressiveness, which demonstrated a satisfactory value for proactiveness (Cronbach's alpha = 0.79) and a less reliable value for competitive aggressiveness (Cronbach's alpha = 0.66).

Although Lumpkin and Dess (2001) demonstrated that entrepreneurial orientation can be measured by four distinct concepts, the three dimensions developed by Miller and Friesen (1982) have been most widely used in entrepreneurship and strategic management research (Kreiser *et al*., 2002:71).

Knight (1997:215) assessed the scale developed by Khandwalla (1977) and termed it the ENTRESCALE. Eight items were used in the study. In order to identify whether entrepreneurial orientation is a unidimensional or multidimensional construct, a factor analysis was performed, which showed a two-factor structure. All items were

assessed regarding their reliability and an overall Cronbach's alpha value of 0.834 was established (Knight, 1997:218-219). Knight (1997:219) used structural equation modelling to assess construct validity. The measurement model fitted the data well, lending support for construct validity. Construct validity was tested in the form of discriminant validity, using a correlation analysis correlating the aggregated ENTRESCALE dimensions with other relevant entrepreneurship measures, which showed satisfactory results (Knight, 1997:220).

Chadwick *et al*. (2008:70,76) examined the entrepreneurial orientation scale with nine items covering innovation and proactiveness. The scale demonstrated good reliability, with Cronbach's alpha values at 0.82. The reliability is consistent with Knight's (1997) findings. Factor analysis was conducted, which showed a reliable two-factor structure which was also found in Knight's (1997) study. Convergent validity was assessed using correlation analysis between the ENTRESCALE and a measure of proactiveness developed by Venkatraman (1989; in Chadwick *et al*., 2008:75). Support for convergent and nomological validity was found (Chadwick *et al*., 2008:75-76).

The studies presented so far consider that entrepreneurial orientation consists of three dimensions: innovation, risk-taking and proactiveness, which are either present in an organisation or not. Morris and Sexton (1996), however, developed an approach which demonstrates that entrepreneurial orientation can be assessed based on the degree and amount of entrepreneurship that takes place in an organisation.

Morris and Sexton (1996:5-9) developed the construct of entrepreneurial intensity. The underlying concepts are innovation, risk-taking and proactiveness. It is argued that entrepreneurship is a matter of degree and frequency. The degree of entrepreneurship was measured by items covering the extent of top-management decision making in an innovative, risk-taking and proactive way. These items were developed by Miller and Friesen (1983:232) and adapted by other researchers. Next, the number of new products, services and processes was assessed, by indicating if they were new to the world, new to the market or modifications or extensions of pre-existing items.

Satisfactory reliability could be achieved for the degree of entrepreneurship. Innovativeness demonstrated a Cronbach's alpha of 0.84, risk-taking was at 0.72 and proactiveness at 0.67. Regarding frequency of entrepreneurship, absolute numbers were reported. The entrepreneurial intensity measure was calculated by mean scores of the degree of entrepreneurship and the average of responses on the frequency dimension. The measure of entrepreneurial intensity was an equally weighted index of the combination of degree and frequency (Morris & Sexton, 1996:9-10).

The presented studies on the measurement of entrepreneurial orientation showed that the construct can be measured reliably by the three concepts of innovation, risk-taking and proactiveness. Whereas some researchers argue that entrepreneurial orientation is a unidimensional construct (Covin & Slevin, 1986), others demonstrate that it is a multidimensional construct consisting of distinct factors (Chadwick *et al*., 2008; Knight, 1997; Lumpkin & Dess, 2001; Miller & Friesen, 1982).

George (2011:3) takes the discussion further and argues that entrepreneurial orientation is not only a multidimensional construct, but that it can also be modelled as a reflective or formative construct. The differences and implications of reflective versus formative measurements will be outlined in section 4.3.1.

#### 4.2.2.2 Corporate entrepreneurship measuring instruments

Khandwalla (1977:23,424,637) developed a measurement instrument to assess corporate design of organisations. Corporate design is influenced by environmental, strategic, structural and behavioural constructs. Reliability was measured using Nunnally's formula for reproducibility. The values are stated in brackets where applicable.

The environmental construct consisted of variables measuring research and development activities (n.a.), the rate of innovation (0.76), competitive pressure (0.56) and the external environment (n.a.) (Khandwalla, 1977:639-642,659).

The strategic construct included variables measuring performance aspirations (0.69), the organisation's orientation to diversification (n.a.) and vertical integration (n.a.),

standardisation orientation (0.45), risk-taking (0.53), optimisation of use of resources (0.80), participation (0.85), flexibility (0.68) and coercion of top management (0.52) (Khandwalla, 1977:642-650,660-661).

The technological construct consisted of variables capturing capital intensity (n.a.) and orientation towards mass production (n.a.) (Khandwalla, 1977:650-651,661).

The structural construct included measures of delegation of authority (0.81), distribution network (n.a.), vertical integration (0.69), divisionalisation (n.a.) and sophistication of control and information systems (0.80) (Khandwalla, 1977:651-655).

The control of behaviour construct was used to assess management's activities to reduce conflict or improve coordination (n.a.) (Khandwalla, 1977:655-656).

Performance was measured with an index of subjective (0.84) as well as an index of objective performance (n.a.) (Khandwalla, 1977:656-658).

Although values for competitive pressure (0.56), performance aspirations (0.69), risk-taking (0.53), coercion (0.52) and flexibility (0.68) are below the suggested criterion of 0.7, they were included in the study since the research was in its early stages and low values can be accepted in that stage (Khandwalla, 1977:658).

Overall the scale developed by Khandwalla (1977) showed that different aspects of a corporate management style can be measured reliably.

Zahra (1991:272) developed a measure for corporate entrepreneurship. Zahra states that his corporate entrepreneurship indicators cover an organisation's actual engagement in entrepreneurship, whereas other measures such as the scale developed by Miller (1983) measure the disposition towards entrepreneurship.

Corporate entrepreneurship was measured by four indicators, a corporate entrepreneurship index, sales derived from new business lines, sales derived from new products or brands and an external orientation of corporate entrepreneurship (Zahra, 1991:271-272).

First, a corporate entrepreneurship index was developed. The index consists of nine items which showed acceptable reliability (Cronbach's alpha = 0.86). The items relate to areas such as supporting and rewarding employees, engagement in innovation, organisational structure, management support, competitor orientation and environmental aspects (Zahra, 1991:271,285). The corporate entrepreneurship index was shown to be valid when correlated with Miller's (1983) index consisting of the concepts of innovation, risk-taking and proactiveness. Further, a clear distinction from Miller's (1983) index could be shown (Zahra, 1991:271).

The second measure in Zahra's (1991) model is percentage of sales derived from new lines of business. The third measure considers percentage of sales derived from new products or brands. The last measure accounts for external orientation of corporate entrepreneurship, which was measured by the number of joint ventures the organisation had participated in the past three years. Reliability for these indicators was established using objective as well as subjective data (Zahra, 1991:272).
Zahra (1991:278) also demonstrated a positive association of corporate entrepreneurship with financial performance measures.

Antoncic and Hisrich (2001:495-496) used the ENTRESCALE (Knight, 1997) and the corporate entrepreneurship scale by Zahra (1991) to further refine the measurement scales and assess their cross-national validity.

The construct of corporate entrepreneurship consisted of 37 items that measured four concepts. Reliability in the form of Cronbach's alpha was assessed for the Slovenian and the US sample. The values are provided in brackets. The four concepts consider: new business venturing (0.83/0.51), innovativeness (0.89/0.87), self-renewal (0.92/0.83) and proactiveness (0.69/0.66). Except for proactiveness, all concepts showed acceptable levels of reliability. Exploratory factor analysis and confirmatory factor analysis were conducted for all dimensions and showed satisfactory results. Convergent and discriminant validity were also established (Antoncic & Hisrich, 2001:517-518).

Overall, the corporate entrepreneurship construct showed acceptable internal and external validity regarding the generalisability across the two samples (Antoncic &

Hisrich, 2001:521). These results give confidence for the use of corporate entrepreneurship items in future international research studies.

Kuratko *et al*. (1990:54) developed a comprehensive measurement of corporate entrepreneurship in the “Intrapreneurial Assessment instrument (IAI)”.

The scale was further refined by Hornsby, Montagno and Kuratko (1992 in Hornsby *et al*., 1999:12) leading to the “Corporate Entrepreneurship Assessment Instrument (CEAI)”.

Hornsby *et al*. (2002:253) applied the Corporate Entrepreneurship Assessment Instrument (CEAI) to middle managers. The purpose of the study was to assess firm-internal factors that influence middle management’s participation in corporate entrepreneurship activities.

The following five concepts were used to measure corporate entrepreneurship: management support, organisational structure, risk-taking, time availability and reward and resource availability. The concepts were operationalised with a total of 84 items (Hornsby *et al*., 2002:263).

Exploratory and confirmatory factor analysis resulted in five factors. Reliability for all factors was established with Cronbach’s alpha. The values are provided in brackets. The five factors are: management support (0.92), work discretion (0.86), rewards/reinforcement (0.75), time availability (0.77) and organisational boundaries (0.69). Results from a second sample also showed a five-factor model and high reliability (Hornsby *et al*., 2002:266-267). Discriminant validity was established for all five factors (Hornsby *et al*., 2002:268).

The presented studies by Khandwalla (1977), Zahra (1991) and Hornsby *et al*. (2002) demonstrate that corporate entrepreneurship is a diverse construct. Besides the entrepreneurial orientation constructs of innovation, risk-taking and proactiveness, other relevant constructs have been considered. All three studies show that entrepreneurial orientation can reliably be measured by internal and external dimensions. While Hornsby *et al*. (2002) focus on a comprehensive internal measure

of corporate entrepreneurship considering management support, organisational structure, rewards, time and resource availability; Khandwalla (1977) and Zahra (1991) also include external dimensions such as a competitor orientation and environmental changes. All three studies demonstrate acceptable reliability values for their scales, which provide a basis for their use in further research.

Brown, Davidsson and Wiklund (2001:954) developed a measurement instrument based on Stevenson's (1983 in Brown *et al.,* 2001:952) conceptual model of entrepreneurship as opportunity-based firm behaviour.

Brown *et al*. (2001:955) operationalised Stevenson's conceptualisation of entrepreneurial management to assess a firm's degree of entrepreneurship.

Stevenson's entrepreneurial management construct consisted of eight dimensions: strategic orientation, commitment to opportunity, commitment of resources, control of resources, management structure, reward philosophy, growth orientation and entrepreneurial culture (Brown *et al*., 2001:955-956).

The developed scale consisted of a total of 20 items measuring the different dimensions. Factor analysis showed six distinct factors, which suggests discriminant validity. Strategic orientation and commitment to opportunity formed one factor and commitment of resources and control of resources another factor. The remaining constructs formed one factor each. Reliability measures expressed in Cronbach's alpha showed satisfactory values for strategic orientation (alpha = 0.82), management structure (alpha = 0.78) and growth orientation (alpha = 0.71). Cronbach's alpha was lower for entrepreneurial culture (alpha = 0.68), resource orientation (alpha = 0.58) and reward philosophy (alpha = 0.58) (Brown *et al*., 2001:957-959, 963).

Convergent validity was established through a comparison of the entrepreneurial management scale with Covin and Slevin's (1989) entrepreneurial orientation scale. Correlation between the two indices revealed a moderately high degree of correspondence, which demonstrates that the two measures are related, but only partly overlapping (Brown *et al.,* 2001:961). Factor analysis with both scales resulted

in nine distinct factors, which represent the six factors of the entrepreneurial management scale and three factors from the entrepreneurial orientation scale. This result shows that the two scales are distinct. This was further supported by correlation analysis of the factor indices, which indicated rather low correlations between them (Brown *et al*., 2001:961).

Although the research focus of the two studies by Brown *et al*. (2002) and Hornsby *et al*. (2002) was somewhat different, the concepts that were used for measurement are comparable. Both approaches include measures of resource availability, organisational structure, rewards and management support. Furthermore, both studies demonstrate reliability and validity of each concept. Brown *et al*. (2001) further include aspects of strategic orientation, growth orientation and culture. These additional aspects provide an even more holistic view of the corporate entrepreneurship construct.

### 4.2.3 Measuring instruments for entrepreneurial capital

Various studies use three dimensions of entrepreneurial capital, namely financial, social and human capital (Audretsch & Keilbach, 2004:419; Firkin, 2001:2) for measuring.

Entrepreneurial capital has been associated with performance and competitive advantage due to the inimitability of human and social capital (Audretsch & Keilbach, 2004:419; Hatch & Dyer, 2004:1155; Hitt *et al*., 2001:13).

Financial capital considers financial assets of any form that are directly convertible into money (Firkin, 2001:2). Audretsch and Keilbach (2004:423) measured financial capital using inventory and past investments within the manufacturing sector.

Unger *et al*. (2011:1,6) conducted a meta-analysis on human capital measures that have been applied in studies over a 38-year period.

Studies were rather diverse in their conceptualisation of human capital, which makes it difficult to assess what kind of human capital should be considered (Unger *et al*., 2011:2).

Quantitative studies that were included in the meta-analysis were grouped in one of two human capital aspects. First, human capital was considered as an investment which includes aspects such as education, start-up experience, industry-specific experience, management experience and work experience. Second, human capital was considered as an outcome, which summarises effects of human capital investments such as entrepreneurial skills, competencies and knowledge (Davidsson & Honig, 2003:306; Unger *et al.,* 2011:3,9).

Unger *et al*. (2011:10-11) note that not all studies included in the meta-analysis reported reliability on their measurement. However, the average Pearson Product-Moment Correlation for studies that reported reliability was 0.77, which indicates high reliability of the measures.

Hitt and Ireland (2002:4) defined human capital as including aspect such as education, experience, knowledge and skills. This definition is very similar to that of Rauch *et al*. (2005:683,688), who defined human capital as consisting of education, experience and skills that help to get the work tasks done. The construct was conceptualised as an index for which the individual dimensions were defined to be causal. As will be outlined later in this chapter, conventional reliability and validity assessments cannot be used with causal indicators. Procedures to ensure reliability and validity of measures were conducted.

Overall, the studies presented by Unger *et al*. (2011) and Rauch *et al*. (2005) indicate that human capital can be measured reliably using the aspects of education, experience, knowledge and skills.

Davidsson and Honig (2003:307) state that social capital refers to people's ability to take advantage of their social structures, networks or memberships. Furthermore, social capital is considered to be multidimensional and occurs on an individual and organisational level.

Social capital has been operationalised using the number of organisations, associations, communities or alumni organisations an individual belongs to (Davidsson & Honig, 2003:309,314; De Carolis *et al*., 2009:535).

De Carolis *et al*. (2009:535) operationalised social capital using two dimensions: social networks and relational capital. The concept of social networks was measured by the number of networks a person belonged to. The second dimension consisted of three items measuring the extent of involvement in these organisations. Reliability of social capital was acceptable, with a Cronbach's alpha of 0.76.

Baron and Markman (2000:107) suggest that social capital should also consider social skills. They argued that a person's access to networks depends on the ability to interact effectively with others.

Baron and Markman (2003:49) measured social skills by various items suggested by the social skills inventory (SSI) by Riggio (1986:652), and further developed new items. The resulting factor structure considered social perception, social adaptability, and expressiveness, which yielded acceptable Cronbach's alpha values of 0.83, 0.67 and 0.74 respectively.

The social skills inventory (SSI) consists of 105 items which measure seven dimensions of social skills: emotional expressivity, emotional sensitivity, emotional control, social expressivity, social sensitivity, social control and social manipulation. The dimensions showed good reliability values; Cronbach's alpha was between 0.75 and 0.88 (Riggio, 1986:653).

Overall the studies on social capital presented indicate that the construct can reliably be measured in its quantitative and qualitative aspects. The quantitative part includes aspects such as the number of networks or the amount of time spent conducting networking activities. The qualitative aspects of the construct consider social skills, which include social perception, adaptability or expressiveness (Baron & Markman, 2003; Davidsson & Honig, 2003; De Carolis *et al*., 2009; Riggio, 1986).

### 4.2.4 Measuring instruments for market orientation

The two main scales for market orientation have been developed by Narver and Slater (1990) and Kohli and Jaworski (1990). Desphandé *et al*. (1993) developed a scale to assess a firm's customer orientation.

The three scales have been further developed and streamlined by Deshpandé and Farley (1998) and Matsuno *et al*. (2005).

The following paragraphs outline the properties of the different market orientation scales.

Narver and Slater (1990:22) developed a measurement instrument for market orientation as an organisational culture.

Narver and Slater (1990:22) defined market orientation as a unidimensional construct consisting of three behavioural aspects: customer orientation, competitor orientation and interfunctional coordination, and two decision criteria: long-term focus and profit objective of the business (Narver & Slater, 1990:22).

Items for each of the five concepts of market orientation were developed, and content validation was established by using a panel of experts in the strategic marketing field (Narver & Slater, 1990:23). Customer orientation was measured using six items, competitor orientation included four items, and interfunctional coordination consisted of five items. The two decision criteria were measured using three items each (Narver & Slater, 1990:24).

Internal consistency was assessed using Cronbach's alpha and item-to-total correlations. The Cronbach's alpha values for customer orientation (alpha = 0.868), competitor orientation (alpha = 0.727) and interfunctional coordination (alpha = 0.735) were satisfactory. However, values for long-term focus (alpha = 0.408) and profit emphasis (alpha = 0.004) were below the recommended value of 0.7 (Nunnally, 1978 in Santos, 1999:2). Consequently the two decision

criteria were not further analysed. However, inter-rater reliability was assessed and showed satisfactory results (Narver & Slater, 1990:24).

Construct validity was assessed by convergent, discriminant and concurrent validity. Convergent validity between the three concepts of market orientation was assessed with correlation analysis, which showed satisfactory results. Discriminant validity was measured with a scale that is considered to be different from market orientation. The results provided support for discriminant validity (Narver & Slater, 1990:25).

To assess concurrent validity, Narver and Slater (1990:26) correlated the market orientation construct with two constructs that had been validated before. The correlations showed satisfactory results, providing support for concurrent validity (Narver & Slater, 1990:26).

Jaworski and Kohli (1993:53) constructed their scale of market orientation using three different concepts: intelligence generation, intelligence dissemination and responsiveness to information. A total of 32 items were developed to assess the concepts. 10 items relate to intelligence generation, eight to intelligence dissemination and 14 to responsiveness to information.

Reliability measures in the form of Cronbach's alpha for the dimensions showed satisfactory results. The following Cronbach's alpha values were identified: intelligence generation 0.71, intelligence dissemination 0.82, responsiveness to information 0.82 (Jaworski & Kohli, 1993:60,65).

A mean score for the overall market orientation construct was calculated by adding the corresponding item scores from all three concepts. Correlation between the overall score and each of the three concepts, as well as correlation between the three concepts, showed satisfactory results (Jaworski & Kohli, 1993:60).

In another study Kohli *et al*. (1993:467) developed the MARKOR scale, which is a further refinement of the original scale by Jaworski & Kohli (1993).

It hypothesised that the market orientation construct represents one general factor consisting of three correlated factors. Based on error variance estimates and analysis of cross-loadings of items, the original scale of 32 items was reduced to 20 items, which represented a better model fit (Kohli *et al*., 1993:470).

In another step a multi informant sample was drawn to run a replication analysis to determine the appropriate factor structure. It was found that several of the models that included a general factor of market orientation and three component factors lacked discriminant validity between intelligence dissemination and responsiveness to information (Kohli *et al*., 1993:470-471).

Further confirmatory factor analysis was conducted to assess the validity of the market orientation construct. Overall moderate validity was found (Kohli *et al*., 1993:473).

Deshpandé *et al*. (1993:24,27) developed a measure for customer orientation. The dimensions of customer orientation related to the conceptual definition by Kohli and Jaworski (1990) and Narver and Slater (1990). The construct consisted of nine items (Deshpandé *et al*., 1993:29,33-34).

Reliability was assessed using Cronbach's alpha, which was satisfactory (alpha = 0.69). Internal validity was determined using item-to-total correlations (Deshpandé *et al*., 1993:29).

Deshpandé and Farley (1998:213,216) directly compared the three scales developed by Narver and Slater (1990), Kohli *et al*. (1993) and Deshpandé *et al*. (1993), based on reliability and validity analysis. Moreover, a synthesis of the three scales for market orientation into the MORTN scale was developed.

Acceptable Cronbach's alpha levels were found for the Narver and Slater scale (1990) (alpha = 0.90) and the Deshpandé *et al.* scale (1993) (alpha = 0.72) and somewhat lower reliability levels for the Kohli *et al*. scale (1993) (alpha = 0.51) (Deshpandé & Farley, 1998:216).

Construct validity was calculated using three items from an unrelated scale. Results showed strong discriminant validity (Deshpandé & Farley, 1998:218). External validity was assessed using a constant-sum scale which showed satisfactory results for all three scales (Deshpandé & Farley, 1998:217). Predictive validity considering performance indicators for all three scales was determined, showing satisfactory results (Deshpandé & Farley, 1998:218).

High correlations between the three scales, as well as a high degree of intra-company reliability, could be shown. A comparison of inter-rater reliability allows the conclusion that the three scales can be used interchangeably in practice (Deshpandé & Farley, 1998:218-219).

A cross-national comparison of the three scales showed strong reliability in European and US studies. The scale by Deshpandé *et al*. (1993) has the broadest international exposure, with applications of the scale in India, China, Japan, Germany and England (Deshpandé & Farley, 1998:219-220).

Cross national assessment of validity did not show any significant differences between countries or industries, lending support to the conclusion that all three scales are valid across different nations and industries (Deshpandé & Farley, 1998:221-222).

A synthesis of the three scales was developed in order to account for redundancies by using all three scales as well as achieving a smaller number of items to make the market orientation scale practical for use in larger studies (Deshpandé & Farley, 1998:222).

Factor analysis with 44 items from all three scales was performed resulting in one factor that explained more than 40% of variance. This factor included 10 items from all three scales and was termed the MORTN scale. The MORTN scale showed high reliability (alpha = 0.88) and predictive validity (Deshpandé & Farley, 1998:222-223).

Matsuno *et al*. (2005:3-4) developed the EMO (extended market orientation) scale, which extends the scales by Narver and Slater (1990) and Kohli *et al*. (1993). A

comparison between the EMO scale and the scales by Narver and Slater (1990) and Kohli *et al*. (1993) was conducted.

The EMO scale incorporates a broader scope of stakeholders and market factors. It consists of the concepts of intelligence generation, dissemination activities and responses to market players and has a total of 22 items. Information generation consisted of eight items, information dissemination included six items and responsiveness to information was measured with eight items. Cronbach's alpha for each concept and the overall market orientation measure (alpha = 0.85) showed satisfactory results: information generation (alpha = 0.65), information dissemination (alpha = 0.75), responsiveness to information (alpha = 0.81). Further, convergent validity was established (Matsuno *et al*., 2005:4-6).

Unidimensionality for all three scales was assessed. A second-order confirmatory factor analysis produced satisfactory fit indices for the EMO and the Narver and Slater (1990) scale. For the Kohli *et al*. (1993) scale unidimensionality could not be assessed and it was subsequently removed from further analysis (Matsuno *et al.*, 2005:5).

On the level of the second-order factor structure the two remaining scales were assessed based on their fit statistics. Both scales achieved good fit statistics (Matsuno *et al*., 2005:5).

Predictive validity was determined for the Narver and Slater (1990) scale and the EMO scale using performance measures in structural equation modelling. Both scales were positively related to performance indicators indicating predictive validity. However, the scale by Narver and Slater (1990) was considered to be more efficient in prediction as it considers fewer items (Matsuno *et al*., 2005:5-6).

Overall, Matsuno *et al*. (2005:6) note that no single scale was found absolutely satisfactory.

The presented studies on measuring instruments for market orientation have evolved around the concepts developed by Narver and Slater (1990), Kohli and Jaworski

(1990) and Jaworski and Kohli (1993). Various studies extended and compared the original scales (Deshpandé *et al*., 1993, Deshpandé & Farley, 1998; Kohli *et al*., 1993; Matsuno *et al*., 2005). The studies showed consistently acceptable reliability and validity of the scales, even in an international setting (Deshpandé *et al*., 1993). However, it appears that no scale is completely satisfactory in capturing the construct of market orientation (Matsuno *et al*., 2005:6). It needs to be noted that market orientation has been measured as a reflective construct that is considered to be either unidimensional (Deshpandé & Farley, 1998; Narver & Slater, 1990) or multidimensional (Jaworski & Kohli, 1993; Kohli *et al*., 1993; Matsuno *et al*., 2005).

### 4.2.5. Measuring instruments for firm performance and relative competitive strength

Financial performance can be measured using objective measures or subjective measures. Objective measures relate to actual percentage figures of sales growth, turnover or profitability (Dawes, 1999:65). However, as mentioned in chapter three, most managers are unwilling to disclose firm performance indicators (Moorman & Rust, 1999:187). Moreover, in some cases the collection of objective financial data may not be viable, as the data may only be available on an aggregated level which is not appropriate for the level of analysis (Wall, Michie, Patterson, Wood, Shehan, Clegg & West, 2004:96).

Various studies measuring market orientation have previously used subjective measures of performance (Dawes, 1999; Dess & Robinson, 1984; Moorman & Rust, 1999).

Measures for subjective performance relate to questions such as “Please rate the overall financial results of your firm”, and “Please rate the return on investment or return on assets of your firm”. Answers to these questions are given on a scale with anchor labels such as “very good”, “very poor” (Dawes, 1999:65,69-70).

A comparison of studies that use objective and subjective performance measures shows that these measures are strongly correlated, which demonstrates convergent

validity (Dawes, 1999:68-70; Dess & Robinson, 1984:269; Moorman & Rust, 1999:187).

Wall *et al*. (2004:95) analysed the validity of subjective measures. The subjective measures asked for the company's performance in comparison to the main competitor. Objective measures included financial data from audited records. The study showed convergent and discriminant validity (Wall *et al*., 2004:101,104,111).

Considering the results of the presented studies, subjective measures of financial firm performance provide a reliable measure if objective data cannot be obtained.

Some researchers (Barney, 1991:99) argue that competitive advantage derives from the firm's resources, which must be valuable, rare, inimitable and sustainable. Other researchers (Porter, 1980 in Cockburn *et al*., 2000:1126) argue that competitive advantage derives from the firm's microeconomic environment (Cockburn *et al*., 2000:1126).

Cockburn *et al*. (2000:1128) state that competencies may lead to competitive advantage. However, one also needs to understand where the competencies come from.

In order to achieve competitive advantage it is necessary to have the required resources but at the same time have strategies to transform these resources into capabilities (Chandler & Hanks, 1994:335).

Generic strategies of competitive advantage are described as cost leadership, differentiation and focus (Porter, 1998:xxii).

Chandler and Hanks (1994:338) measured competitive strategies using three dimensions: innovation, quality and cost leadership. All three dimensions were measured with multiple items.

Innovation was measured by three items: being the first to have new products available, stressing new product development and engaging in innovative marketing

techniques (Chandler & Hanks, 1994:338). The second dimension, high quality, was measured by five items: emphasis on quality control, meeting customer requirements, emphasis on firm's superior customer service, producing only the highest quality products and setting customer needs first (Chandler & Hanks, 1994:338). Cost leadership was the third dimension, consisting of three items: emphasising cost reduction in business operations, emphasising improvement in employee productivity and operations efficiency, and lower production cost due to process innovation (Chandler & Hanks, 1994:338).

For all three dimensions Cronbach's alpha was assessed and showed acceptable values: innovation (alpha = 0.70), quality (alpha = 0.78) and cost-leadership (alpha = 0.73). Discriminant validity between the three dimensions was also established (Chandler & Hanks, 1994:338-339).

Zhou, Brown and Dev (2009:1065) measured competitive advantage using differentiation advantage consisting of two types: namely market differentiation and innovation differentiation. Items for market and innovation differentiation were modified from Chandler and Hanks (1994). Exploratory and confirmatory factor analysis were performed to assess reliability and convergent and discriminant validity. The analysis showed acceptable values. Composite reliability for market differentiation was 0.73 and for innovation differentiation 0.66 (Zhou *et al*., 2009:1067-1068).

Burke (1984:347) developed a measure for relative competitive strength which considered a business unit's share of the market. This measure is considered to reflect the business unit's position within the market compared with that of major competitors.

Relative competitive strength was measured by multiple items. Items compared the business unit with its major competitor in five dimensions: product changes, price changes, service improvements, technological innovation and marketing methods. Reliability was assessed by Cronbach's alpha, which was completely satisfactory (alpha = 0.94). Discriminant validity between relative competitive strength and other constructs was established (Burke, 1984:351-353).

Competitive strength is considered to have explanatory power over performance. It captures how well the firm systematically engages with its environment and how well it can distinguish itself from other firms (Augusto & Coelho, 2009:96).

Augusto and Coelho (2009:96-98,101) state that competitive strength captures aspects of how well a firm can anticipate and shape the market in which it operates. Competitive strength was measured by five items relating to those of the competition: the organisation's prices, quality of products, capacity to compete, diversity of product and its tendency to be ahead of competitors. The items were derived from Burke (1984). Composite reliability, which can be compared to Cronbach's alpha, was acceptable, with a value of 0.81 which exceeds the reference value of 0.7. Convergent and discriminant validity were established (Augusto & Coelho, 2009:100).

The presented studies on competitive advantage measure the construct using different aspects of market-related items and firm-internal items. The market-related items refer to market share and activities to compete with competitors. Firm-internal factors consider the capacity to innovate, and quality and cost aspects. In combination these items provide a good measure of the construct, as has been demonstrated by the acceptable reliability and validity measures (Augusto & Coelho, 2009; Burke, 1984; Chandler & Hanks, 1994; Zhou *et al*., 2009).

## 4.3 LITERATURE REVIEW ON STATISTICAL MODELLING

In statistical modelling, causal modelling is considered to be the most prominent approach for theory development. This framework considers cause and effect relationships between constructs (Jaccard & Jacoby, 2010:137-138; Shmueli, 2010:289). Structural equation modelling (SEM) is used to quantitatively assess cause-effect relationships between variables of interest (Pearl, 2007:135).

In statistical modelling a careful distinction between causal explanation and empirical prediction needs to be made (Shmueli, 2010:289). The purpose of exploratory modelling is causal explanation, which tries to match the statistical model with the data to draw inferences (Shmueli, 2010:290,293). Empirical prediction is conducted

in predictive modelling. The focus of predictive modelling is on the individual constructs in the model. The statistical model is used to predict new values of the dependent variable (Shmueli, 2010:290,293). The perspectives of causation versus prediction are also reflected in the two approaches that can be applied to SEM, namely covariance-based structural equation modelling and partial-least squares modelling. The two approaches will be discussed in more detail in chapter five.

The general model of SEM considers two types of variables: latent variables or latent constructs, which are variables that cannot be directly observed or measured. These variables have also been termed unobserved or unmeasured variables. Latent variables need to be inferred from a set of observed variables. Observed variables are also called measured, manifest, or indicator variables, items or proxies. These variables represent a set of variables that are used to define the latent variable or construct (Bollen, 1989:11,16; Diamantopoulos *et al*., 2008:1204; Schumacker & Lomax, 2010:3).

SEM consists of two parts. The first is a measurement model that specifies the relationships between the latent variables and their measures. The second is a structural model which specifies the causal relationships between the latent variables (Anderson & Gerbing, 1988:411; Bagozzi & Baumgartner, 1994:387; Bollen, 1989:11; Burke Jarvis *et al*., 2003:199; Diamantopoulos *et al*., 2008:1204; Edwards & Bagozzi, 2000:155; Law *et al*., 1998:741).

The following paragraphs outline both parts and describe the various steps to specify the measurement model and the structural model.

### 4.3.1 Measurement model

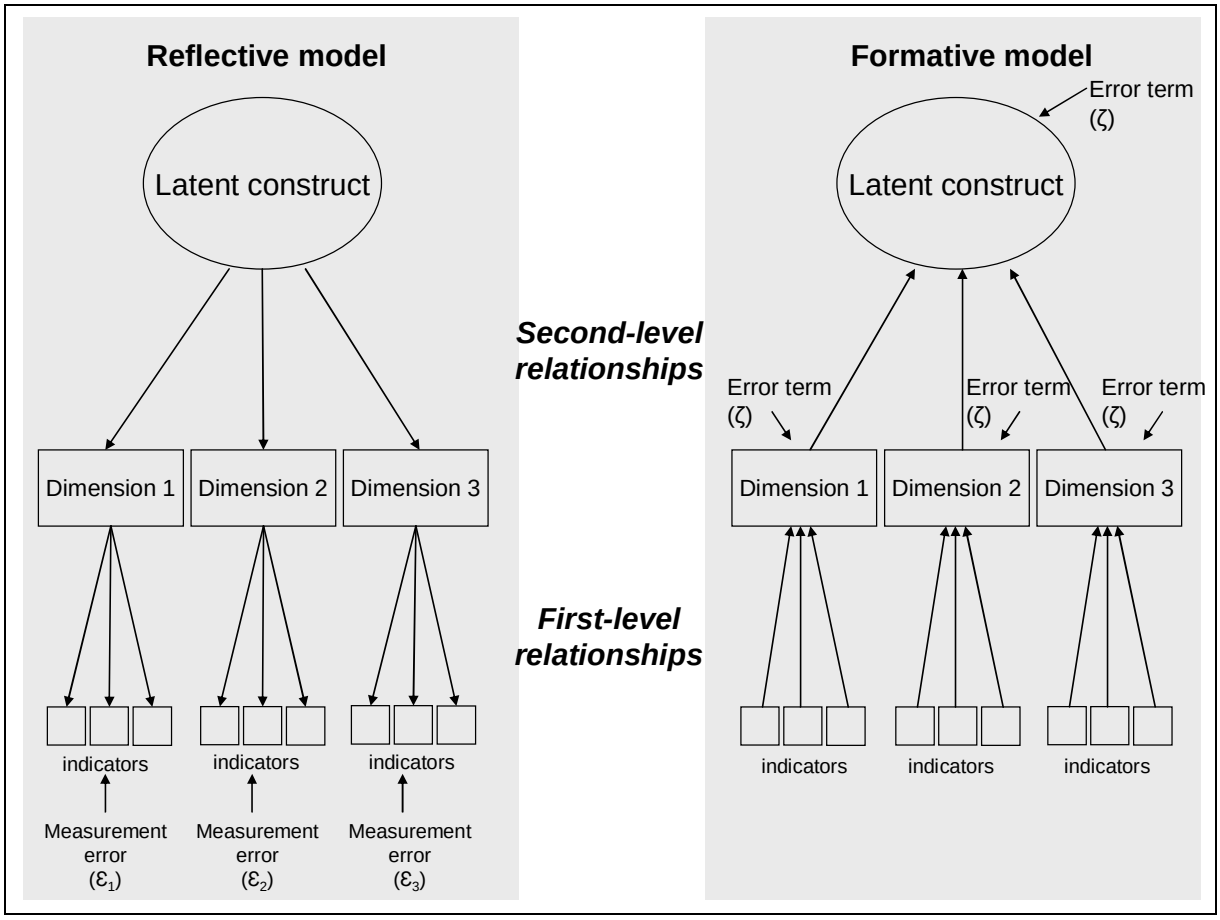
Multidimensional constructs are often used in research to assess the overall latent variable. A multidimensional construct is a construct involving more than one dimension which is treated as a single theoretical concept. A dimension is a manifestation of the construct (Diamantopoulos *et al*., 2008:1205; Edwards, 2001:144; Law *et al.,* 1998:741; Law & Wong, 1999:144; MacKenzie *et al*., 2005:711).

It is argued that multidimensional constructs are useful as they present a holistic view of complex phenomena and at the same time account for precision in measuring the dimensions (Edwards, 2001:145). However, it is important that the relationships between the construct and its dimensions are well defined (Law *et al*., 1998:741).

There are various ways in which a multidimensional construct can relate to its dimensions and the dimensions to the indicators. When dealing with multidimensional constructs it is necessary to distinguish between different levels of analysis. The first level (first-order) is relating the observed variables to their dimensions. The second level (second-order) relates the dimensions to the latent constructs. For each level either a formative or a reflective specification is possible (Diamantopoulos *et al*., 2008:1205-1206)

The following figure presents the two types of relationships.

**FIGURE 4.1: Reflective and formative relationships**




**Source**: adapted from MacKenzie *et al*. (2005:711,714)

Burke Jarvis *et al*. (2003:204) observe that it is possible for single multidimensional constructs to have different measurement models, one relating its measures to its first-order constructs and another one relating its dimensions to the second-order factor. Therefore it is possible to have mixed models such as first-order reflective and second-order formative or vice versa.

The characteristics of the reflective and formative models can be described from four aspects, such as causality, intercorrelation, error term, antecedents and consequences. The following descriptions apply to both, first-level and second-level relationships, but only second-level relationships will be explicitly described.

First, in the reflective model the causality flows from the construct to the dimensions. Therefore the structural paths on the path diagram (Figure 4.1) point from the construct towards the dimensions (Bollen & Lennox, 1991:306; Burke Jarvis *et al*., 2003:203; Diamantopoulos *et al*., 2008:1205; Law & Wong, 1999:144-145; MacCallum & Browne, 1993:533; MacKenzie *et al*., 2005:711,713).

In the formative model the dimensions cause the construct, they make the construct appear. The paths in the path diagram (Figure 4.1) point from the dimensions to the construct (Edwards, 2001:147; Law *et al*., 1998:745; Law & Wong, 1999:146; MacCallum & Browne, 1993:533).

Second, the dimensions in the reflective model need to be positively correlated as they represent the same underlying construct and share a common theme (Bollen & Lennox, 1991:307; Burke Jarvis *et al*., 2003:203; Diamantopoulos *et al.,* 2008:1205; Law & Wong, 1999:144-145; MacKenzie *et al.,* 2005:711).

In formative models there are no specific expectations about intercorrelations between dimensions (Bollen & Lennox, 1991:308; Diamantopoulos *et al*., 2008:1204). Formative dimensions of the same construct can have positive or negative correlations or no correlation. As the dimensions capture distinct aspects of the latent construct, they are not interchangeable. Omitting one dimension changes the whole construct (Bollen & Lennox, 1991:308; Diamantopoulos *et al*., 2008:1204).

Therefore using instruments like factor analysis to examine the correlations between the dimensions could have a serious negative impact, as one could overlook valid dimensions that determine the construct. Moreover, high correlations between the dimensions make it difficult to separate the distinct influence of each dimension on the latent construct, which is described as a multicollinearity problem (Bollen & Lennox, 1991:307).

Third, in the reflective model the measurement error is determined on the level of observed variables (Bollen & Lennox, 1991:306; Diamantopoulos & Winkelhofer, 2001:271; MacKenzie *et al*., 2005:711).

For formative models an error term is captured on the construct level which impacts on the latent variable but is uncorrelated with the observed measures. The error term cannot be considered as a measurement error. It is rather a disturbance term that comprises all remaining causes of the construct that are not represented by the indicators (Diamantopoulos, 2006:9-10; Edwards, 2001:155).

Fourth, antecedents and consequences of the measures need to be considered. In the reflective model indicators reflect the underlying construct and should therefore have the same antecedents and consequences (Burke Jarvis *et al*., 2003:203; MacKenzie *et al*., 2005:713). In formative models indicators do not necessarily capture the same aspects of the construct and therefore they cannot be expected to have the same antecedents and consequences (Burke Jarvis *et al.,* 2003:203; MacKenzie *et al.,* 2005:713).

#### 4.3.1.1 Scale development

Rossiter (2002:306,308) describes a six-stage process of generating and selecting items to measure a construct. The process considers reflective and formative cases in scale development. The steps for scale development are outlined in the following paragraphs.

First, the construct must be defined in terms of the object, the components and the attributes, and the rater entity. The construct refers to a phenomenon of theoretical

interest that is described in terms of the object, including its constituents or components (reflective or formative dimensions), the attributes (reflective or formative indicators) and the rater (person who judges) (Rossiter, 2002:308,310).

The second step in scale development is to classify the objects. Objects can either be concrete singular (unidimensional), abstract collective (reflective multidimensional) or abstract formed (formative multidimensional). The latter two classifications require an index when it comes to enumeration and reporting (Rossiter, 2002:313).

Third, attributes can be classified into concrete (singular), (abstract) formed and (abstract) eliciting (Rossiter, 2002:313).

Concrete attributes have unanimous agreement between different raters and refer to only one characteristic. For these attributes a single-item measure is sufficient and valid. This means that the description of that item and the response categories must be clear (Rossiter, 2002:313-314).

Components adding up to the overall meaning of the attribute are called formed attributes. The response to the components causes the attribute to appear (Rossiter, 2002:314).

Researchers have different opinions about the number of attributes. Diamantopoulos and Winkelhofer (2001:271) state that formed attributes require a census of indicators, whereas Rossiter (2002:314) argues that the formed attribute needs to include main components; otherwise one searches for low-incidence components.

An abstract-eliciting attribute describes attributes that consider traits or a disposition. The items are manifestations of the trait or disposition. Furthermore, raters' answers on which characteristics represent the attribute would differ only slightly. Eliciting attributes should be written as a set of distinct activities. Items are interchangeable and a reasonable sample of items, up to five items, is considered to be sufficient (Rossiter, 2002:316-318).

The next step in scale development is rater identification. The scale score reliability will differ depending on the rater entity, which can be an individual, experts or a group. First, individual raters are persons providing self-reports on attributes. Expert raters, conduct a content analysis and thus reliability of the attributes. Group raters are usually a sample of consumers, managers, salespersons etc. The object that these raters assess is often a company or a product (Rossiter, 2002:318-319).

The fifth step in scale formation puts together the object items with their attribute items to form the scale. The scale items need to be easily understood, and this needs to be tested in pre-tests. For first-order eliciting attributes, coefficient beta, which is a test to assess unidimensionality, should be computed. Values of at least 0.5 are needed to infer that there is a general factor accounting for 50% of the item variance. For second-order eliciting attributes, a confirmatory factor analysis can be applied (Rossiter, 2002:320-322). The response answer format should consider questions that do not imply any intensity. The answer categories should be developed considering minimum to maximum intensity (Rossiter, 2002:323).

The last step in scale development is the enumeration process. This process describes procedures to derive a total score from scale items. As the construct can consist of different object and attribute types, the procedures will vary. An index can be described as a sum of item scores. A profile rule can also be established where each component must exceed a minimum level in order to be included in the index. A multiplicative rule can be applied in cases where a theory regarding the construct's algebraic relations is available. In all other cases a linear relationship between the construct and its dimensions should be assumed. Items can also be weighted before the index is computed. However, it is necessary to have a conceptual definition for it, as empirical weighting is not appropriate. Furthermore, items for indexes cannot be deleted, as they form the scale. Eliciting attributes are, however, interchangeable items (Law *et al*., 1998:751; Rossiter, 2002:325).

#### 4.3.1.2 Reliability and validity assessments of the measurement model

Bollen (1989:194) states that the problem with common reliability and validity tests is that they consider only observed measures but do not account for the latent variable and hence measurement error.

In order to determine reliability and validity of the measurement model it is necessary to assess the indicators themselves, as well as their relation to their latent variables. The procedures vary depending on the type of indicators, reflective versus formative (Jahn, 2007:21).

In the reflective case, a first step is to analyse factor loadings, which should achieve a minimum value of 0.7 (Henseler, Ringle & Sinkovics, 2009:299; Jahn, 2007:21). However, Chin (1998:325) notes that loadings with 0.5 and 0.6 can also be considered if research development is in the early stages.

In a second step internal consistency of indicators is determined with composite reliability. Composite reliability is more accurate than Cronbach's alpha, which is sensitive to the number of indicators (Chin, 1998:320; Jahn, 2007:21).

A third step combines reliability and validity assessments in the measurement model. The average variance extracted (AVE) determines the amount of variance that is captured by the construct in relation to the amount of variance due to measurement error (Fornell & Larcker, 1981:45). Values lower than 0.5 indicate that the variance due to measurement error is larger than the variance captured by the construct. This means that validity of the indicators and the construct is questionable (Fornell & Larcker, 1981:46).

In the case of formative indicators reliability in the form of internal consistency cannot be applied as indicators can have positive, negative or zero correlation (Burke Jarvis *et al*., 2003:202; Diamantopoulos *et al*., 2008:1215).

Indicator validity can be assessed in various ways. First, the loadings which reflect the impact of the formative indicator on the latent construct need to be significant.

Items with non-significant loadings should be eliminated as they do not represent valid indicators of the construct (Diamantopoulos *et al.*, 2008:1215).

Diamantopoulos and Winkelhofer (2001:272) suggest validity assessment by using an overall measure that summarises the essence of the construct. A high relationship between the formative indicator and the overall item signifies indicator validity.

Assessing validity on the construct level focuses on nomological and/or criterion-related validity. To assess nomological validity, Diamantopoulos and Winkelhofer (2001:273) suggest linking the latent construct with other related constructs such as antecedents and/or consequences. In order to assess validity three steps need to be considered. First, it is necessary to gather additional information on the related construct. Second, the related construct needs to be reflective, and third, a theoretical relationship between the latent construct and the related construct needs to be generated.

Diamantopoulos and Siguaw (2006:271-272) provide an approach to assessing criterion validity. An external construct which is positively related to the focal construct is developed. Regression analysis is performed on all indicators of the focal construct (reflective and formative) and the external construct to assess the magnitude and significance of the relationships.

Diamantopoulos and Siguaw (2006:267,275) note that the initial item pool for both types of measurement, reflective or formative, is the same. Hence, items that have been used in reflective models can also be applied to formative models. However, after identification, reliability and validity assessments have been conducted, one cannot expect to have the same item pool for reflective and formative models.

The previous paragraphs have outlined reliability and validity assessments of measurement models. It has been noted that different approaches need to be followed when dealing with reflective and formative models. The reflective assessment basically follows traditional scale evaluation procedures, which allow for determining reliability and validity. For formative models reliability cannot be determined. However, validity becomes even more important, and this was described

by the assessment of validity measures such as indicator validity, nomological validity and criterion validity. Further, formative models need to be identified, which requires additional measures (Diamantopoulos & Winkelhofer, 2001; Diamantopoulos & Siguaw, 2006; Diamantopoulos *et al.*, 2008).

#### 4.3.1.3 Model misspecification and its impact

Although reflective and formative measures were initially developed around the same time, the 1960s and 1970s, in today's social sciences reflective measurements are commonly used, whereas formative measurements are rarely used in research endeavours (Diamantopoulos, 2006:7). A reason for this may be the convenience of analysing models under the reflective view. A number of programmes are available for the analysis of covariance based structural equation modelling (Law & Wong, 1999:156).

However, researchers argue that technical convenience should not guide the research and the adoption of the type of measurement model as a misspecification can have serious effects (Law & Wong, 1999:159).

Model misspecification influences the estimates of the measurement and structural model parameters, which affect the conclusion about the theoretical relationships among the constructs (Burke Jarvis *et al.,* 2003:207,209). Burke Jarvis *et al.* (2003:212) conducted a Monte Carlo simulation manipulating the measurement model and the structural model. It was found that goodness-of-fit indices are not able to detect model misspecification, as indices produce satisfactory results for the incorrectly as well as the correctly specified models. A model could show satisfactory fit indices even though the structural parameters are biased, which would result in misleading inferences. Furthermore, paths in the structural model coming from a misspecified construct could lead to type I errors. Paths leading into a construct with a misspecified model could lead to type II errors.

MacKenzie (2003:324) notes that measurement model misspecification can undermine construct validity. First, the relationship between the measures and the construct are misrepresented. Second, if a formative indicator were treated as a

reflective indicator scale purification methods, such as alpha coefficients, could lead the researcher to drop items even though they represent valid measures of the construct.

Burke Jarvis *et al*. (2003:206) reviewed the measurement model specifications of four top marketing journals regarding construct definition over a 24-year period. Their results indicated that out of 1192 analysed constructs, 839 (70%) were correctly specified, and 353 (30%) were incorrectly modelled. The majority of constructs (810) were reflective constructs which were correctly specified.

Podsakoff *et al*. (2003:649-650) found that out of 138 analysed leadership constructs, 65 (47%) were incorrectly specified, with reflective indicators rather than the correct specification of formative indicators.

Burke Jarvis *et al*. (2003:208) present an overview of constructs commonly used in marketing literature which should be specified in a formative way. Among those constructs is market orientation, which should be specified as a second-order formative construct involving intelligence generation, dissemination and responsiveness to information. As outlined in section 4.2.4, the market orientation construct has previously been measured as a unidimensional (Narver & Slater, 1990) or reflective multidimensional construct (Jaworski & Kohli, 1993; Kohli *et al*., 1993; Matsuno *et al*., 2005).

Cadogan, Souchon and Procter (2008:1263) developed a formative, multidimensional model of market-oriented behaviours using the elements of the market orientation construct by Kohli and Jaworski (1990). Cadogan *et al*. (2008:1272-1274) identified all the variables that form market orientation and assessed nomological validity for the model. The fit indices for all three concepts of information generation, dissemination and responsiveness were good. Cadogan *et al*. (2008:1274) suggest replicating the study in order to prove stability.

Coltman, Devinney, Midgley and Venaik (2008:1260) also modelled market orientation as a formative construct. In their empirical study it was found that market orientation can be modelled in both ways: reflective and formative.

George (2011:12-15) develops a second-order formative model of entrepreneurial orientation, consisting of the reflective first-order concepts innovation, proactiveness and risk-taking. The formative model is compared with a reflective model. The results indicate that when entrepreneurial orientation is constructed as a second-order reflective construct, the causal paths are inflated, leading to invalid conclusions. However, in a comparison of fit indices the model misspecification could not be detected.

The presented studies indicate that model misspecification is a serious problem that can lead to wrong inferences. Furthermore, it has been found that fit indices are not always suitable for detecting model misspecification (Burke Jarvis *et al*., 2003; George, 2011; MacKenzie, 2003). A selected number of studies were presented that outline the modelling of market orientation and entrepreneurial orientation as formative constructs. The studies showed acceptable reliability and validity values (Cadogan *et al.*, 2008; George, 2011). One study found that market orientation can be modelled either in a formative or reflective way (Coltman *et al*., 2008).

### 4.3.2 Structural model

The structural model focuses on the causal relationships between the latent variables which are represented as paths (Bollen, 1989:11; Jaccard & Jacoby, 2010:166).

First, the direction of the paths needs to be determined, which is followed by an estimation of the path strength. Path strength is described by path coefficients (Jahn, 2007:10).

Two types of structural models can be distinguished, which determine the demands for statistical analysis. First, the recursive model is characterised by uncorrelated disturbance terms and unidirectional causal effects. The statistical requirements for this analysis are rather simple. Second, non-recursive models have correlated disturbance terms and can have feedback loops which require additional assumptions (Kline, 2011:106). For the purpose of this study a recursive model of market-driving ability was developed.

Structural models distinguish between exogenous and endogenous variables. An exogenous variable does not have causal paths pointing at it, whereas endogenous variables have at least one causal path going into them (Jaccard & Jacoby, 2010:145). The effect of one latent variable on the other can be analysed as direct, indirect and total effects (Jahn, 2007:10).

In a final step the whole model (structural and measurement) is submitted to testing. The available procedures and the appropriate fit indices to evaluate model fit will be outlined in chapter five.

The following section will outline the measurement and structural model for market-driving ability in corporate entrepreneurship.

## 4.4 MODEL OF MARKET-DRIVING ABILITY IN CORPORATE ENTREPRENEURSHIP

In the following the measurement and structural model of market-driving ability in corporate entrepreneurship are described.

### 4.4.1 Measurement models

The following section outlines the measurement models used in this study to determine market-driving ability. The scale and index development follows the steps described by Rossiter (2002).

The rater identity is the same for all following measurement models. Raters in this study are members of an organisation operating in the South African healthcare industry who hold a junior, middle or top management position.

The South African healthcare sector is characterised by a dual system: the public and private sector. The overall spending of the public sector accounts for 34% of total health expenditure, while the private sector makes up 66%. The prevalence of diseases like HIV/Aids and tuberculosis is among the highest in the world (Avert, n.d.). Furthermore, diseases of a modern society such as hypertension and diabetes

are very evident. The South African government strives to improve the healthcare for all citizens and plans to introduce a national health insurance system (SouthAfrica.info, 2009).

The healthcare sector comprises several market players which form a part of this study, such as the pharmaceutical industry, medical device industry, medical schemes and pharmaceutical distributors/wholesalers. The healthcare sector provides growth opportunities as well as challenges due to changes in the regulatory environment, which makes it an ideal industry to investigate market-driving ability of organisations.

#### 4.4.1.1 Measurement model for market driving

As outlined in chapter three researchers differ in their opinions on how market driving can be described. For the purpose of this study market driving is considered to be a second-order formed abstract object which includes three components: a firm's activities regarding market sensing, influencing customer preferences and alliance formation.

Market driving is considered as formative, as the three dimensions make unique contributions to the construct. Hence, omitting one would change the construct of market driving. Furthermore, a change in one of the three components would be expected to change the overall construct of market driving. Finally, the three components of market sensing, influencing customer preferences and alliance formation do not share a common theme (MacKenzie, 2003:325).

Following Rossiter's (2002:313) suggestion, an index was generated for market driving.

The next step in scale formation was to classify the dimensions market sensing, influencing customer preferences and alliance formation. The items of these dimensions are first-order relationships and represent the specific manifestation of the dimension; hence they are described as eliciting attributes.

The items of the respective dimensions are indicative rather than formative. Causality flows from the dimensions, such as market sensing, to the items which represent the dimension.

As suggested by Rossiter (2002:317) each attribute should include three to five items to assess unidimensionality. In accordance with the discussed literature (Bollen & Lennox, 1991:306; Diamantopoulos & Winkelhofer, 2001:271; MacKenzie *et al*., 2005:711), for each observed reflective item a measurement error term is added and a disturbance term is added for the formative construct of market driving.

The full questionnaire is provided in Annexure A.

Alliance formation was measured by five self-constructed items (questions 54-58) for which ideas were taken from Kale *et al*. (2000), Baron and Markman (2000) and Gulati (1999).

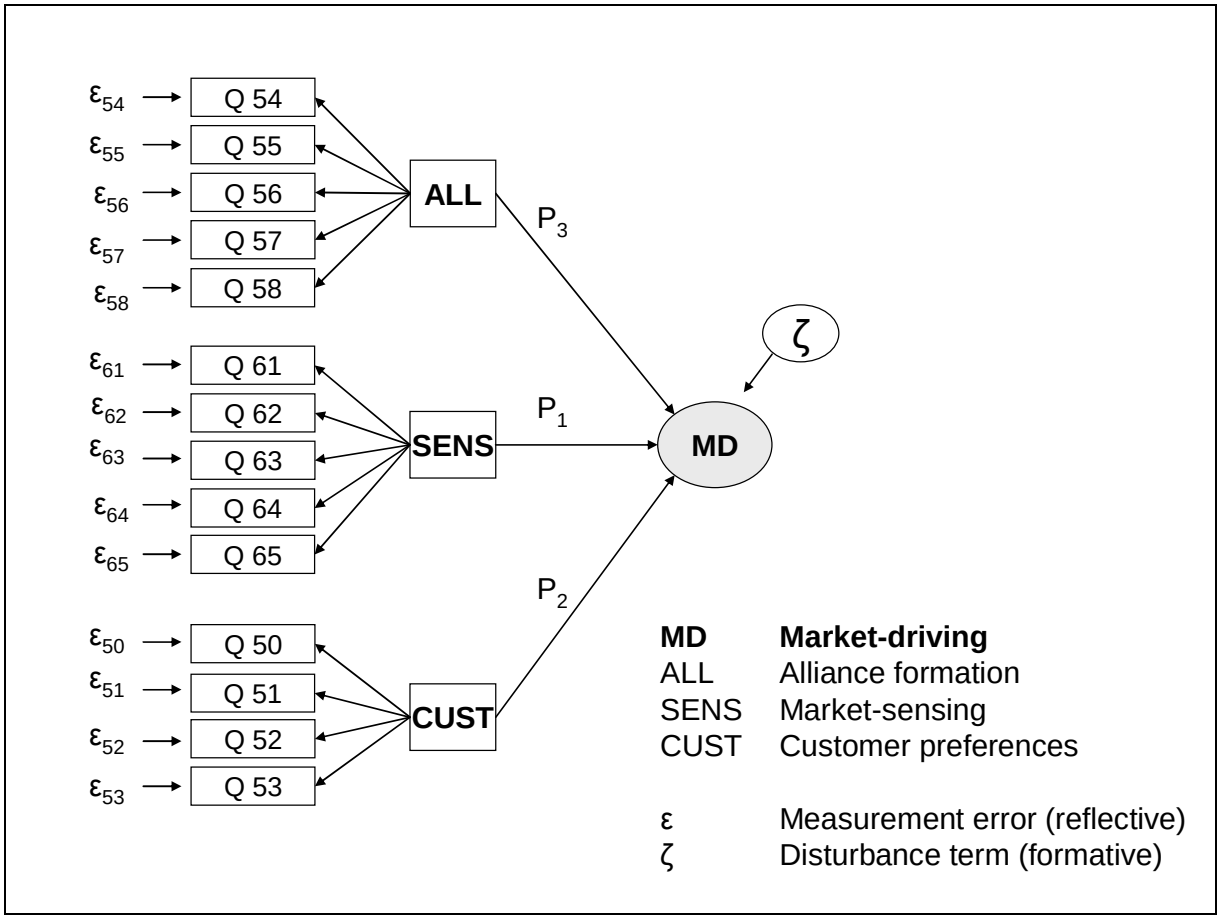
Market sensing was measured by five items (questions 61-65) which were adapted from the scanning intensity scale by Barringer and Bluedorn (1999) and the scanning items used by Miller and Friesen (1982).

Influencing customer preferences was measured by four self-constructed items (questions 50-53), taking ideas from Narver *et al*. (2004), Jaworski *et al*. (2000) and Kumar *et al*. (2000).

The last step in scale formation has been described as the enumeration process (Rossiter, 2002:325). A summed index was formed for market driving which was derived from the sum of item scores. Further, a linear relationship between market-driving and its components was assumed.

Figure 4.2 summarises the measurement model for market driving.

**FIGURE 4.2: Measurement model for market driving**




**Source**: Author's own compilation

In a first step propositions are formulated. Cooper and Schindler (2008:64) state that propositions are statements about concepts that may be true or false. In chapter five propositions are formulated for empirical testing and hence become hypotheses.

The following propositions derive from the measurement model:

P1: Market driving can be measured by market-sensing activities.

P2: Market driving can be measured by activities related to influencing customer preferences.

P3: Market driving can be measured by alliance-formation activities.

#### 4.4.1.2 Measurement model for corporate entrepreneurial management

Corporate entrepreneurial management is considered to be a second-order formed abstract object consisting of three dimensions: risk-taking, management support and organisational structure.

The dimensions consist of first-order eliciting attributes which are represented in questions 1-10. Causality flows from the dimension, for example from risk-taking to its items.

An index for corporate entrepreneurial management was developed which consisted of the sum of item scores.

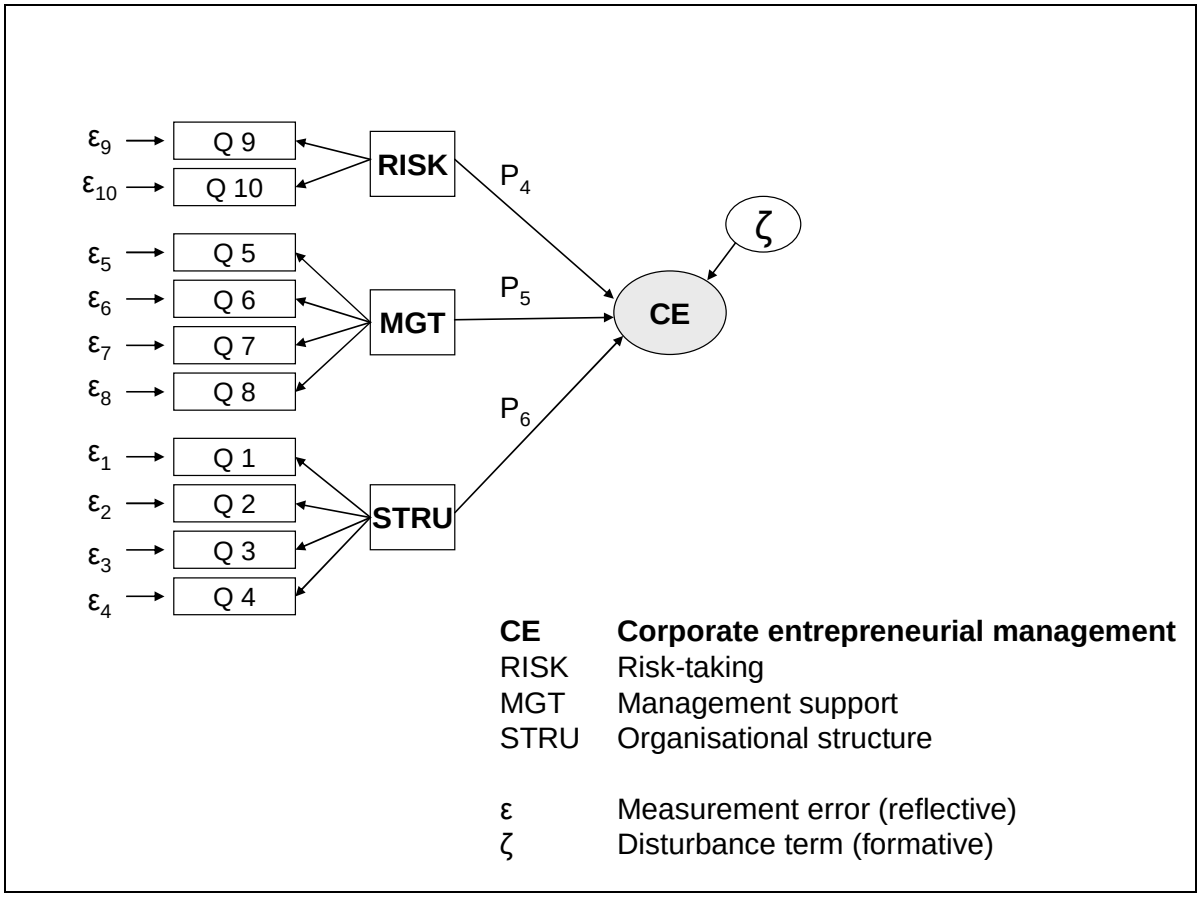
Risk-taking was measured by the two items (questions 9-10) developed by Miller and Friesen (1982) which have been used in numerous previous studies (Kreiser *et al.*, 2002; Miles & Arnold, 1991; Morris & Sexton, 1996; Smart & Conant, 1994).

Management support consisted of four items (questions 5-8), which were derived from Hornsby *et al*. (2002).

Organisational structure consisted of four items (questions 1-4), adapted from Hornsby *et al*. (2002) and Khandwalla's study (1977).

The following figure summarises the measurement model for corporate entrepreneurial management.

**FIGURE 4.3: Measurement model for corporate entrepreneurial management**




**Source**: Author's own compilation

The propositions for corporate entrepreneurial management are as follows:

P4: Corporate entrepreneurial management can be measured by risk-taking activities.

P5: Corporate entrepreneurial management can be measured by management support.

P6: Corporate entrepreneurial management can be measured by organisational structure.

#### 4.4.1.3 Measurement model for entrepreneurial capital

Entrepreneurial capital is considered to be a second-order eliciting attribute which is reflected in the three dimensions of financial, social and human capital. These three

dimensions are first-order eliciting attributes which consist of three items each. A total item score for entrepreneurial capital was generated.

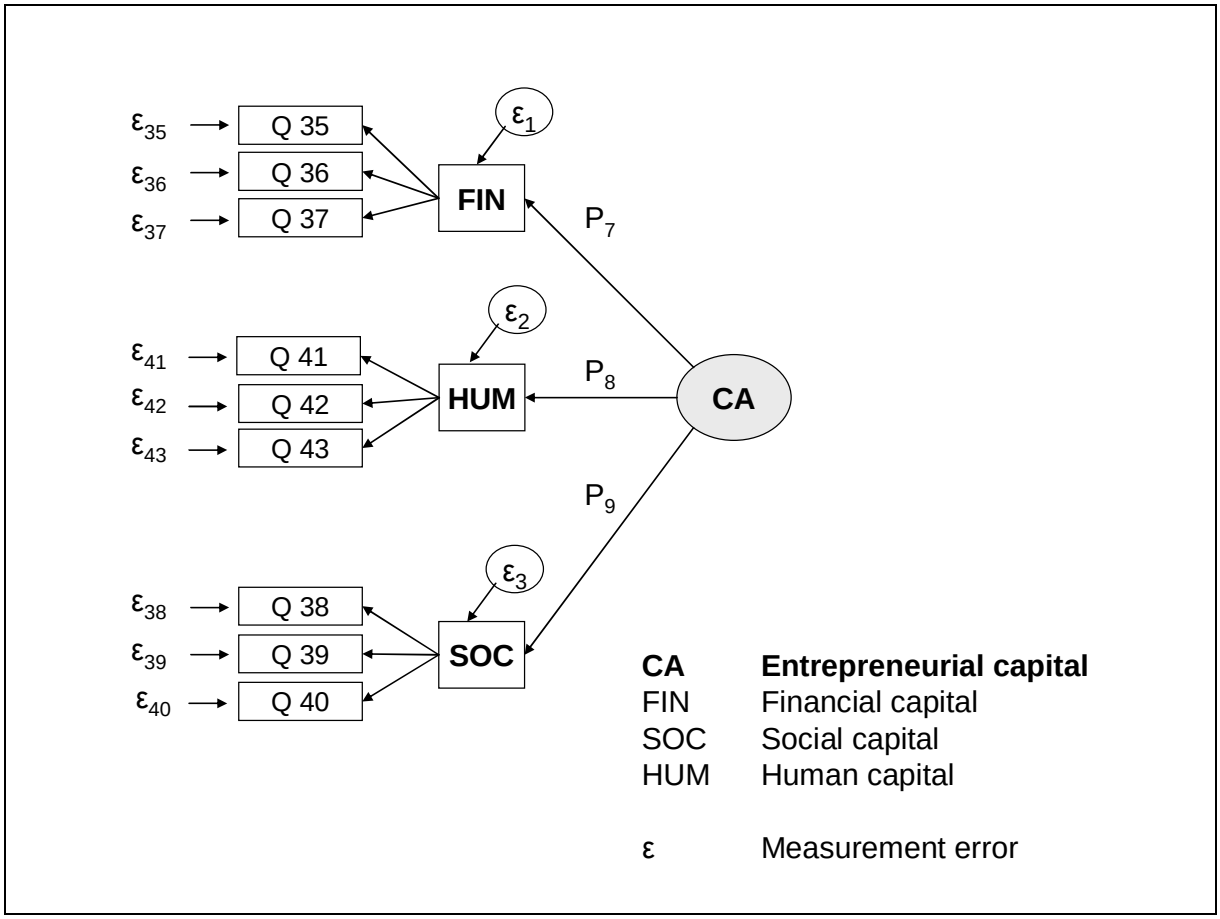
Financial capital was measured by three items (questions 35-37). The items were self-constructed; ideas were taken from Miller and Friesen (1982) and Khandwalla (1977).

Human capital included three items (questions 41-43) which were self-constructed; ideas were taken from Unger *et al*. (2011) and Rauch *et al*. (2005).

Social capital consisted of three items (questions 38-40) which were self-constructed; ideas for the item development were taken from Baron and Markman (2000).

The following figure summarises the measurement model for corporate entrepreneurial management.

**FIGURE 4.4: Measurement model for entrepreneurial capital**




**Source**: Author's own compilation

The propositions for entrepreneurial capital are as follows:

P7: Entrepreneurial capital is reflected in financial capital.

P8: Entrepreneurial capital is reflected in human capital.

P9: Entrepreneurial capital is reflected in social capital.

#### 4.4.1.4 Measurement model for strategic orientation

Strategic orientation is considered to be a second-order formed attribute which is caused by four dimensions information generation, information dissemination, interfunctional coordination and innovation intensity. These four dimensions are first-order eliciting attributes. An index for strategic orientation was developed which consisted of the sum of item scores.

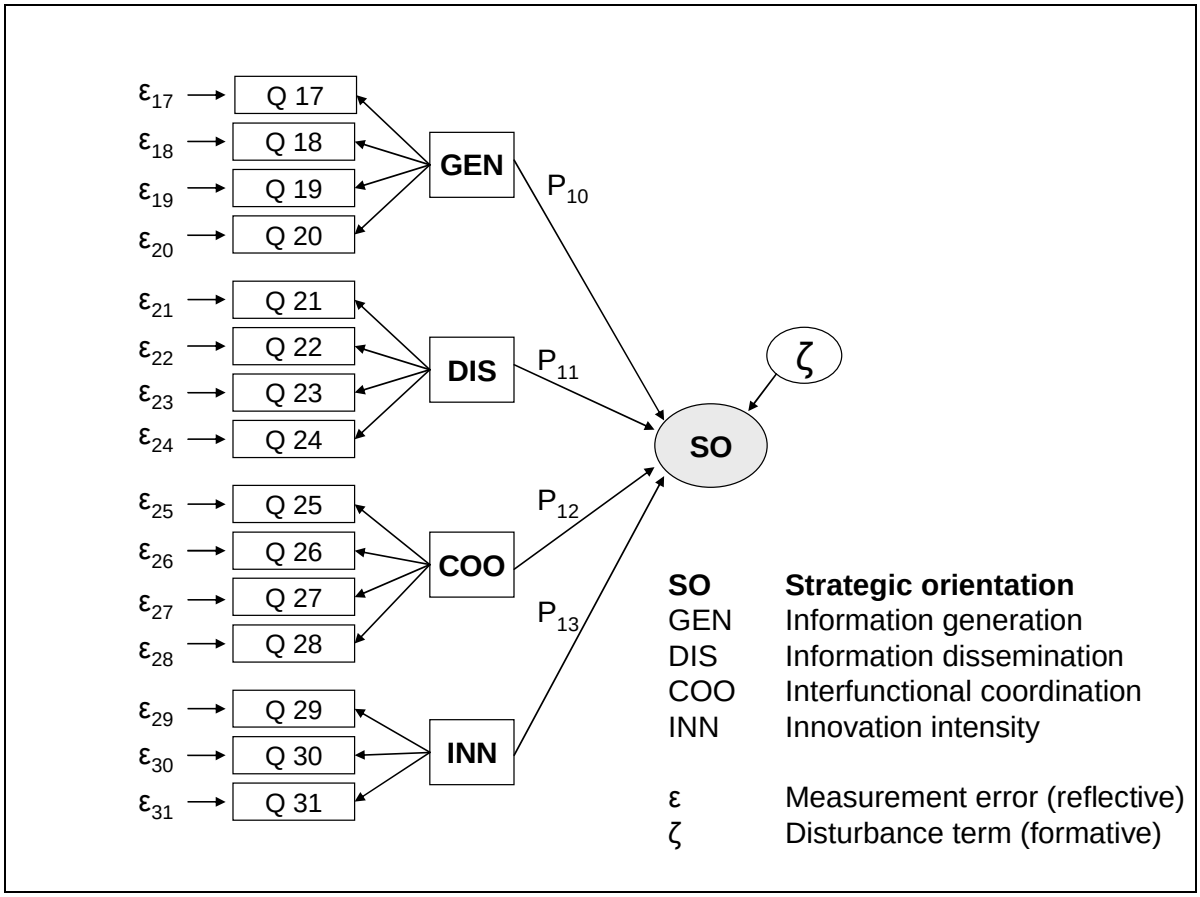
Information generation was measured by four items (questions 17-20) from the scale developed by Jaworski and Kohli (1993).

Information dissemination consisted of four items (questions 21-24) which were adapted from Jaworski and Kohli (1993).

Interfunctional coordination consisted of four items (questions 25-28). The items were derived from the scale developed by Narver and Slater (1990).

Innovation intensity consisted of three items (questions 29-31) which were adapted from Miller and Friesen (1982).

**FIGURE 4.5: Measurement model for strategic orientation**




**Source:** Author's own compilation

The propositions for strategic orientation are as follows:

P10: Strategic orientation can be measured by information generation.

P11: Strategic orientation can be measured by information dissemination.

P12: Strategic orientation can be measured by interfunctional coordination.

P13: Strategic orientation can be measured by innovation intensity.

#### 4.4.1.5 Measurement model for entrepreneurial behaviour

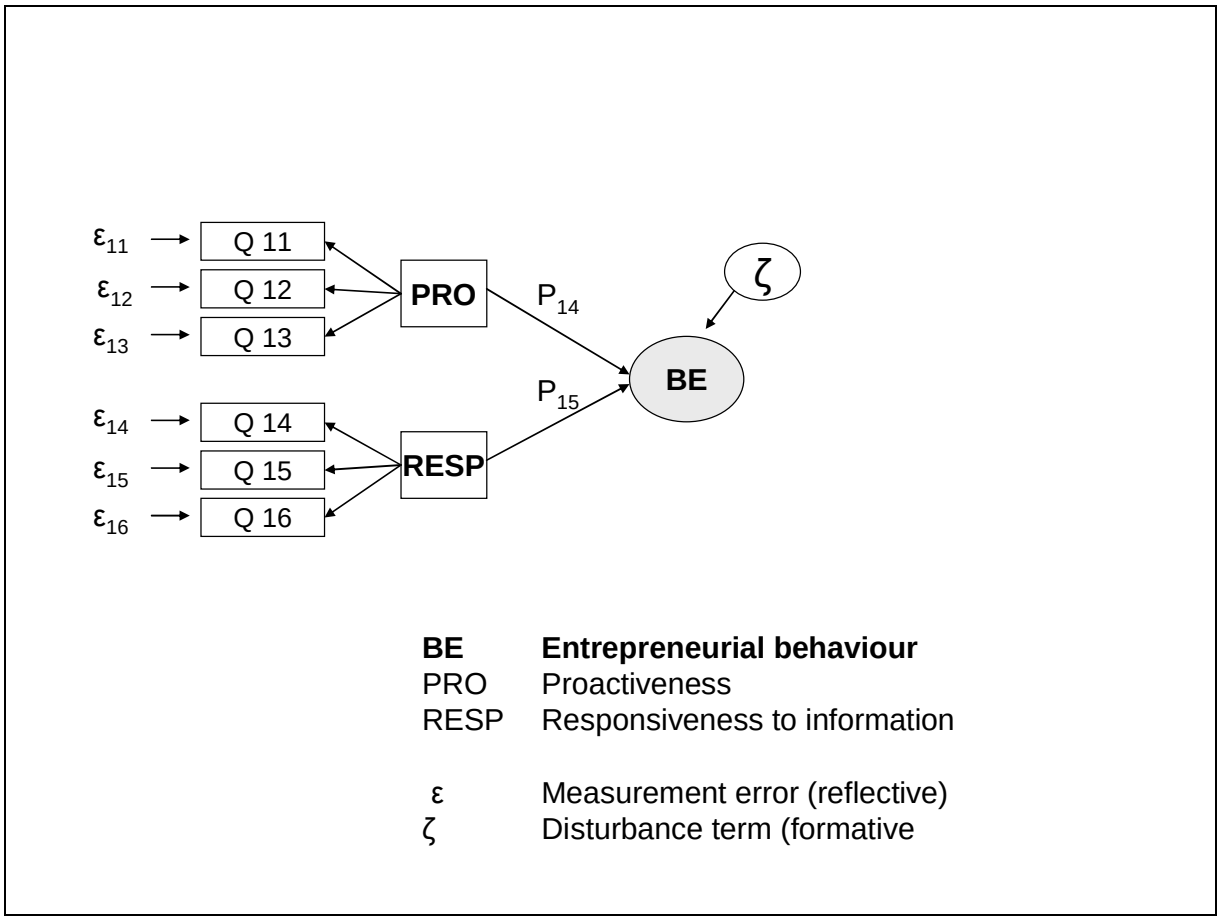
Entrepreneurial behaviour is considered to be a second-order formed attribute which is caused by the two dimensions of proactiveness and responsiveness to information. These two dimensions are first-order eliciting attributes.

An index for entrepreneurial behaviour was developed which consisted of the sum of item scores.

Proactiveness was measured by three items (questions 11-13); items were adapted from Lumpkin and Dess (2001).

The three items used to measure responsiveness to information (questions 14-16) were adapted from Jaworski and Kohli (1993) and Kohli *et al*. (1993).

**FIGURE 4.6: Measurement model for entrepreneurial behaviour**




**Source**: Author's own compilation

The propositions for entrepreneurial behaviour are as follows:

P14: Entrepreneurial behaviour can be measured by proactiveness.

P15: Entrepreneurial behaviour can be measured by responsiveness to information.

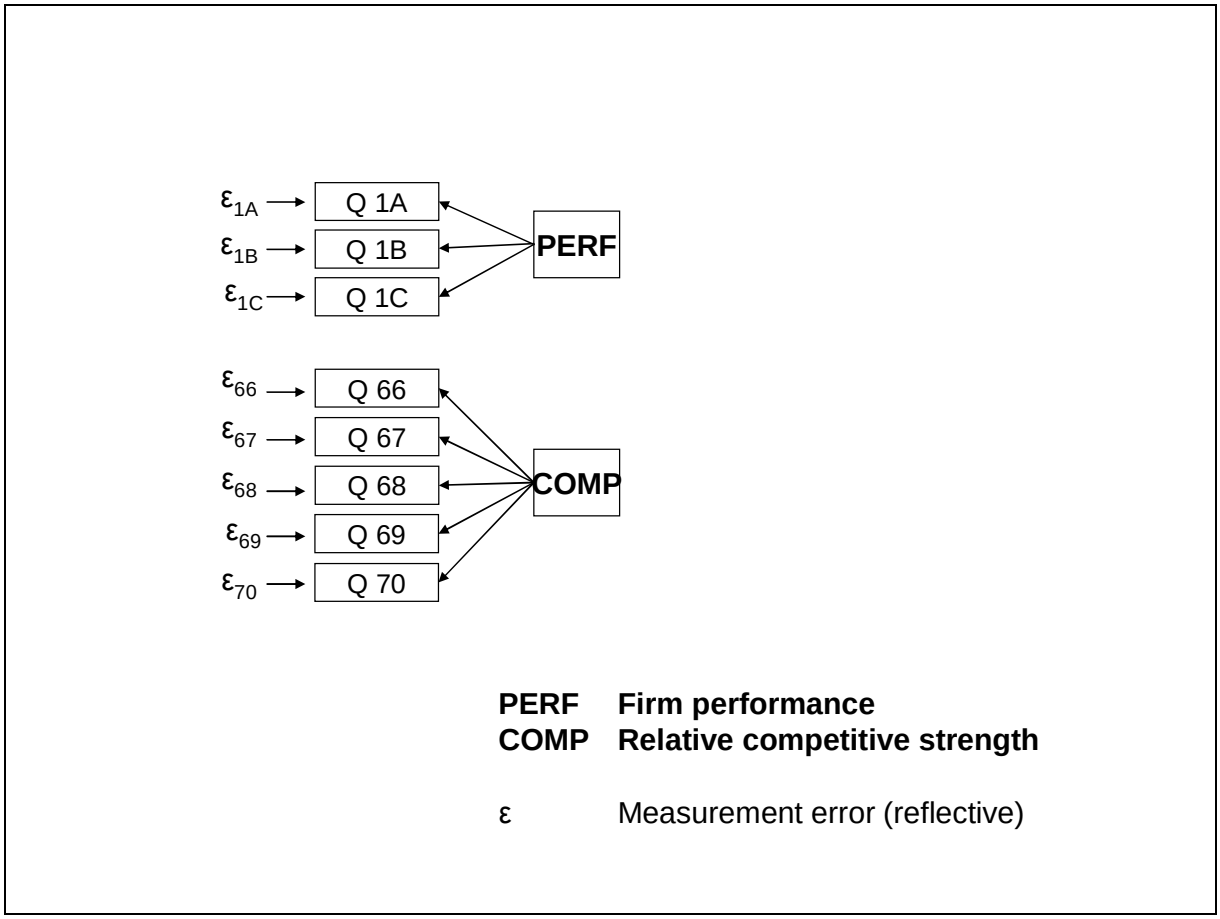
#### 4.4.1.6 Measurement model for firm performance and relative competitive strength

Firm performance and relative competitive strength are considered to be first-order eliciting attributes.
A summed score for each concept, firm performance and relative competitive strength, was developed, which consisted of the sum of its item scores.

Firm performance was measured with three self-constructed items (questions 1A-1C) that captured the perception of respondents on firm performance.

Relative competitive strength was measured with five items (questions 66-70), which were adapted from Burke (1984).

**FIGURE 4.7: Measurement model of firm performance and relative competitive strength**




**Source**: Author's own compilation

Firm performance and relative competitive strength are outcomes parameters of this study and were hence tested as a part of the structural model in this study.

### 4.4.2 Structural models

The following section outlines three different hypothesised structural models. The first model investigates a direct effects relationship between the exogenous latent variables and market-driving ability. The second model determines whether the management level as a moderating variable influences the paths between the exogenous latent variables and market driving. In a third model the industry focus of the organisation is considered as a moderating variable.

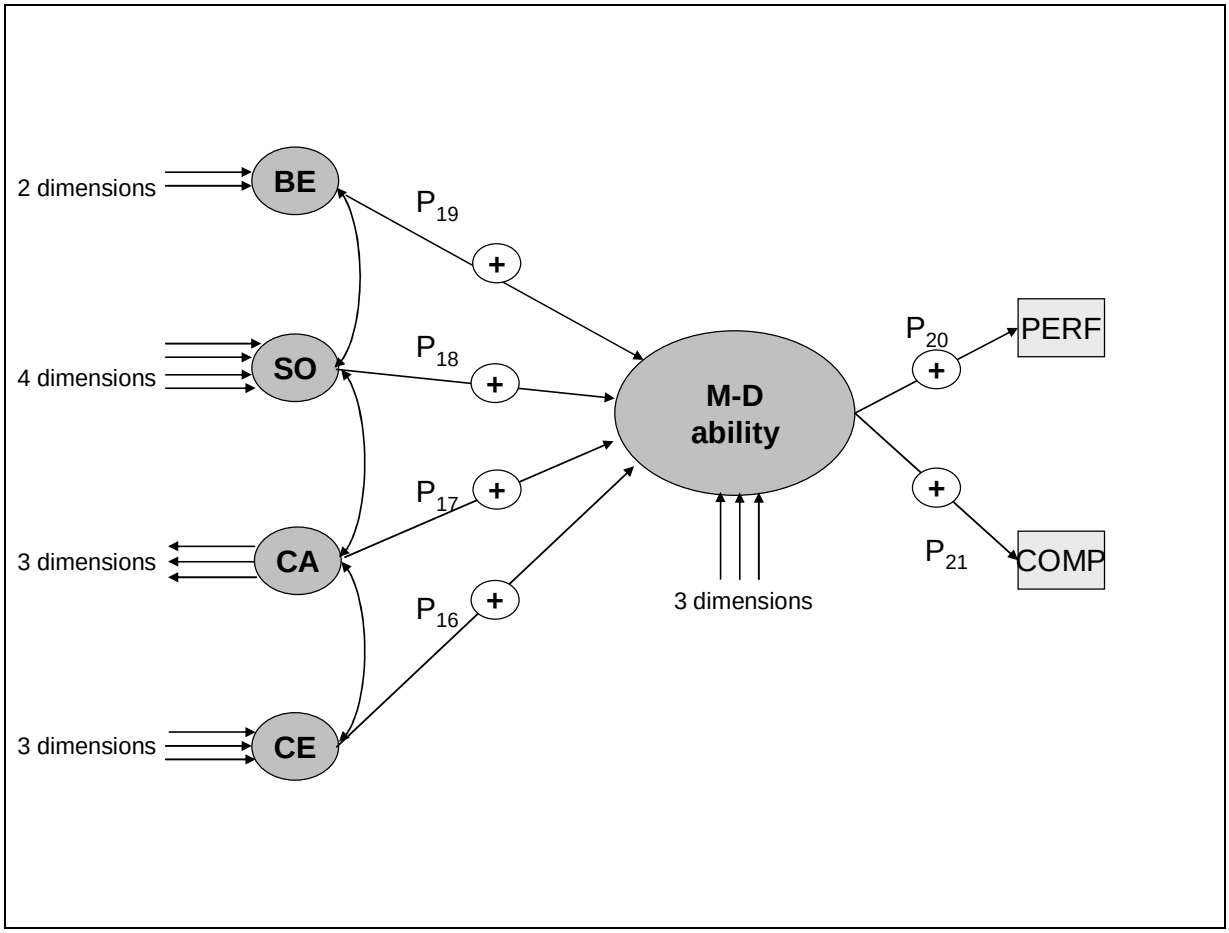
#### 4.4.2.1 Direct effects model (model 1)

It is suggested that the structural model of market driving is a recursive model with linear relationships and uncorrelated disturbance terms.

The exogenous latent variables in the model are corporate entrepreneurial management (CE), entrepreneurial capital (CA), strategic orientation (SO) and entrepreneurial behaviour (BE). The endogenous latent variables are market-driving ability (MD-ability), firm performance (PERF) and relative competitive strength (COMP).

The first structural model (Figure 4.8) presents direct relationships between the latent variables. The double-headed curved arrows between the exogenous latent variables represent an unanalysed relationship. It is acknowledged that the latent variables could be correlated; however, this study is not going to explore if and why they are correlated (Jaccard & Jacoby, 2010:143).

**FIGURE 4.8: Direct effects model (model 1)**




**Source**: Author's own compilation

The propositions that derive from the path diagram are stated as follows:

P16: Corporate entrepreneurial management positively influences market-driving ability.

P17: Entrepreneurial capital positively influences market-driving ability.

P18: Strategic orientation positively influences market-driving ability.

P19: Entrepreneurial behaviour positively influences market-driving ability.

P20: Market-driving ability positively influences firm performance.

P21: Market-driving ability positively influences relative competitive strength.

#### 4.4.2.2 Moderating effects model: Management level (model 2)

In the second and third structural models, moderating effects are considered. A moderator is a qualitative or quantitative variable that affects the direction and/or strength of the relationship between an independent and a dependent latent variable (Baron & Kenny, 1986:1174; Helm, Eggert & Garnefeld, 2010:524; Henseler & Fassott, 2010:713).

The structural model considers the influence of management level (top, middle, junior) on the relationship between the exogenous latent variables and market-driving ability.

As previous research (Hornsby *et al*., 2002:260,269) found, upper middle managers perceive key firm internal factors in a different way from lower middle managers. Middle managers' perception of these factors influenced their participation in entrepreneurial endeavours. Therefore it would be interesting to see if a moderating relationship could be found in this study.

For the purpose of this study it was investigated whether the path between the exogenous latent constructs and market driving was influenced by the management level. The specific question that was asked was: "Will the relationship between corporate entrepreneurial management, entrepreneurial capital, strategic orientation, entrepreneurial behaviour and market-driving ability be influenced by the various management levels?"
The direction of the moderating effect was not hypothesised.

The following propositions derive from the second model:

P22: The path between corporate entrepreneurial management and market-driving ability will differ between various levels of management.

P22a: The path between corporate entrepreneurial management and market-driving ability will differ between top management (level 1) and middle management (level 2).

P22b: The path between corporate entrepreneurial management and market-driving ability will differ between middle management (level 2) and junior management (level 3).

P22c: The path between corporate entrepreneurial management and market-driving ability will differ between top management (level 1) and junior management (level 3).

P23: The path between entrepreneurial capital and market-driving ability will differ between various levels of management.

P23a: The path between entrepreneurial capital and market-driving ability will differ between top management (level 1) and middle management (level 2).

P23b: The path between entrepreneurial capital and market-driving ability will differ between middle management (level 2) and junior management (level 3).

P23c: The path between entrepreneurial capital and market-driving ability will differ between top management (level 1) and junior management (level 3).

P24: The path between strategic orientation and market-driving ability will differ between various levels of management.

P24a: The path between strategic orientation and market-driving ability will differ between top management (level 1) and middle management (level 2).

P24b: The path between strategic orientation and market-driving ability will differ between middle management (level 2) and junior management (level 3).

P24c: The path between strategic orientation and market-driving ability will differ between top management (level1) and junior management (level 3).

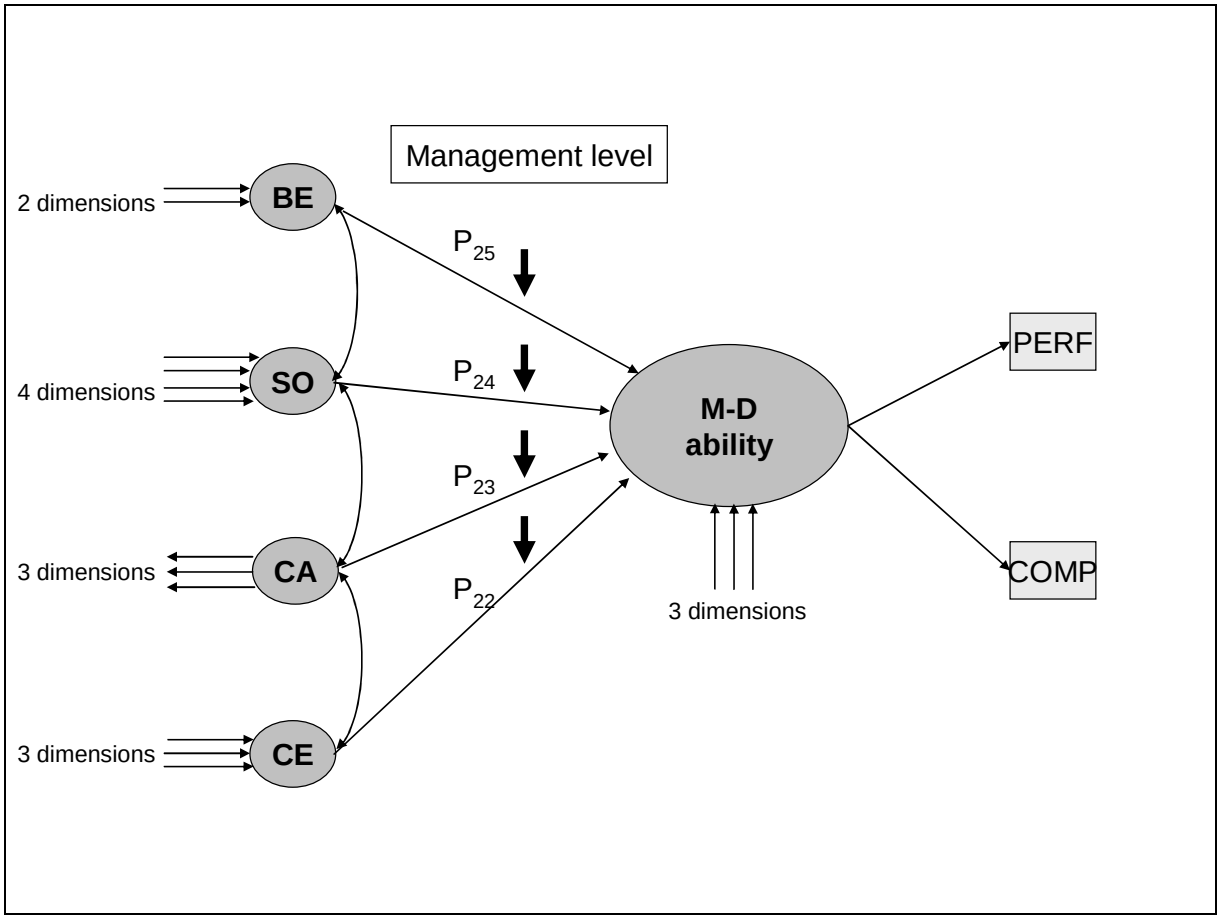
P25: The path between entrepreneurial behaviour and market-driving ability will differ for various management levels.

P25a: The path between entrepreneurial behaviour and market-driving ability will differ between top management (level 1) and middle management (level 2).

P25b: The path between entrepreneurial behaviour and market-driving ability will differ between middle management (level 2) and junior management (level 3).

P25c: The path between entrepreneurial behaviour and market-driving ability will differ between top management (level 1) and junior management (level 3).

**FIGURE 4.9: Moderating effects model: Management level (model 2)**




**Source**: Author's own compilation

### 4.4.2.3 Moderating effects model: Industry focus (model 3)

The third structural model considers the moderating influence of industry focus of organisations (Pharmaceutical manufacturers, medical device manufacturers, pharmaceutical distributors/wholesalers and medical schemes) on the relationship between the latent exogenous variables and market-driving ability. The industry focus of organisations is associated with certain challenges in the respective market.

Previous research (Khandwalla, 1976/77; Zahra & Covin, 1995) found that events in the external environment such as turbulence and dynamism in the market, restrictive access to the market and technological sophistication influenced firms' activities.

Zahra & Covin (1995:52) formed an environmental hostility index which took account of profit margins, growth rates and the number of bankruptcies in order to determine the relationship between corporate entrepreneurship and performance. These

quantitative data are not available for the different business sectors in the South African healthcare industry included in this study. Therefore the influence of industry focus on the paths was determined on a qualitative basis, considering the information that could be obtained by secondary research for the individual business sectors.

The pharmaceutical industry, consisting of manufacturers of originals and generics, is growing at a steady pace with prosperous growth expectations. In 2009 the total pharmaceutical market was estimated at 19.8 billion South African Rand (ZAR), which was a 15% increase on that of 2008 (Aspen Pharma, 2009:3). In 2010 the market was expected to reach 24.56 billion ZAR and by 2014, 35.97 billion ZAR (ReportLinker, 2011).

South Africa's leading pharmaceutical organisations are constantly looking for strategic alliances within the country as well as exploring expansion opportunities into neighbouring African countries (Aspen Pharma, 2009:3; ReportLinker, 2011). The pharmaceutical market will be influenced by patent expirations which will further strengthen the position of generic organisations (ReportLinker, 2011). Furthermore, government's efforts for a national health insurance system will put pressure on the industry for lower cost and increased patient access to medication.

These expectations about market development lead to the hypothesis that pharmaceutical organisations have a strong need to increase their market-driving ability, as the industry is considered highly competitive, with various challenges that impact on growth opportunities and market access.

The South African medical device industry is considered to be dynamic and highly competitive, with national and international players. It is estimated that approximately 95% of devices are imported (Anon., 2010:3). Market growth in the medical device industry is expected at 7.1% from 2010-2015 (Episcom Healthcare Intelligence, 2010). Currently the medical equipment market is not well regulated as there is no comprehensive medical device regulation system (Medicaldevice-network.com, 2009). The positive growth outlook can be considered to enhance firm's activity in market driving. However, the uncertainty regarding the regulatory environment could provide obstacles to market-driving endeavours.

Two of the leading distributors of pharmaceuticals are experiencing continued growth of their business. Innovations regarding distribution systems that increase turnaround times, provide process efficiency and add flexibility to the client, are being introduced. However, a regulation by the government to cap logistical fees provides future challenges to pharmaceutical distributors (UTI Pharma, 2011). Considering this information, the distributors of pharmaceuticals will have a strong need to achieve market driving for their organisations in order to tackle the challenges ahead and ensure continuing success.

The medical schemes environment in South Africa is characterised by consolidations, liquidations and mergers. The number of medical schemes is constantly declining. From 2006 to 2009 the number of open medical schemes decreased by almost 50%, from 218 to 110 schemes. Currently 33 open medical schemes operate in South Africa. The number of principal members increased steadily over the past years with an increase rate of 4.8% for the period 2006-2007 and 2.9% for the period 2008-2009. However, more and more elderly people join medical schemes, with an increase of 0.4% and 0.6% for the periods 2006-2007 and 2008-2009 respectively. Furthermore, spending on hospitals, medical specialists and medicines accounts for the majority of total spending, which increased by 13.7% from 2006 to 2007 and by 18% from 2008 to 2009. (Council of Medical Schemes, 2009:123-125; 2010:157-165).

Based on this information it can be assumed that medical schemes need to increase their activities towards market driving in order to stay competitive and tackle the challenges of rising healthcare costs and an ageing member portfolio. However, it can also be assumed that, based on the rising cost and the aspirations of the government to introduce a national healthcare system, medical schemes will resign and will not engage in market-driving activities.

It is hypothesised that the industry focus will impact on the paths between the dimensions and market driving. Considering the opportunities and challenges of each industry sector, the direction of the effect cannot be specified.

P26: The path between corporate entrepreneurial management and market-driving ability will differ for various industries.

P26a: The path between corporate entrepreneurial management and market-driving ability will differ between pharmaceutical manufacturers and medical device manufacturers.

P26b: The path between corporate entrepreneurial management and market-driving ability will differ between medical device manufacturers and pharmaceutical distributors/wholesalers.

P26c: The path between corporate entrepreneurial management and market-driving ability will differ between pharmaceutical manufacturers and pharmaceutical distributors/wholesalers.

P26d: The path between corporate entrepreneurial management and market-driving ability will differ between pharmaceutical manufacturers and medical schemes.

P26e: The path between corporate entrepreneurial management and market-driving ability will differ between medical device manufacturers and medical schemes.

P26f: The path between corporate entrepreneurial management and market-driving ability will differ between pharmaceutical distributors/wholesalers and medical schemes.

P27: The path between entrepreneurial capital and market-driving ability will differ for various industries.

P27a: The path between entrepreneurial capital and market-driving ability will differ between pharmaceutical manufacturers and medical device manufacturers.

P27b: The path between entrepreneurial capital and market-driving ability will differ between medical device manufacturers and pharmaceutical distributors/wholesalers.

P27c: The path between entrepreneurial capital and market-driving ability will differ between pharmaceutical manufacturers and pharmaceutical distributors/wholesalers.

P27d: The path between entrepreneurial capital and market-driving ability will differ between pharmaceutical manufacturers and medical schemes.

P27e: The path between entrepreneurial capital and market-driving ability will differ between medical device manufacturers and medical schemes.

P27f: The path between entrepreneurial capital and market-driving ability will differ between pharmaceutical distributors/wholesalers and medical schemes.

P28: The path between strategic orientation and market-driving ability will differ for various industries.

P28a: The path between strategic orientation and market-driving ability will differ between pharmaceutical manufacturers and medical device manufacturers.

P28b: The path between strategic orientation and market-driving ability will differ between medical device manufacturers and pharmaceutical distributors/wholesalers.

P28c: The path between strategic orientation and market-driving ability will differ between pharmaceutical manufacturers and pharmaceutical distributors/wholesalers.

P28d: The path between strategic orientation and market-driving ability will differ between pharmaceutical manufacturers and medical schemes.

P28e: The path between strategic orientation and market-driving ability will differ between medical device manufacturers and medical schemes.

P28f: The path between strategic orientation and market-driving ability will differ between pharmaceutical distributors/wholesalers and medical schemes.

P29: The path between entrepreneurial behaviour and market-driving ability will differ for various industries.

P29a: The path between entrepreneurial behaviour and market-driving ability will differ between pharmaceutical manufacturers and medical device manufacturers.

P29b: The path between entrepreneurial behaviour and market-driving ability will differ between medical device manufacturers and pharmaceutical distributors/wholesalers.

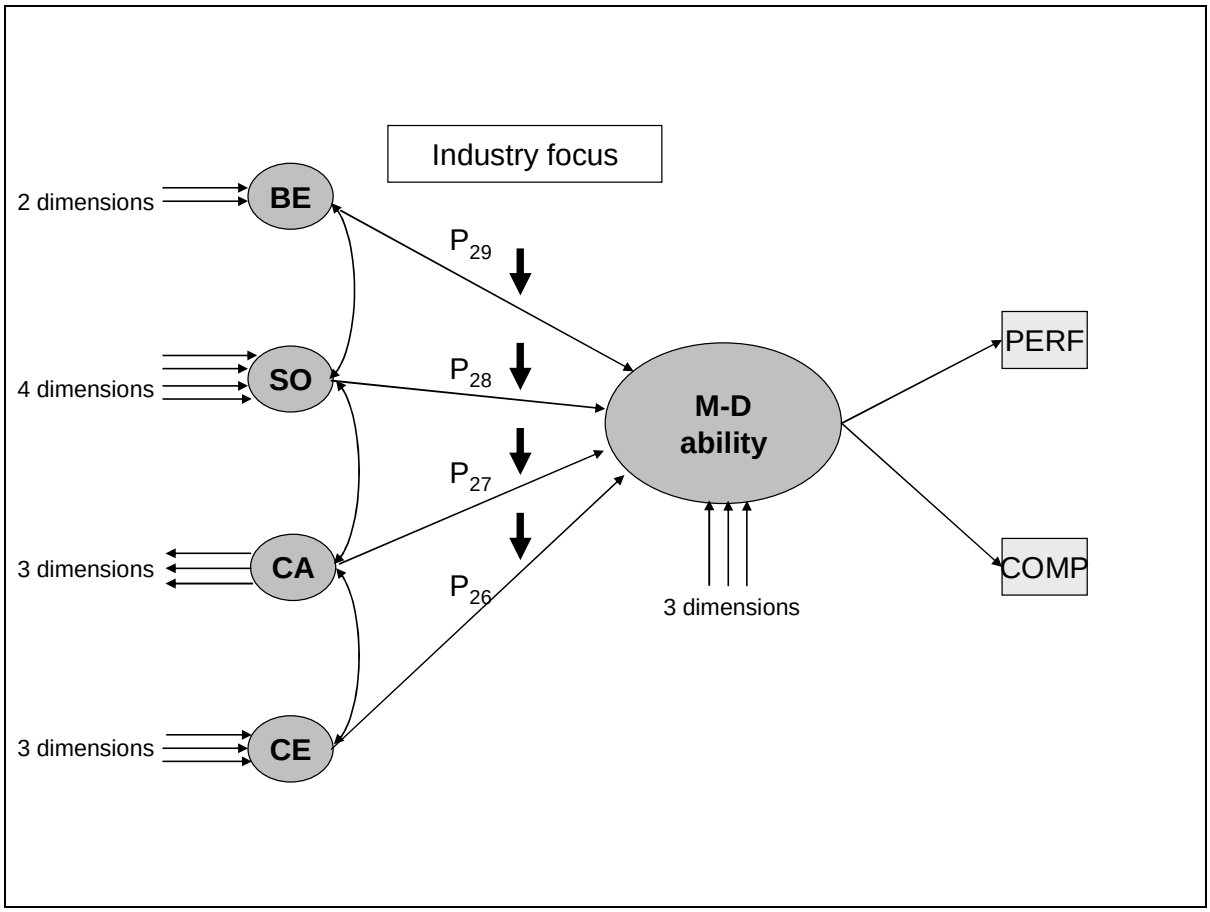
P29c: The path between entrepreneurial behaviour and market-driving ability will differ between pharmaceutical manufacturers and pharmaceutical distributors/wholesalers.

P29d: The path between entrepreneurial behaviour and market-driving ability will differ between pharmaceutical manufacturers and medical schemes.

P29e: The path between entrepreneurial behaviour and market-driving ability will differ between medical device manufacturers and medical schemes.

P29f: The path between entrepreneurial behaviour and market-driving ability will differ between pharmaceutical distributors/wholesalers and medical schemes.

**FIGURE 4.10: Moderating effects model: Industry focus (model 3)**




**Source:** Author's own compilation

## 4.5. CONCLUSION

The chapter provided a literature overview relating to measuring instruments that have been used in past research and are relevant for this study. The instruments' dimensions and their reported reliability and validity measures were presented.

Relevant literature on statistical modelling was also presented. It was explained that the two parts of the model, the measurement model and the structural model, need to be specified in order to achieve complete model specification. The measurement model, which is certainly the more difficult part to specify, can consist of reflective or

formative relationships between a construct and its dimensions and the dimensions with their indicators. The impact of model misspecification was also discussed.

The third part of this chapter addressed the development of a model for market-driving ability in corporate entrepreneurship. In a first step the measurement model for each construct was developed. Measurement model specification followed the guidelines outlined by Rossiter (2002). The constructs of market-driving, corporate entrepreneurial management, strategic orientation, and entrepreneurial behaviour were defined with reflective first-order indicators and formative second-order dimensions. Entrepreneurial capital was defined with reflective first-order indicators and reflective second-order dimensions. Performance and relative competitive advantage were considered to consist of first-order reflective indicators.

In a second step the structural models for this study were specified. The first model represents a direct effects model and considers that the exogenous constructs: corporate entrepreneurial management, entrepreneurial capital, strategic orientation and entrepreneurial behaviour, directly and positively influence market-driving ability. It was also specified that market-driving ability positively influences relative competitive strength and firm performance.

The second model considers the moderating effect of the management level on the structural relationships. The third model considers the moderating effect of industry focus on the relationships between the exogenous latent constructs and market-driving ability.

The chapter concluded with the explicit specification of propositions that derive from the specified path diagrams.