2017 Radboud University

A configurational approach to innovation focused on Small and Medium-sized manufacturing Enterprises in India

Abstract: This article raises the question which configurations of regional institutional voids and firm resources lead to the presence or absence of innovation performance of Small and Medium-sized manufacturing Enterprises in India? For firm resources the following conditions were taken into account: 1) managerial experience; 2) workforce educational level; and 3) knowledge sources. By using fuzzy set Qualitative Comparative Analysis as research technique we found that the presence of a well-educated workforce in combination with the presence of regional institutional voids and the absence of an experienced manager leads to innovativeness. On the other hand, we found that the absence of knowledge sources in combination with the absence of the other conditions (institutional voids, educated workforce and experienced managers) leads to non-innovativeness. The findings especially revealed the importance of well-educated workers in order to become innovative. The results indicated that these conditions, at the same time, do influence the innovativeness of SMEs. Something that is often not appointed in existing literature, but in the meantime something that has a lot of impact on the innovation performance of enterprises in India.

Keywords: India, innovation, regional institutional voids, resource-based view, fs/QCA, SMEs

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Master thesis Business administration
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Nijmegen, 19th of June 2017

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1 Introduction

"There is nothing I fear more than waking up without a program that will help me bring a little happiness to those with no resources, those who are poor, illiterate, and ridden with terminal disease."

~ Nelson Mandela ~

These inspiring, but at the same time heartbreaking words from Nelson Mandela are no exception for most emerging markets. One of the main characteristics of emerging markets are high poverty, and high volatility such as domestic policy instability (Khanna & Palepu, 2010; Mody, 2004). The United Nations (2016) stated in their World Economic Situation and Prospects report, for example, that "one in five people in developing regions still live below the international poverty line of $1.90 a day" (p.26). India is such an emerging market, characterized by a high poverty rate (The World Bank, 2016), and corruption level in state and local governments (Khanna, Palepu, & Sinha, 2005). But, how does this influence SME innovation in India? Innovation is an important driving force of firm performance and corporate growth (Qian & Li, 2003; Franko, 1989; Bradley, McMullen, Artz, & Simiyu, 2012). However, institutional voids such as access to finance, and a lack of firm resources such as low educated and skilled workers are one of the main characteristics that hamper the innovation performance of Small and Medium-sized Enterprises (SMEs), defined as enterprises with fewer than 100 employees, in India (Dutz, 2007). This study tries to explore which combinations of institutional voids and firm resources lead to the presence or absence of SME innovation in India.

1.1 Research problem

India, one of the most populous countries in the world (approximately 1.3 billion inhabitants), still struggles in dealing with their large population characterized by a high poverty rate (Yadav, 2013; The Heritage Foundation, 2017). This has something to do with their economic situation. For example, various authors found a negative relation, ceteris paribus, between economic growth and poverty (Kanbur, 2004; Bourguignon, 2004; United Nations, 2016). But, what drives the overall economy in India? According to different authors, innovation is one of the key drivers for firm performance, and therefore an important indicator for the growth of emerging economies (Qian & Li, 2003; Franko, 1989; Bradley, McMullen, Artz, & Simiyu, 2012). Nonetheless, companies in emerging markets often face difficulties, and challenges in improving their innovation performance where their innovation capabilities still lack (Cook & Memedovic, 2003; Awate, Larsen, & Mudambi, 2012; Bradley, McMullen, Artz, & Simiyu, 2012). This study focuses on product innovation, as it is mainly linked to firm performance and long-term survival of small and large firms (Banbury & Mitchell, 1995). Product innovation is defined as the introduction of a new or significantly improved product or service (e.g. adjustments in its functional characteristics) to the consumer (Manual, 2005).

In economic sense many authors of publications about emerging markets agree: one of the main economic characteristics of these countries are the shortcomings of essential resources supporting economic activities, like an inadequate infrastructure, poor educated inhabitants, inefficient government system, uncertain regulatory environment, low developed capital markets, and there are a lot more essential shortcomings which hamper innovative activities (Dutz, 2007), since it is costly to deal with these so called institutional voids. These voids can be divided into shortcomings related to product, labor, and capital markets (Fisman & Khanna, 2004; Khanna & Palepu, 2010; Khanna, Palepu, & Sinha, 2005; Luo & Tung, 2007; Mody, 2004; United Nations, 2016). SMEs in India also face these problems, for example acces to finance is a major obstacle while this is an important indicator of innovation performance (Dutz, 2007). Moreover, these firms in India heavily struggle with voids, such as a poor infrastructure, corruption, and high transaction costs (Khanna & Palepu, 2010; Khanna, Palepu, & Sinha, 2005; Yadav, 2013; Dutz, 2007). In addition, these SMEs face an extreme scarcity of firm resources such as a lack of capital, and a deficiency of educated and skilled workers (Dutz, 2007; Sikka, 1999; Kumar & Subrahmanya, 2010). Institutional voids, and a lack of firm resources accordingly hamper the innovation performance of SMEs in India, and subsequently their corporate growth (Dutz, 2007). While SMEs have a significant contribution to the overall economic value, there is little understanding of the combination of indicators that hamper or promote SME innovation (Ayyagari, Demirgüç-Kunt, & Maksimovic, 2011; Dutz, 2007; Stephan, Uhlaner, & Stride, 2015). This makes it even more challenging to stimulate their innovation performance (Yadav, 2013; Dutz, 2007).

1.2 Research objective

As mentioned earlier, innovation performance is an important aspect for firms (Bradley, McMullen, Artz, & Simiyu, 2012; Franko, 1989; Qian & Li, 2003). If we are able to find the most appropriate combination(s) of circumstances, regarding institutional voids and firm resources, under which SME innovation performance is present, we are able to give recommendations to stimulate the innovation performance of SMEs in India (Bradley, McMullen, Artz, & Simiyu, 2012; Pinho, 2008).

SMEs in India collectively have a significant impact on the economic situation in that, among others, they create many jobs (recent numbers state: more than 80 million) and accordingly contribute to the socio-economic development, such as national wealth and GDP of rural and backward areas (Mahemba & Bruijn, 2003; Bell, 2015; Robson, Haugh, & Obeng, 2009; SME Chamber of India, n.d.; Nikaidoa, Pais, & Sarma, 2015). This is especially true for labor intensive sectors, such as agriculture and manufacturing (Loayza & Raddatz, 2006). The SME sector in India contributes for approximately 45% to the manufacturing production, and therefore has a large input in this field (Nikaidoa, Pais, & Sarma, in Ministery of MSME, 2015). However, like in developed economies, especially SMEs in emerging markets face difficulties through an increase in foreign competition “due to the accelerated

process of globalization" (Kumar & Subrahmanya, 2010, p.558; SME Chamber of India, n.d.) which forces them to innovate in order to survive (Lin, 1998; Ayyagari, Demirgüç-Kunt, & Maksimovic, 2011; Kumar & Subrahmanya, 2010; SME Chamber of India, n.d.). While SME innovation is very important, there is little understanding about the combined effects of institutional voids and firm resources to their innovation performance (Ayyagari, Demirgüç-Kunt, & Maksimovic, 2011; Stephan, Uhlaner, & Stride, 2015; Nair, Guldiken, Fainshmidt, & Pezeshkan, 2015). In reality companies have to deal with both factors at the same time (Mercer Delta, 2004). Therefore it would be viable to see what combinations lead to the presence or absence of innovation, which can help SMEs to anticipate and make decisions in various situations in order to be innovative. "In essence, a configurational approach suggests that organizations are best understood as clusters of interconnected structures and practices, rather than as modular or loosely coupled entities whose components can be understood in isolation" (Fiss, 2007, p. 1180). For this reason we used a configurational approach, to study the combinations of institutional voids and firm resources leading to the presence or absence of SME innovation.

The objective of this research is:

i. This study explores which configurations of regional institutional voids and firm resources, leads to the presence or absence of innovation of SMEs in India.

The research question that we answer in this study is:

Which configurations of regional institutional voids and firm resources lead to the presence or absence of innovation performance of Small and Medium-sized manufacturing Enterprises in India?

1.3 Theoretical, and managerial significance

Seeing that innovative practices of SMEs have a huge impact on their firm performance it is interesting to identify what factors lead to innovation of these enterprises. This is something, various researches tried to explore. Barasa et al. (2017), for example, found an interaction effect between firm-level resources and regional institutional quality on the innovation performance of companies in East Africa. Also other studies identified factors associated with innovation performance, such as regional-specific characteristics, networks, and trust (Murphy, 2002; Rondé & Hussler, 2005). However, according to Robson, Haugh, and Obeng (2009) most of the studies about innovation in emerging markets are not comprehensive. Most studies regarding innovation are focused on developed economies (Oyelaran-Oyeyinka, Laditan, & Esubiyi, 1996; Ayyagari, Demirgüç-Kunt, & Maksimovic, 2011). Besides, the studies about innovation in emerging markets were mostly concentrated on large firms, and often neglected innovative practices of smaller firms (Ayyagari, Demirgüç-Kunt, & Maksimovic, 2011). In this sense more research in this field is necessary, and therefore this study is of theoretical importance as it focuses on different factors affecting SME innovation in India (Ayyagari, Demirgüç-Kunt, & Maksimovic, 2011; McAdam, Reid, & Shevlin, 2014).

This research contributes to the literature of institutional theory (in particular institutional voids), and resource-based view, by integrating variables of the two perspectives. Most researchers applying to the institutional theory focused on the differences in cultural characteristics in the institutional environments, and therefore neglected other important institutional factors (Bruton, Ahlstrom, & Obloj, 2008), while Peng (2002) highlighted the importance of institutional influences on business strategies. Nonetheless, recent studies such as Barasa et al. (2017) did consider different institutional factors in relation to innovation, but these studies let the issue of institutional voids omitted. They mainly focused on governmental related institutions but did not elaborate, for example, on ways in which voids in product, labor, and capital markets impact innovation. Mair, and Marti (2009) describe institutional voids as "situations where institutional arrangements that support markets are absent, weak, or fail to accomplish the role expected of them" (p. 422). Studies which did elaborate on these institutional voids focused particularly on the problems these voids created for firms, while less is said about the effects of it (McCarthy & Puffer, 2016).

Besides, more research regarding the resource-based view is desirable (Hoskisson, Eden, Lau, & Wright, 2000); there is still a lack of attention in the resource-based view literature to different contextual aspects (Garridoa, Gomez, Maicas, & Orcos, 2014), while the institutional environment is extremely influential to the competitive advantage of a firm (Gao, Murray, Kotabe, & Lu, 2010). It is the combination between the institutional environment, and the resource-based view that can add its value (Peng, Sun, Pinkham, & Chen, 2009; Gao, Murray, Kotabe, & Lu, 2010). Yet, further research is needed to see which macro environmental structures (institutional theory), and micro processes (resource-based view) leads to innovation (Nair, Guldiken, Fainshmidt, & Pezeshkan, 2015; Stephan, Uhlaner, & Stride, 2015). Together, both views are connected elements and important indicators for a firm's innovation performance, as Castellacci (2015) highlighted. However, they also stated more research is necessary to provide further evidence for the interconnectedness between the two and their combined influence to innovation. Therefore it is important to consider various variables of these views in combination, this is where our research mainly adds its value.

As demonstrated, the two previous mentioned theories are important indicators for the innovation performance of a firm. According to Cook, and Memedovic (2003) companies are more successful regarding their competitive advantage if they benefit from specific environmental advantages. It is interesting to see whether this also applies to the innovation performance of SMEs in different regions. Yet, to the best of our knowledge, none of the empirical literature studied the differences in regional characteristics regarding institutional voids combined with variables of the resource-based view leading to the presence or absence of SME (product) innovation in India. We expect there are significant differences in regions (Barasa et al. 2017), for example in institutional voids such as poor

infrastructure or access to finance. Therefore we focus on the regional institutional voids to see if this causes differences in the innovation performance of SMEs.

Institutional voids and/or firm level resources both influence the innovativeness of SMEs (Sleuwaegen & Goedhuys, 2002; Murphy, 2002; Castellacci, 2015). For managers of SMEs in developing countries this study therefore is valuable, since this would give the opportunity to see what factors in the configuration, of institutional voids and firm resources, are sufficient and/or necessary to be or become innovative. This gives explanation why certain companies have a better or worse innovative performance, in comparison to others. At the same time, this can help them by making strategic decisions in favor of their innovativeness. For example, when they see which combinations of institutional voids or firm resources stimulate innovative performance, they can adapt on these factors while avoiding the factors with an adverse effect.

1.4 Research structure

The thesis is structured as follows. Section 2 outlines the theoretical framework, which discusses the theories and their underlying dimensions used in this research. Next, the methodology of the study is drafted in section 3 and includes, among others, the measurement level of the variables to measure the constructs. Subsequently, a presentation of the analysis and results follows in section 4. The paper concludes with a discussion and conclusion of the results, and with some practical implications and recommendations in section 5.

2 Theoretical framework

2.1 Introduction

Previous studies outlined the importance of firm resources and the institutional environment (in particular institutional voids), and its influence on the innovation performance of SMEs (Dutz, 2007; Castellacci, 2015; Barasa et al., 2017). This section outlines the theoretical background and the relevant findings of preceding studies regarding these theories and its influence to the innovation performance of SMEs. This chapter is structured as follows; we start by outlining our integrative framework where the variables regarding institutional voids and resource-based view are combined. Next, we delineate more broadly on the theoretical background of institutional voids and the resource-based view, and their link to innovation. We conclude with our propositions.

2.2 Theories

Institutional voids and a lack of firm resources both hamper SME innovation in India (Dutz, 2007). While SMEs have a significant contribution to the overall economic value, there is little understanding of the indicators (in particular about the configuration between institutional voids and firm resources) that hamper or promote SME innovation (Ayyagari, Demirgüç-Kunt, & Maksimovic, 2011; Dutz, 2007; Stephan, Uhlaner, & Stride, 2015). In this research we focus towards the configuration of different variables of two theories in relation to SME innovation, namely: the institutional theory (in particular institutional voids), and the resource-based view. Before we briefly review these two theories, we made a case for an integrative framework.

2.2.1 An integrative framework

Both scholars of the institutional theory and resource-based view seek to explain factors influencing the innovation performance of a firm. For instance, in the institutional literature, Lu, Tsang, and Peng (2008) outlined that the quality of a country's institutional system is related to the innovation performance of firms. In the resource-based view literature, for example, Goedhuys, Janz, and Mohnen (2014) indicated that the availability and quality of firm resources are related to a firm's innovation performance. These researches mainly studied the factors of both theories separately in relation to innovation. However, in reality firms need to deal with both situations at the same time (Mercer Delta, 2004). We would therefore gain a more reliable impression if we look to the complete picture of both theories in relation to the innovativeness of SMEs. So, it is interesting to see what combinations of conditions regarding institutional voids and firm resources lead or do not lead to innovation of SMEs in India (Peng, Sun, Pinkham, & Chen, 2009; Gao, Murray, Kotabe, & Lu, 2010). According to different authors there is too little known about this combination, and therefore more research is needed (Nair, Guldiken, Fainshmidt, & Pezeshkan, 2015; Stephan, Uhlaner, & Stride, 2015). Few studies tried to analyze this issue or concluded, perhaps without being aware of it, something related to this topic. For

example, Sleuwaegen, and Goedhuys (2002) said in their study concerning growth of firms in developing countries; “In developing economies where both product and input markets are characterized by severe imperfections, firms compete heavily for inputs (i.e. resources). Restricted access to a wide range of resources is typically experienced by managers and owners of firms as an important growth constraining factor. The lack of credit, management and skilled labor, the lack of access to industrial sites with suitable infrastructure facilities, regulatory constraints, the various kinds of taxes, price regimes, the lack of materials and spare parts are frequently mentioned to be among the growth hampering factors” (p.120). In this statement they particularly stress the obstruction of institutional voids, however they also emphasize the importance and interrelationship between the institutional environment with its voids, and the accessibility of firm resources. This could indicate that firms located in environments with high voids possess less resource capital and therefore experience lower innovation performance than firms located in more developed areas, something that is confirmed by other researchers (Mercer Delta, 2004; Mahemba & Bruijn, 2003). Also Keizer, Dijkstra, & Halman (2002), and Castellacci (2015) showed the importance of firm resources, as networks and R&D budget, in combination with the institutional environment, as governmental support, on SME innovation. Lu, Tsang, and Peng (2008) also showed the complementarities of firm resources and institutions, as they indicated that knowledge is a primary resource in dealing with a countries institutional system. Besides, some authors showed that well-established firm networks may reduce the negative influences of institutional voids since these firms, for example, are less dependent on inefficient governmental institutions to access financial or human capital (Fisman & Khanna, 2004; Castellacci, 2015; Wang & Cuervo-Cazurra, 2017). This may indicate that some firm resources may reduce the impact of institutional voids in favor of their innovativeness.

A configuration approach is appropriate to obtain a more comprehensive understanding of organizations, since it highlights different interconnected practices which may affect the organization as a whole, instead of looking to the components in isolation. Therefore it gives a more complete picture of organizations (Fiss, 2007). This demonstrates the importance of a theoretical configuration, however, to the best of our knowledge, none of the existing researches studied the configuration of variables regarding regional institutional voids and firm resources and its influence to the innovativeness of SMEs in an emerging market. The institutional and resource-based view literature have, mainly, been evolved independently from each other by examining its relation to innovation (Goedhuys, Janz, & Mohneny, 2014; Lu, Tsang, & Peng, 2008). Therefore, too little information is available to make well-grounded propositions of the most appropriate combinations of the variables (of the two theories) leading to SME innovation. Below, we therefore reviewed these two theories separately to explain more broadly what (variables) we are combining, in our integrative framework,

and how it may influence the innovativeness of SMEs. Based on this information we formulated the propositions for this integrative framework.

2.2.2 Regional institutional voids and innovativeness

Institutions can be defined as "rules of the game in a society" (North, 1990, p. 3). It is a very broad concept and can include formal (such as rules and regulations), and informal constraints (such as norms and values). When well organized institutions structure political, social, or economic exchange (North, 1990). In emerging markets, however, these institutions commonly fall short, and cause operating challenges and increase transaction costs (Khanna & Palepu, 2010). Because of these common shortcomings in emerging markets we focus our study on the effects of the so called institutional voids. Mair, and Marti (2009) describe institutional voids as "situations where institutional arrangements that support markets are absent, weak, or fail to accomplish the role expected of them" (p. 422). Besides, Khanna, and Palepu (2010) define institutional voids as "the lacunae created by the absence of (…..) market intermediaries" (p. 14). In short, both statements appoint the market imperfections of an institutional context in a specific country (Khanna & Palepu, 2000). An emerging market such as India has a variety of market failures such as a lack of information, poor infrastructure, corruption, inadequatly financial market, and high transaction costs (Khanna & Palepu, 2010; Khanna, Palepu, 2000; Khanna, Palepu, & Sinha, 2005; Yadav, 2013; Dutz, 2007). Various authors, sometimes without referring specific to institutional voids, admitted the adverse effects on market efficiency and development these voids cause (Mair & Marti, 2009; Khanna & Palepu, 2010; Khanna & Palepu, 2000). These market shortcommings make it costly for firms, especially for SMEs that already face difficulties through a lack of resources such as little investment capital (Williams, 2014; Luo & Tung, 2007), to collect important resources as technological, human, and physical capital (Khanna & Palepu, 2000).

India is known for its large disparity and diversity in states concerning, for example, labor regulation, access to finance, corruption, infrastructure, and quality of electricity provision. Regarding this inequality, lower income states (that are less developed) have much more incidents than higher incomes states, and therefore business growth is much higher in the more developed areas in comparison to the less developed areas. This is, among others, one of the reasons for the variety in industrial growth between states in India (World Bank Group, 2014; Honorati & Menistae, 2007; Das, 2010). According to Nair, Guldiken, Fainshmidt, and Pezeshkan (2015) this also may explain the differences in innovation outcomes across the states in India. However, they also appointed there are still few studies that explored regional differences regarding innovativeness in India. Hence, location matters to innovation; firms located in environments with high voids possess less resource capital and therefore experience lower innovation performance than firms located in more developed areas (Mercer Delta, 2004; Mahemba & Bruijn, 2003). The degree and effectiveness of innovation depends

on, and is established through the interaction of a SME and its external environment (Nadler & Tushman, in Mahemba & Bruijn, 2003; Mercer Delta, 2004). Thus, the location of small firms is an important factor associated with the ability to innovate (Mahemba & Bruijn, 2003; North & Smallbone, 2000). We therefore focus on the regional institutional voids in this study. Like Khanna & Palepu (2010) we divided institutional voids into shortcomings related to product, labor and capital markets, and to the macro context (regulatory environment).

Product market: The product market is the market where seller and buyer find each other and do business. Voids in product markets consists of deficiencies in soft- and hard infrastructure (Khanna & Palepu, 2010; Khanna, Palepu, & Sinha, 2005). *Hard infrastructure* includes all physical roads and bridges but also telecommunications and electrification. S*oft infrastructure* consists of business facilitators such as suppliers, consultants, research companies, and storage facilities (Khanna & Palepu, 2010; Khanna, Palepu, & Sinha, 2005; Wanmali, 1992; Singh, & Kathuria 2016). Previous studies showed both forms of infrastructure are essential to achieve long-term economic gains, and when well organized it stimulates innovation, business growth, and subsequently economic development (Wanmali, 1992; Singh & Kathuria, 2016; Chittoor, Aulakh, & Ray, 2015). For example, Brooks (2016) suggest that a good organized infrastructure, that stimulate "the flow of goods and services, as well as factors of production, can increase the benefits from connectivity" (p.176). These benefits exist according to his research of information, and knowledge spillovers that encourage innovation (Brooks, 2016). However, India is known for its poorly developed hard and soft infrastructure, and according to Contractor, Kumar, and Dhanaraj (2015) it is one of the bottlenecks for economic growth (Khanna, Palepu, & Sinha, 2005). But, this may vary across states. Various studies in India showed, for example, that SMEs located in urban or accessible rural areas are more innovative than SMEs located in remote rural areas, as these areas have, among others, a less developed infrastructure (Das K. , 2010; Nair, Guldiken, Fainshmidt, & Pezeshkan, 2015).

Singh & Kathuria (2016) indicated that transportation, electrification, and telecommunication are important attributes of a countries hard infrastructure. Hence, the availability and quality of these attributes represent the components of the hard infrastructure. Besides, the soft infrastructure consists of business facilitators (Wanmali, 1992). Therefore this study is focused on soft attributes as access to inputs and suppliers, access to production technology, and availability of storage facilities.

Labor market: The labor market consists of the demand (employees) and supply (employers) of labor (The Economic Times, n.d.). Often companies in emerging markets face problems with recruiting well educated and skilled workers because it is scarce and costly (Khanna, Palepu, & Sinha, 2005; Fisman & Khanna, 2004). This has several reasons; lack of recruiters or agencies, unfamiliarity with quality of education institutes, inability for people to study, and/or low quality of the education system

(Khanna & Palepu, 2010; Khanna, Palepu, & Sinha, 2005; Mihai, Ţiţan, & Manea, 2015). For instance, children in low-income countries often do not have the opportunity to study since their families cannot afford it (Mihai, Ţiţan, & Manea, 2015). The lack of high-quality human capital is a huge problem, as various studies demonstrated its direct relation with firm productivity, innovation performance, and economic development (Barasa, et al. 2017; Blundell, Dearden, Meghir, & Sianesi, 1999; Schündeln & Playforth, 2014; Robson, Haugh, & Obeng, 2009). Blundell, Dearden, Meghir, and Sianesi (1999), for example, compared several studies and saw these studies all indicated a positive connection between labor knowledge and skills, and firm innovation and productivity. Besides, Schündeln and Playforth (2014) who studied the influence of education on economic growth in India argued this relation, ceteris paribus, also exists. More specifically to SMEs, empirical studies indicated that SMEs in low-income countries often are confronted with a lack of management and technical skills because, among others, they are regularly family based. These drawbacks consequently impact their financial, and innovation performance (Hughes, O'Regan, & Sims, 2009; McAdam, Reid, & Shevlin, 2014). The average level of education scattered across the population in India is still low, despite the significant educational growth of the past few years. This makes it is very difficult for companies to attract educated workers, and has serious consequences for the economic development (Schündeln & Playforth, 2014). But also this may differ across regions in India, where rural areas commonly have a less developed education system compared to urban areas (Das, 2010; Nair, Guldiken, Fainshmidt, & Pezeshkan, 2015).

This research is focused on the accessibility of an adequately educated workforce in the labor market, since previous studies indicated the degree of education is related to a firm's innovation performance (Schündeln & Playforth, 2014; Robson, Haugh, & Obeng, 2009).

Capital market: The capital market is the market where buyers and sellers meet for financial reasons. It allows companies, for example, to access capital from external parties for investments (The Economic Times, n.d.; Khanna & Palepu, 2010). The capital markets in emerging economies is from a buyer's perspective known for its lack of sophistication, lack of information about intermediaries, and lack of reliable intermediaries such as investment banks or venture capital firms (Khanna, Palepu, & Sinha, 2005; Khanna & Palepu, 2010; Fisman & Khanna, 2004). On the other (seller) side, investors are often not stimulated to invest or mobilize capital for certain firms due to weak investor protection laws, and lack of reliable firm information (Farooq, et al., 2016; Khanna, Palepu, & Sinha, 2005). Therefore it can be very hard for firms in these countries to access capital (Fisman & Khanna, 2004). Especially for SMEs that already face difficulties in order to gain access to external finance, for example, as Whited (1992) indicated "that firm size is an important factor in determinning access to financial markets" (p.1441). Also Nikaido, Pais, and Sarma (2015) who studied the barriers of SMEs in India confirmed firm size matters in accessing external credit; generally small enterprises face constraints in

approaching capital. This in turn creates difficulties for these companies to invest or innovate (Whited, 1992; Hyytinen & Toivanen, 2005). For instance, Hyytinen and Toivanen (2005) found evidence that capital market imperfections, which hamper organizations to access external finance, obstruct innovation and growth. In India the financial institutes are mainly established in large urban cities. This makes it for firms nearly located to these cities possible to access capital. However, for firms located outside these urban areas it is very challenging to access financial support as the infrastructure is very poorly organized (Fisman & Khanna, 2004; Khanna, Palepu, & Sinha, 2005). In India, especially the low availability and high costs (due to higher credit charges) of external capital are major obstacles for SMEs (Ministery of Finance, in Nikaidoa, Pais, & Sarma, 2015). Das (2010), noticed that especially firms in rural areas and small towns face extreme difficulties in accessing credit.

In this research the accesibility to finance represents the component of the capital market, since previous studies showed its relation to a firm's innovation performance (Hyytinen & Toivanen, 2005).

Regulatory environment: Khanna & Palepu (2010) refer in their book about, among others, insitutional voids to the Macro context which, for example, may consist of shortcommings in the regulatory system. The regulatory environment in emerging markets is often known for the absence of regulatory institutions, high corruption, and a weak and unreliable rule of law. This affects business activities such as innovation (Khanna, Palepu, & Sinha, 2005; Fisman & Khanna, 2004; Barasa et al., 2017; Goedhuys, Mohnen, & Taha, 2016). Barasa et al. (2017) studied, for example, the influence of regional institutional quality on the innovation performance of firms in developing countries. They indicated that a higher regional institutional quality leads to a better innovation performance. Accoring to them, a well organized regulatory environment consists of a "low corruption level, a strong rule of law, and a high degree of regulatory quality within a region" (Barasa, et al., 2017, p. 281). Subsequently this helps to reduce uncertainty of companies (Peng, 2002). Besides, Goedhuys, Mohnen & Taha (2016) argued that corruption and other institutional obstacles directly hinder innovation in firms, due to lower trust in the market and higher transaction costs, which subsequently decreases investments in innovative practices. India is also known for its corruption level, and unfriendly regulatory system that increases uncertainty and transaction costs. Besides, the regulatory climate in India widely differs across states (Singh, 2008; Khanna, Palepu, & Sinha, 2005; Khanna & Palepu, 2004).

As mentioned before, Barasa et al. (2017) showed the importance of a low corruption level, a strong rule of law, and a high degree of regulatory quality in the institutional environment. This research, therefore, focuses on these three variables that together represent the regulatory environment.

Conclusion: Institutional voids related to product, labor, and capital markets, and regulatory environment are important indicators of the innovation performance of SMEs. Castellacci (2015) confirms this in his study about institutional voids and its impact on the innovation activities of firms.

He indicated, inter alia, that the innovativeness of firms is likely to develop when market institutions become more adequate. We therefore use these variables as condition in our configurational approach.

2.2.3 Resource-based view and innovativeness

In 1991 Barney designed a theoretical model which explains the competitive advantage of firm resources. This so called resource-based view explains firm resources should have four attributes - they should be valuable, rare, imperfectly imitable, and non-substitutable - to have a competitive advantage (Barney, 1991). Many firm resources can be included in a study, as these resources could be classified "into three categories; (1) physical capital resources (Williamson, as cited in Barney, 1991), (2) human capital resources (Becker, as cited in Barney, 1991), and (3) organizational capital resources (Tomer, as cited in Barney, 1991)". In recent years various studies tested elements of this model in different contexts, including emerging markets (Goedhuys, Janz, & Mohneny, 2014; Barasa et al., 2017).

Especially for SMEs, resources can be challenging to obtain and therefore they often have to deal with resource constraints, and subsequently are less innovative in comparison to the large, resource-endowned enterprises (Knight & Cavusgil, 2004; Robson, Haugh, & Obeng, 2009). SMEs often cannot afford it to own valuable resources themselves due to a lack of capital. Instead of owning the resources they heavily depend on networks with various stakeholders, named as inter-organizational resource capital (sometimes also called social capital). These knowledge sources can have high economic value as they share, for example, multiple value chain activities and facilities such as production facilities and technological development (Oviatt & McDougall, 1994; Hausman, 2005). In this way, SMEs are still able to have access to those resources that are needed, without owning it (Das & Teng, 2000; Vermeulen & Hütte, 2014). However, human capital is needed and supports the ability to absorb knowledge, for example arising out of knowledge sources, to use it within the organization (Smith, Collins, & Clark, 2005; Uden, Knoben, & Vermeulen, 2014). Therefore, inter-organizational capital and human capital interact with each other; inter-organizational capital helps to share and acquire knowledge (it sets the context) while human capital absorb the knowledge (Swart, 2006). Besides, various researches demonstrated the importance of both resources for a firm's innovation performance (Barasa et al., 2017; Murphy, 2002; Hoskisson, Eden, Lau, & Wright, 2000; Peng & Luo, 2000). Since human capital resources – such as educated workers and experienced managers – and inter-organizational capital resources – various knowledge sources – are very important for SMEs, this study specifically focuses on these two types of resources.

Human capital resources: According to Barney (1991) human capital consists of the skills, intelligence, and experience of individual workers and managers. In this research we define human resources like Wright, McMahan, and McWilliams (1994) did; as the group of human capital, directly

linked to employment, under a firm's supervision. This consists of the knowledge, skills, and abilities the workers have (Wright, McMahan, & McWilliams, 1994). Romer (1990) subdivided human capital additionally in educational level, and experience. Besides, he and others indicated a positive relation between the availability of human capital and a countries economic performance, and this can partly explain the low economic growth and innovativeness in underdeveloped areas (Romer, 1990; Robson, Haugh, & Obeng, 2009). Other studies outlined the positive effects of educational level, and experience on the innovation performance of firms in developed and developing countries (Robson, Haugh, & Obeng, 2009; Romijn & Albaladejo, 2002; Mahemba & Bruijn, 2003; Hausman, 2005). Robson et al. (2009) for example showed that workers in Africa with higher levels of education are more likely to bring innovative ideas. Besides, Hausman (2005) who studied the indicators of innovativeness among small businesses showed the importance of education and experience of the individual employees and managers in a firm. According to him this has something to do with their skills and with their ability to learn. However, the average level of education scattered across the population in India is still low, despite the significant educational growth of the past few years. This makes it is very difficult for companies to attract educated workers, and has serious consequences for their economic development (Schündeln & Playforth, 2014). In general, SMEs commenly lack human capital (Hausman, 2005), in India this is extreme due to scarcity of human capital resources such as insufficient skilled manpower, and a deficiency of educated and trained managers and workers (Dutz, 2007; Sikka, 1999; Kumar & Subrahmanya, 2010; SME Chamber of India, n.d.).

As mentioned before, Romer (1990) indicated the importance of formal education, and experience as components of human capital. Therefore this study focuses on the managerial experience, and workforce educational level which together illustrates the human capital resources of a firm.

Inter-organizational capital resources: Barney (1991) explained organizational capital resources as the organizational structure, planning and controlling systems and the relations and networks with other firms in the environment. This research focuses on the usage of such knowledge sources for innovative activities undertaken by the SME. For SMEs a network of well-maintained connections is very important as they generally have a deficiency of physical resources like a shortage of working capital, technological obsolescence, and an unskilled workforce (Hoskisson, Eden, Lau, & Wright, 2000; Hitt, Dacin, Levitas, Arregle, & Borza, 2000; SME Chamber of India, n.d.). Many studies about networks subdivided it in established business relations with buyers, competitors, suppliers, or institutional actors such as the government (Romijn & Albaladejo, 2002; Peng & Luo, 2000; Danso, Adomako, Damoah, & Uddin, 2016). Various authors indicated the importance of such networks as it provides valuable information, knowledge, and social capital in favor of innovativeness (Hausman, 2005; Robson, Haugh, & Obeng, 2009; Murphy, 2002; Romijn & Albaladejo, 2002). However, there are much

more sources that may generate valuable new information to undertake new innovative activities, such as the internet, consultancy firms, professional journals etc. (Uden, Knoben, & Vermeulen, 2014). Several other authors aligned themselves with this statement by showing that external sources positively influence innovation as it provides the organization with new knowledge and information (Chang, Chang, Chi, Chen, & Deng, 2012; Nieto & Santamaría, 2007; Leiponen & Helfat, 2011). In this regard, each firm (innovative or not) could have a network but especially the information exchange (usage of knowledge sources) in a network is essential to innovation (Murphy, 2002; Putnam, Leonardi, & Nonetti, 1993; Woolcock, 1998). For example, Neito and Santamaría (2007) pointed out that various sources stimulate innovation by receiving mixed and diversified knowledge and information. Some researchers noticed differences in innovativeness between small, and large densely populated towns or regions due to larger networks of companies located in large cities that therefore take advantage of a diverse set of knowledge and information exchange (Robson, Haugh, & Obeng, 2009; Dickson et al., in Robson, Haugh, & Obeng, 2009; Meijers, Burger, & Hoogerbrugge, 2016). Besides, according to Uden, Knoben & Vermeulen (2016), and Laursen & Salter (2006) the sources of information (called *search breadth* in their studies) can make a network valuable and may positively influence the innovativeness of a firm. In this regards, a broader knowledge base existing of various external knowledge sources, may positively affect the innovativeness of a firm.

However, in their research Uden, Knoven, and Vermeulen (2016) also found situations in which these sources could negatively influence the innovativeness of a firm. For example, they noticed that in regions where knowledge is difficult to obtain, firms are more innovative when they have a low search breadth. Because, in these regions, networks have more costs than benefits. Also other authors hesitate about the influence of knowledge sources such as networks on innovation. They stated networks can have different downsides. Especially for small firms which may suffer from small sized networks with little variety in the acquired information (Hausman, 2005; Murphy, 2002). Other downsides of networks are the inertia of change caused by the parties involved, and the lack of trust which causes the withholding of important information (Hoskisson, Eden, Lau, & Wright, 2000; Murphy, 2002).

As mentioned before many studies about networks subdivided it in established business relations with various actors (Romijn & Albaladejo, 2002; Peng & Luo, 2000; Danso, Adomako, Damoah, & Uddin, 2016). Networks or other sources are especially valuable when the firm is able to use the information provided by them for innovative practices (Uden, Knoben, & Vermeulen, 2016). Therefore this research focuses on various knowledge sources that provide this valuable information. Together it illustrates the inter-organizational capital resources of a firm.

Conclusion: SMEs often cannot afford it to own valuable resources themselves due to a lack of capital (Hausman, 2005). Therefore, Inter-organizational capital and human capital are important for SMEs; inter-organizational capital helps to share and acquire knowledge, while human capital helps to absorb the knowledge needed to be innovative (Swart, 2006). These resources related to human, and inter-organizational capital all have something to do with the innovativeness of SMEs (Barasa et al., 2017; Murphy, 2002; Hoskisson, Eden, Lau, & Wright, 2000; Peng & Luo, 2000). We therefore use these resources as conditions in our configurational approach.

2.3 Propositions

Previous mentioned studies showed the importance and influences of both theories regarding the innovativeness of SMEs. Hence, institutional voids and firm resources are both able to promote or hamper innovation (Castellacci, 2015; Peng & Luo, 2000). In this research we explore what configurations of the different variables of these two theories lead to the presence or absence of SME innovation in India. In general we saw, in the previous mentioned literature, that the absence of institutional voids, and the presence of firm resources positively influence the innovativeness of a firm, and vice versa. From a comprehensive view, we therefore expect:

1. *The absence of regional institutional voids in combination with the presence of resource capital is associated with the presence of SME innovation in India.*
2. *The presence of regional institutional voids in combination with the absence of resource capital is associated with the absence of SME innovation in India.*
3. *The presence of regional institutional voids in combination with the presence of resource capital is associated with the presence of SME innovation in India.*

3 Methodology

This section outlines the design of the research consisting of; the research approach, case selection, data collection, operationalization of the variables, analysis of the data, and test of robustness.

3.1 Research approach

"If there are good reasons to believe that the phenomenon of interest is best understood in terms of set relations, then this represents a strong argument for the use of set-theoretic methods such as QCA" (Schneider & Wagemann, 2012, p. 12). As showed in chapter 2, this research aims to analyze the most appropriate combinations of regional institutional voids and firm resources that promote or hamper SME innovation in India. For this reason a configuration approach, sometimes called a set-theoretic approach, is useful as it is able to analyze the interconnections and combinations of theoretical variables that jointly lead to an outcome (Fiss, Marx, & Cambre, 2013). The notion of the configuration approach is: "The whole is best understood from a systemic perspective and should be viewed as a constellation of interconnected elements" (Fiss, Marx, & Cambre, 2013, p. 2). So, the approach assumes and tests interactions between the variables in the form of positive or negative complementarities resulting in the presence or absence of an outcome (Fiss, Marx, & Cambre, 2013). Thereby it is able to present all possible combinations across these variables that may lead either to the presence or absence of an outcome. These outcomes are showed seperatly, making it possible to see what combinations are productive or rather counterproductive. Besides, this approach could be used to show various paths that may lead to the same outcome (Fiss, Marx, & Cambre, 2013; Schneider & Wagemann, 2012). In the end, this approach is able to give us a closer understanding and a more complete picture of the interconnected variables leading to innovativeness of SMEs in India.

Qualitative Comparative Analysis (QCA), is a configurational method that can be used for analyzing configurations (Fiss, Marx, & Cambre, 2013). "This analysis consists of finding (combinations of) conditions that are subsets or supersets of the outcome and thus to arrive at sufficient and necessary conditions" (Schneider & Wagemann, 2012, p. 11). A *sufficient* condition, in this regard, is a condition that is exclusively present in cases with the same outcomes. So, "there should not be a single case that shows the condition but not the outcome" (Schneider & Wagemann, 2012, p. 57). If this is true the case is a subset of the whole, since they share something in common. However, in this situation the same outcome may be achieved by other combined variables and therefore it is not a necessary condition. In the case of a *necessary* condition, the outcome cannot be achieved without the condition, and therefore the outcome is a subset of the condition (Schneider & Wagemann, 2012). QCA is able to deal with these complexities of combined causes leading to a particular outcome. It is able to show what configurations lead to the presence of an outcome and to the absence of an outcome, separately. Besides, as mentioned earlier, it is able to present necessary and sufficient variables for specific

outcomes (Fiss, Marx, & Cambre, 2013; Schneider & Wagemann, 2012). QCA works well with mid-sized N data (10-50 cases), and with large-N data (more than 50 cases). As shown in sub-section 3.2 we have 733 cases (SMEs), so this would not be an obstacle. QCA has two major variants that differ in type of sets; (1) crisp-set QCA (csQCA), and (2) fuzzy-set QCA (fsQCA). In csQCA, sets either have a score of 0 or 1, where 0 means non-membership and 1 means membership. If we translate this to SME innovation we can say a SME is innovative (1) or non-innovative (0). These are dichotomous variables and, therefore, this method is often criticized since it represents a loss of emperical information and, at the same time, it reduces the robustness of the results, as it is very subjective and complicated where to put the threshold. These criticisms, however, can be prevented by being transparant (Schneider & Wagemann, 2012). FsQCA, on the other hand, allows for various intervals of membership scores between 0 and 1. For example, it allows a 5-point interval: full non-membership (0), mostly out (0.25), indifference (0.50), mostly in (0.75), and full set membership (1). In this range it still means that the, so called, anchors of 0 and 0.25 indicate non-membership but now we are able to note that a value of 0.25 is better than a value of 0. This also applies to the values 0.75 and 1 that both indicate membership. Fuzzy-set QCA can be used to analyze both crisp-sets and fuzzy-sets at the same time depending on the variables used in a study (Schneider & Wagemann, 2012). In the end, this can give more meaning to the outcomes (Schneider & Wagemann, 2012). In this study, therefore, the fuzzy-set Qualitative Comparative Analysis has been applied.

3.2 Case selection and data collection

This research is focused on Small and Medium-sized Enterprises in the manufacturing sector in India. These SMEs are defined as manufacturers with 5-99 employees, and it includes all manufacturing sectors ranked in the International Standard Industrial Classification of All Economic Activities (ISIC), Revision 3.1 (group D), by the United Nations (United Nations, n.d.). To test our propositions, two surveys are combined namely (1) the India Enterprise Survey 2013-2014 (ES) done by The World Bank, and (2) the India Innovation Follow-up Survey 2016 (IFS) done by the Tilburg University in collaboration with the Enterprise Analysis Unit of The World Bank (sometimes also referred to as the Innovation Capability Survey (ICS))[1]. The ES tries to gain data in the private sector regarding firm performance, firm structure, business perceptions, and business environment (World Bank Group, 2014). They try to understand how various market environments influence firm performance in developing countries (World Bank Group, n.d.). The IFS complements the ES by focusing on innovation, and innovative capabilities of firms in developing countries (Tilburg University & The World Bank, 2016). Both surveys used standard established questionnaires conducted through face-to-face interviews. In sub-section 3.3 more information is given about the questions we used and their corresponding measurement

[1] More detailed information about these surveys can be found on www.enterprisesurveys.org

levels. The two surveys used stratified random sampling which is a useful technique to ensure all important parts of the population are represented in the sample (Babbie, 2012). The ES stratified its sample based on three levels; industry, firm size, and region to find a representative group of respondents. The IFS drawn a sample (randomly selected and stratified based on firm size and location) of the manufacturing firms interviewed in the ES 2014, and contains 1000 firms of which 733 SMEs. This enabled us to merge the two surveys into one dataset (Tilburg University & The World Bank, 2016). However, the ES covered 23 states in India, excluding states with a low contribution to the national GDP, while the IFS covered 17 of these 23 states. Therefore, we focused on these 17 states covered in both the ES and IFS. Table 1 gives an overview of the regions, cases (SMEs), and sample sizes of the dataset (Tilburg University & The World Bank, 2016).

	State (regions)	Sample size (SMEs)		State (regions)	Sample size (SMEs)
1.	Bihar	39	**10.**	Maharashtra	58
2.	Chhattisgarh	36	**11.**	Orissa	29
3.	Delhi	57	**12.**	Punjab	47
4.	Goa	15	**13.**	Rajastha	54
5.	Gujarat	66	**14.**	Tamil Nadu	60
6.	Haryana	34	**15.**	Uttar Pradesh	52
7.	Jharkhan	33	**16.**	Uttaranchal	27
8.	Karnataka	40	**17.**	West Bengal	39
9.	Madhya Pradesh	47		Total	733

Table 1: Sampled regions

The ES was implemented as follows: companies that seemed to be eligible for an interview were first contacted over the phone. After this an appointment was made, with the companies that passed this phone check, for a face-to-face interview with a manager, director, or owner (World Bank Group, 2014). These companies were later contacted again for a follow-up survey (for the IFS). Overall, the responses of the enterprises to the surveys were good; 62% of the contacted companies were willing to cooperate (Tilburg University & The World Bank, 2016).

3.3 Operationalization and calibration of the variables/sets

An important part of the configuration approach is the operationalization and calibration of the variables (Schneider & Wagemann, 2012). As said before fsQCA allows for various intervals of membership scores between 0 and 1 to analyze whether something is in or out the set. This is done by the placement of anchors/breakpoints, and crossover points (Schneider & Wagemann, 2012; Chappin, Cambré, Vermeulen, & Lozano, 2015). In this sub-section we demonstrated our variables and calibrated them into crisp-sets or fuzzy-sets.

3.3.1 Outcome variable

The outcome variable in this study is the innovation performance (in particular product innovation) of SMEs. The ES asks respondents whether the firm introduced any new or significant improved product or process during the last three years (yes or no), and in this sense an enterprise is innovative when they introduced at least one new or significant improved product or process. Another possible way to measure innovation is by looking to patent applications. However, India is known for its lack of patent filings (Nair, Guldiken, Fainshmidt, & Pezeshkan, 2015). This was also reflected in the data where only 42 out of 554 enterprises requested one or more patents during the last three years. Therefore the data was not normally distributed and not appropriate to use (see Appendix 5; table 3 and 4). Another question that could be used to measure innovation was found in the IFS that asks respondents whether they are innovative or not (yes or no). But in our opinion this question is too subjective, as it is not very clear when a firm is innovative or not. This is also reflected in the results where only 14 out of the 554 enterprises said they are not innovative (see Appendix 5; table 3 and 5). As a result, this research used the first mentioned ES item to measure innovation. This measurement of innovation is also used in various other studies and demonstrated its usefulness here (e.g. Barasa et al., 2017; Chadee & Roxas, 2013). The variable is dichotomous and therefore we needed to treat it as a crisp-set; a special case of fuzzy sets with two anchors. In this regards, anchor 1 means that a SME is innovative, and 0 means a SME is non-innovative (Schneider & Wagemann, 2012).

3.3.2 Conditions

This sub-section starts with the conditions of the institutional voids subdivided into product, capital, and labor market, and regulatory environment. Next, the conditions of the firm resources are highlighted, and subdivided into human capital resources, and inter-organizational resources. The corresponding questions, we used in this study, of the ES and IFS are listed in Appendix 1.

Regional institutional voids

The regional institutional voids are divided into the product, labor and capital market, and regulatory environment. To measure these variables, independently, we used various items of the ES. Each item is measured on a 5-point Likert Scale ranging from 0 No Obstacle to 4 Very Severe Obstacle, and has an ordinal measurement level. As Khanna & Palepu (2010) stated, voids can be seen as roadblocks or, in other words, obstacles. The more something is seen as an obstacle, the more it can be perceived as a void (Khanna & Palepu, 2010). Therefore, these questions are all appropriate to measure the level of voids in the product, labor and capital market, and regulatory environment. All scores, however, are measured on firm-level while we would like to study what kind of effect regional voids have. Thus, we needed to aggregate the firm-level values to a composite measure of the regional level. This needed to be done by calculating the mean score of voids experienced by companies located in a particular

region, and we needed to do this for each region. More detailed information about these calculations can be found in chapter 4. Next we described how we measured each variable, and after that we explained how we calibrated the condition.

Product market: The product market is subdivided into hard, and soft infrastructure. The items underlying the hard and soft infrastructure together represent the product market (Khanna & Palepu, 2010; Khanna, Palepu, & Sinha, 2005). The ES offers a number of items that can be used to measure the degree of voids, SMEs experienced, in the product market. The ES asks respondents to what degree transport, electricity, and telecommunication are obstacles to the current operations of the firm. Singh & Kathuria (2016) indicated these three items are important attributes of a country's hard infrastructure. As a result, these questions are used to measure the voids of the hard infrastructure in the product market. Besides, the ES asks respondents to what degree the access to inputs and supplies, access to production technology, and availability of storage facilities are obstacles to the current business activities. These items, which can be seen as business facilitators, are used to measure the voids of the soft infrastructure in the product market (Wanmali, 1992). To create a composite measure of the product market (voids), for each company, we first needed to run a factor analysis to see whether these items measure the construct. After we found the items explaining the construct we needed to calculate the factor scores; which is the composite measurement of the factor for each company (Crilly, 2013; Hair, Black, Babin, & Anderson, 2014). As mentioned earlier, we also had to aggregate these firm-level scores to an average regional score.

Labor market: The ES asks respondents to what degree an inadequately educated workforce is an obstacle to the current business activities. Previous studies indicated that this is an appropriate indicator to measure regional voids in the labor markets, as it measures whether a SME has the possibilities to access well-educated employees in a labor market (Schündeln & Playforth, 2014; Robson, Haugh, & Obeng, 2009). As mentioned earlier, we had to aggregate these firm-level scores to an average regional score.

Capital market: The ES asks respondents to what degree access to finance is an obstacle to the current business activities. The quality of the capital market is dependent on the availability of finance (Hyytinen & Toivanen, 2005). As mentioned before, the more something is seen as an obstacle, the more it can be perceived as a void (Khanna & Palepu, 2010). We were therefore able to measure the degree of voids in the capital market with this question.

Regulatory environment: The regulatory environment is subdivided into level of corruption, rule of law, and regulatory quality. The ES offers various items that can be used to measure the degree of voids, SMEs experienced, in the regulatory environment. Barasa et al. (2017) showed, in their study, the appropriateness of different items from the ES to measure these three variables, which together represent the regulatory environment. Therefore, we also used these items in our research. To

measure the level of corruption, we used the ES question that asks respondents to what degree they perceive corruption as an obstacle to the current business operations. Secondly, to measure rule of law we needed to develop a composite measurement consisting of three items; the ES asks respondents to what degree courts, political instability, and crime, theft and disorder are obstacles to the current business operations. Finally, to measure regulatory quality we needed to develop a composite measurement consisting of four items; the ES asks respondents to what degree tax rates, tax administration, customs and trade regulations, and business licensing and permits are obstacles to the current business operations. The more something is seen as an obstacle, the more it can be perceived as a void (Khanna & Palepu, 2010). Therefore, these are appropriate questions to measure the level of voids in the regulatory environment. These three variables together represent the regulatory environment. To create a composite measure, for each company, we first had to run factor analyses to see whether these items measure the same variable, and after that to see whether these three variables measure the same construct (regulatory environment). After we found the variables explaining the construct we needed to calculate the factor scores; which is the composite measurement of the factor for each company (Crilly, 2013; Hair et al., 2014). Finally, we had to aggregate these firm-level scores to the regional level.

Finally we needed to calibrate these conditions. Since we did not have specific knowledge about the influence of each void in every specific market we decided to bring the voids for the four markets together into one composite measurement. The idea of Khanna & Palepu (2010) was, among other things, to make it easier and more clear for companies or other interested parties to analyze a certain market, seeking for strengths and weaknesses. Therefore they divided these into four markets. Since the experienced voids may differ per region (in India regions differ greatly from each other) we needed regional knowledge in order to calibrate the conditions for each market (Barasa, et al., 2017). Unfortunately, this specific regional knowledge was not available. Besides, our objective is not to analyze each region by using these four voids individually. Instead, our goal is to see what kind of influence regional voids have on the innovativeness of a firm. Khanna & Palepu (2010) stated ‘institutional voids come in many forms and play a defining role in shaping the capital, product, and labor markets in emerging economies’. In this regard institutional voids can be seen as the construct consisting of restrictions in the product, capital, and labor market, and regulatory environment together. Because we do not know how well these markets are developed in each region we decided to combine the four markets into one measurement labeled as ‘institutional voids’. To create a composite measurement, for each company, we first had to run a factor analyses to see whether these four variables measure the same construct (institutional voids). Since we already transformed the individual markets into regional measurement we already obtained the regional composite values by combining them, which resulted in a condition consisting of steps of 0.25 (as we added the four items

together and divided it by 4). More information about these calculations are presented in chapter 4. Since voids can be seen as obstacles, the Likert Scales in the questions already give some explanation whether something is seen as a void or not. To calibrate the condition we used substantive data. As indicated by Transparency International (2016) in their corruption index, India is classified on the 79th place (out of 176 countries) and gets a score of 40 out of 100 (where 0= highly corrupt) regarding their corruption level. In comparison to other countries we noticed, for example, they are less corrupt than Spain, Malta or Turkey. Furthermore, we also noticed India scores on average for short-term and long-term political risks (The Global Economy, in Credendo Group, 2016; The Global Economy2, in Credendo Group, 2016). Besides, the quality of the roads are admittedly bad (The Global Economy3, in World Economic Forum, 2016), but the quality of the railroad on the other hand does not score too low; 4 out of 7 (The Global Economy4, in World Economic Forum, 2015). Next to that, the z-score of India's banking system, which measures the reliability and stability of the banking system, also scores on average; 9 out of 16 (The Global Economy5, in World Economic Forum, 2014). So in general (people indicate) India mostly scores on average (not very good but also not very bad) for these indicators. Therefore we expected this would also be the case for the results in our research. Accordingly, the chance of companies experiencing voids is likely to be smaller, which ensures companies are likely to fall out of the set if we calibrate the condition according to the Likert-scale. As a result we expected companies probably chose for options 0 to 2 (where two is the average), and therefore we calibrated the condition with three anchor-points (the adapted variable consists of steps of 0.25 therefore we needed to calibrate our anchor points precisely; we could not use rounded scales); anchor 0 (fully-out (scale point of 0—0.99): where SMEs do not experience regional voids), anchor 0.5 (crossover point (scale point of 1) where SMEs hardly experience regional voids), anchor 1 (fully-in (scale point bigger than 1): where SMEs experience regional voids). We chose for 0.50 as crossover point since we could not directly suggest whether the SMEs that selected option 1 are in or out the set. However, we also tried anchor-points 0.49 and 0.51 to see whether this affected the results. To avoid errors in the dataset we tested various ways of data calibration in the analysis to see whether substantial differences occured and to check for robustness (Schneider & Wagemann, 2012; Chappin et al., 2015). We did this for all variables in this research.

Firm resources

Human resource capital: Romer (1990) indicated two important components of human capital namely educational level, and managerial experience. The ES asks respondents two questions that can be linked to these components. To measure the experience of the top manager the ES asks how many years of experience the top manager has in the sector. This item has an interval measurement level. According to Ayyagari, Demirgüç-Kunt, & Maksimovic (2011) a manager is highly experienced if he has

worked more than 10 years in the sector, mid-level experienced if he has worked between 3 and 10 years in the sector, and low experienced if he has worked between 1 and 3 years in the sector. Barasa et al. (2017) also used this theoretical distribution in their research and showed the usefulness of it. Using this theoretical knowledge we coded managers with 11 years of experience or more as 1 (fully-in), managers with 8-10 years of experience as 0.75 (mostly-in), managers with 7 years of experience as 0.51 (more in than out), manager with 4-6 years of experience as 0.25 (mostly-out), and managers with 0-3 years of experience as 0 (fully-out).

Secondly, to measure workforce educational level, the ES asks respondents what percentage of full-time permanent workers completed their secondary school, and what percentage has at least a bachelor's degree. These items have an interval measurement level, and are useful questions to measure the workforce educational level in a firm (Mol & Birkinshaw, 2009). Barasa et al. (2017) also used one of these questions in their study and showed the usefullness of it by indicating its effect on the innovativeness of a firm. To see whether these items really measure the construct (educational level) we first needed to run a factor analysis (Crilly, 2013; Hair et al., 2014). After we indicated the items loading on the construct, we had to calibrate the case. Barasa et al. (2017) indicated that approximately 60% of the workforce of innovative firms located in Kenya, Tanzania and Ugande (also developing markets) have completed secondary school education. So we used this as our crossover point. Barasa et al. (2017) did not take the completion of a bachelor's degree into account, but since this is a higher degree of education we used 50% as crossover point for this item. So, in the end firms with a workfoce of which 60% completed their secondary school and/or 50% that completed their bachelor's degree, are in the set while they are out if both percentages are lower. So in this regard our composite calibration looks like this;

- SMEs where 61-100% of the workforce completed their secondary school get a score of 1 (in the set), and SMEs where 0-60% of the workforce completed their secondary school get a score of 0 (out the set).
- SMEs where 51-100% of the workforce completed their bachelor's degree get a score of 1 (in the set), and SMEs where 0-50% of the workforce completed their bachelor's degree get a score of 0 (out the set);

These scores are added together, and divided by two. So, in the end a SMEs could have a score of 0, 0.5, or 1. More detailed information about these calculations can be found in chapter 4. As a result, we have three anchors; anchor 0 (fully-out: scale point of 0), anchor 0.51 (more in than out: scale point of 0.5), and anchor 1 (fully-in: scale point of 1). We chose for 0.51 as anchor-point because Barasa et al. (2017) showed that SMEs (only) reaching the threshold value of 61% or higher for secondary school, are often linked to innovative practices. Therefore we expected that a firm reaching one of the two thresholds (for secondary school and/or bachelor's degree) is likely to be innovative and therefore should be in the set (well-educated). However, we also tried anchor-points 0.49 and 0.51 to see whether this affects the results.

These two items (managerial experience and educational level) together form the human capital in a firm (Romer, 1990). However, we are not able to calculate one mean score of these items, representing the human resource capital, as the two items have different measurement levels. Besides, it is interesting to use them separately in the QCA since this could give valuable insight whether they differ in sufficiency and/or necessity. We therefore used them as separate items in our configurational analysis.

Inter-organizational resource capital: Networks form part of the (inter-)organizational resource capital of a firm (Barney, 1991). As mentioned in our theoretical framework especially external sources positively influence innovation as it provides the organization with new knowledge and information (Chang, Chang, Chi, Chen, & Deng, 2012; Nieto & Santamaría, 2007; Leiponen & Helfat, 2011). Like Uden, Knoben, & Vermeulen (2016) we subdivided knowledge sources into the number of different information sources a firm has (called *breadth of openness* in their research). The IFS asks respondents 9 questions that can be linked to these components. To measure the *breadth of openness* the IFS asks if the firm used information or ideas from competitors, suppliers, products or services, universities, consultancy firms, business associations, professional journals, the internet, or customers for any innovative practices. Each item is measured as a dichotomous variables (yes; 1 or no; 2). Uden, Knoben, and Vermeulen (2016) showed the appropriateness of these questions, as they used exactly the same items to measure the ties of a company with other parties. We first needed to run factor analyses to see whether these items measure the same construct, labeled as *search breadth* (Crilly, 2013; Hair et al., 2014). After we found the variables explaining the construct we had to calculate the factor scores; which is the composite measurement of the items for each company (Crilly, 2013; Hair et al., 2014). We did this in the same way as Uden, Knoben, and Vermeulen (2016) did (the syntaxes can be found in Appendix 5); we coded the items of *breadth* as 0 (no) and 1 (yes). After this we added the scores of *breadth of openness*, for each firm, together. In this regard the score a firm could get is depended on the number of items included, which we knew after the factor analysis (later on in our factor analysis we noticed that we are able to use four items explaining the construct). Therefore each firm could get a score between zero and four (zero indicates a firm did not use any of the sources and four indicates it used all (four) sources). Next, we needed to calibrate the case. Based on previous research we expected that external knowledge sources would positively influence innovative performance (Uden, Knoben, & Vermeulen, 2014; Laursen & Salter, 2006). Looking to the distribution line of knowledge sources regarding to innovativeness in the research of Uden, Knoben & Vermeulen (2014), we chose to use 2 knowledge sources as crossover point; firms with 2 external knowledge sources are located on the positive side of the distribution line regarding innovativeness. Therefore we calibrated this condition based on the number of sources a SME used to gather new knowledge for their innovation practices; anchor 1 (fully-in (scale point of 4): where SMEs used four information sources), anchor 0.75

(mostly-in (scale point of 3): where SMEs used three information sources) anchor 0.51 (more in than out (scale point of 2): where SMEs used two information sources), anchor 0.25 (mostly-out (scale point of 1): where SMEs used one information source), and anchor 0 (fully-out (scale point of 0): where SMEs used none of the information sources). But like we did for all conditions, we tested various ways of data calibration in the analysis to see whether substantial differences occur and to check for robustness (Schneider & Wagemann, 2012; Chappin et al., 2015).

3.4 Data analysis

After we demonstrated, operationalized, and calibrated our variables, we now outlined the data analysis with fsQCA, which we carried out in chapter 4.

As previously mentioned we first needed to run various factor analyses to see whether the different items measure (load on) the same construct. After we found the items explaining the construct we had to calculate the factor scores; which is the composite measurement of the factor for each company (Crilly, 2013; Hair, Black, Babin, & Anderson, 2014). Besides, we had to transform and aggregate some values of the variables we used in the analysis. For example, we needed to calculate the average regional values of the institutional voids. Next to that, we needed to aggregate some scores in order to measure a construct consisting of multiple indicators (where we did not use factor scores, because these were single-item conditions) like educational level. After we transformed these values we were able to run the analysis with fsQCA. "The analysis of necessary conditions should be separate from and should precede the analysis of sufficient conditions" (Schneider & Wagemann, 2012, p. 278). Besides, two separate analyses needed to be carried out to analyze both the occurrence and the non-occurrence of the outcome (Schneider & Wagemann, 2012). As a result, the analysis consisted of 4 steps; (1) analysis of necessary conditions in explaining the occurrence of the outcome, (2) analysis of sufficient conditions in explaining the occurrence of the outcome, (3) analysis of necessary conditions in explaining the non-occurrence of the outcome, and (4) analysis of sufficient conditions in explaining the non-occurrence of the outcome.

Besides, "In order to find set relations, QCA relies on so-called truth tables and straightforward rules of local minimization" (Schneider & Wagemann, 2012, p. 11). For each analysis a truth table is presented. The truth table shows all possible combinations leading to the occurrence or non-occurrence of the outcome. Each row in the truth table represents one of the possible combinations.

In the first analysis of necessity we used the recommended consistency value of 0.9 to determine whether a condition is necessary (Schneider & Wagemann, 2012). For the analysis of sufficiency the truth table has to be used. To determine whether a condition is sufficient we used the advisable consistency value of 0.75. According to Schneider & Wagemann (2012) this is an acceptable threshold. Besides, they state that values above 0.5 should be interpreted with care. Values below 0.5 are not

appropriate to interpret as there is more evidence against the configuration than in favor of it. Sometimes, however, the truth table presents a contradictory row, which means that "the same row leads to both the occurrence and the non-occurrence of the outcome" (Schneider & Wagemann, 2012, p. 120). In this case it is not clear whether the case is sufficient for the outcome or non-outcome. We dealt with such possible situation in two manners (Schneider & Wagemann, 2012); (1) we tried various calibrations, and (2) if this did not work we entered the process of logically minimization where we excluded all contradictory rows. Once we decided a condition is sufficient or necessary we needed to determine whether the conditions are relevant. We did this by calculating the coverage of the different conditions.

3.5 Data robustness

No particular measurements for data validity and reliability are available in QCA (Schneider & Wagemann, 2012). However, various steps are possible to prevent errors in the data. In this sub-section we outlined the steps we took to uphold the validity and reliability, and to prevent errors.

By being transparent in the data operationalization, calibration, and in the analyses we tried to improve the content validity. We further tried to increase this by using external scientific literature in the data calibration, and selection of survey questions (Schneider & Wagemann, 2012). Besides, we used factor analysis to check whether the items load on the construct that we wanted to measure. We also tried various ways of data calibration (by recalibrating the conditions), and tested different consistency levels (by increasing and decreasing the consistency threshold) in the analysis to see whether substantial differences occurred, through minimal changes. This helped to check the robustness of the results. A high robustness of the results means that marginal differences occur in the subset relations, and consistency and coverage levels when changing the threshold in the data calibration (Schneider & Wagemann, 2012). As mentioned before, we also checked the truth tables on possible contradictory rows, and if necessary we applied the process of logically minimization. Finally, we analyzed the necessary and sufficient conditions in two independent steps to avoid pitfalls as a hidden necessary condition and/or a false necessary condition (Schneider & Wagemann, 2012).

3.6 Data examination

First of all we needed to combine the two surveys (the ES and IFS). The two surveys are linked with each other based on identical Firm ID. This left us with 787 small-, medium-, and large enterprises. Our research is focused on SMEs and therefore we filtered out the large enterprises. This left us with 555 SMEs located in 14 out of the 23 different states in India. This sample mainly contained enterprises located in states from the north, east, and west, and therefore underrepresents enterprises located in southern areas such as Karnataka. This means that the research does not include all regions in India, which should be kept in mind when generalizing the results across the country.

We excluded all items from the combined (ES and IFS) dataset which we did not use in our research. Besides, we used the general items such as region, industry, and firm size from the IFS, since this gave us the most recent information about the interviewed enterprises. Furthermore, we examined our data on missing information and other assumptions to recognize and correct for problems that may influence further analyses (Hair, Black, Babin, & Anderson, 2014).

Data check

We first checked the dataset for possible errors. The combined dataset contained text (string) answers instead of the (numeric) values that are used in the survey. We therefore transformed these words into values, in line with the survey questions, and assigned them a label in order to use them as numeric variables. Besides we assigned the corresponding missing values and measurement levels in the dataset. After this transformation no abnormal values or other errors in the dataset have been noted and we therefore did not have to transform any output further. The results are shown in Appendix 5 table 3.

Missing data

Missing data may influence the usefulness and generalizability of the data (Hair, Black, Babin, & Anderson, 2014). We therefore, checked the data for missing information to understand the possible impact of it and to improve the quality of the dataset. The results are shown in Appendix 5, table 3 and 6. In this research missing data is indicated as -7 (does not apply) or -9 (do not know). Most of the items have a negligible amount of missing values under the 10% (see Appendix 5, table 3). We first diagnosed the randomness of all variables together using Little's MCAR test. The results are shown in table 7 (Appendix 5) and the output of the test is significant with an Alpha of .05; $X^2(2060)= 1661$, p= < ,001. This indicates that the data is not completely at random but at random or not at random. To indicate which variables are completely at random (MCAR), at random (MAR), or not at random (MNAR), we conducted several Little's MCAR test. We started to test the variables that approximately have 1% missing data with Little's MCAR test. As indicated in table 8 (Appendix 5) the output of the test is not significant with an Alpha of .05; $X^2(273)= 262$, p= < ,315. Therefore we are able to conclude that the missing data of these variables are MCAR. After this we performed the same test for the variables with missing values ranging from 1–10% (see Appendix 5, table 9). This test is significant with an Alpha of .05; $X^2(105)= 66$, p= < ,002 and therefore indicates that the missing values are not MCAR. When we took a closer look to these variables we noticed that the values regarding the 9 items related to the knowledge sources are missing for the same respondents. However, it is about just 14 respondents and therefore should not cause huge problems. When we excluded these items the table became not significant with an Alpha of .05 indicating that the missing values of the other variables are MCAR; $X^2(23.9)= 23$, p= < ,407 (see Appendix 5, table 10).

After this, we also took a closer look to the characteristics of the missing values presented in the item that asks respondents whether the availability of storage facilities is an obstacle. This item has a missing value of 13.4% which is not a huge problem for such a great sample size. However, we included this variables in the previous Little's MCAR test, and then we noticed that the test became significant with an Alpha of .05; $X^2(114)= 51$, p= < ,001 (see Appendix 5, table 10a). This indicates that the missing values of this variable are not MCAR. When we took a closer look to its characteristics, we saw that 11.4% of the companies said that this item does not apply to them (see Appendix 5, table 11). We therefore made some cross tables to compare the missing value with three general characteristics (industry, region, and firm size) of the enterprises. In this comparison, no large differences between small and medium sized enterprises, and between enterprises across the industries were found (see Appendix 5, table 12 and 13). However, we noticed that various enterprise across different regions chose this category, with different levels. These values were especially high in the regions Delhi, and Madhya Pradesh (see Appendix 5, table 14). This showed us that the data is missing randomly across different subgroups, but with different levels, and this indicates the missing data is MAR (Hair, Black, Babin, & Anderson, 2014). We also checked whether these states have something in common that could explain their answer. However, after examining the characteristics of the regions we could not find similarities that may cause this outcome.

Fs/QCA is appropriate without any missing values. In fuzzy-set QCA only unsystematic missing values are treatable, but also these variables can cause trouble in the analyses. Therefore omitting missing observations using listwise deletion is a suitable way to deal with MCAR and MAR values (Seawright, 2005; Hair, Black, Babin, & Anderson, 2014; Field, 2014). So, we used this technique for the previous mentioned MCAR and MAR values. In the end, the listwise deletion of the missing values left us with 392 SMEs located in 14 out of the 23 different states in India (see table 23). In addition we need to keep in mind that two of the states have, in comparison to the others, less observations (Orissa and Rajasthan).

	State (regions)	Sample size (SMEs)
1.	Bihar	30
2.	Chhattisgarh	28
3.	Delhi	29
4.	Gujarat	63
5.	Haryana	28
6.	Jharkhand	33
7.	Madhya Pradesh	20
8.	Maharashtra	37
9.	Orissa	9
10.	Punjab	29
11.	Rajasthan	7
12.	Uttar Pradesh	33
13.	Uttaranchal	17
14.	West Bengal	29
	Total	392

Table 23: Sampled regions

Normality

After the missing value analysis we examined the normality of the data by looking to the skewness and kurtosis of each variable. Overall, the values seems good with four outliers (b7, c30b, SARd31f, and b1j) that exceeded the kurtosis limit of -3 and +3 (see Appendix 5, table 24). This research has a huge sample size, consisting of 392 enterprises, and therefore this kurtosis should not cause problems. Besides, when we checked the histograms with a normal curve line we saw that the four variables are normal distributed (see Appendix 5, figure 1, 2, 3, and 3a). As a result we may assume that the sampling distribution for all variables are approximately normal (Hair, Black, Babin, & Anderson, 2014; Field, 2014).

4 Results

This section provides stepwise insight into the conducted analyses, and it outlines the results arising from these analyses. We started with the factor analyses in which we transformed and aggregated some values of the used variables. These values are used in the subsequent Qualitative Comparative Analysis (QCA).

4.1 Factor analysis

After the data examination in our method section we continued to the factor analyses for the various latent constructs, explained in the methodology section. To check whether factor analysis is a suitable technique to use, we conducted for each construct a Kaiser-Meyer-Olkin Measure of Sampling Adequacy test (KMO), and Barlett's test of sphericity. The KMO test value should be >.50, and Barlett's test should be significant at *a*= .05, which means that the variables are correlated in the population. Besides, the number of observations per variable should be five times as big as the number of items. In the analysis, factor loadings say something about the correlation of that variable on the factor, and a loading between .30 and .40 is minimally acceptable, greater than .50 is significant, and above .70 is desirable. Besides, extraction values in the communalities matrix should be higher than 0.20. Variables with a lower extraction value or variables with cross-loaders on more factors (0.20 difference or less) are eligible for elimination. In factor analysis it is inappropriate to perform one single analysis using all dependent and independent variables. Instead, the performed analyses should be theoretical supported. We therefore performed different analyses for each construct as structured in our method section (Hair, Black, Babin, & Anderson, 2014; Field, 2014).

After each factor analysis we needed to perform a reliability test for every factor in order to check whether the items consistently reflect the construct. Cronbach's Alpha is used to measure the scale reliability. For this technique a score of approximately .80 is good, a score between .60 and .80 is fine, while a score lower than .60 is not very good. Besides, we need to consider whether it is necessary to delete an item to improve Cronbach's Alpha. It is appropriate to delete an item if the Cronbach's Alpha increases with more than 0.05 (Hair, Black, Babin, & Anderson, 2014; Field, 2014).

Product market

The product market consists of the hard- and soft infrastructure (Khanna & Palepu, 2010; Khanna, Palepu, & Sinha, 2005). According to Sing & Kathuria (2016) the hard infrastructure consists of transportation, electrification, and telecommunication, and according to Wanmali (1992) the soft infrastructure consists of business facilitators like input and supplies, production technology, and storage facilities. We therefore conducted two separate factor analyses (one for the hard infrastructure and one for the soft infrastructure) to test whether this is also true for our target audience.

So, we examined whether transport, electricity, and telecommunication measure the construct labeled as 'hard infrastructure', and whether inputs and supplies, production technology, and storage facilities measure the construct named 'soft infrastructure'. The sample sizes for these questions are sufficient since the number of observations per variable is more than five times as big for the items of the hard- and soft infrastructure (see Appendix 5, table 24). The first conditions that has to be met are KMO and Barlett's tests. As shown in Appendix 6, table 25 the tests indicate that factor analysis is an appropriate technique to use (Hard infrastructure: KMO= .656, and Barlett's test= <.001, Soft infrastructure: KMO= .635, and Barlett's test= <.001). Also the second assumption is met; all variables in the communalities matrices have a greater extraction value than 0.20 (see Appendix 6, table 26). To determine the number of factors we looked to the Eigenvalue and to the Scree plot, shown in Appendix 6, table 27 and figure 4. The Eigenvalue for the hard infrastructure indicates that only the first factor has an Eigenvalue greater than one, and explains 60% of the variance. The Eigenvalue for the soft infrastructure also indicates that only the first factor has an Eigenvalue greater than one, and explains 70% of the variance. Besides, both Scree plots present initially a steep curve, followed by a bend and a horizontal line after the first factor. These results show that for both analyses one factor can be determined. Therefore we needed to use the factor matrices presented in Appendix 6, table 28, as it is not possible to rotate the solution if only one factor is extracted (Field, 2014). These matrices show that each item has a greater loading than .50, and therefore they are all significant. Furthermore, this table shows that there are no cross-loaders which are eligible for removal. Thus, the items of the two factor analyses both explain one factor, labeled as 'hard infrastructure' and 'soft infrastructure', which supports the expectations of Sing & Kathuria (2016), and Wanmali (1992).

Hereafter we performed a reliability analysis for both factors. The reliability analysis for the hard infrastructure shows a Cronbach's Alpha of .645, which is fine. The reliability analysis for the soft infrastructure shows a Cronbach's Alpha of .785, which is also good (see Appendix 6, table 29). We furthermore explored the possibility to increase the Cronbach's Alpha (with a minimum of 0.05) by the elimination of one or more items. As shown in Appendix 6, table 30 this is the case if we delete SARd31f representing the soft infrastructure. However, the Cronbach's Alpha is already very high including this item and therefore we stick to the theory of Sing & Kathuria (2016) and did not delete the variable. As a result, we may conclude that previous mentioned items measure the hard- and soft infrastructure, and that the consistency of these items is good.

Subsequently, we made a composite measurement to create these two new variables. We did this by computing the mean of the three variables (electricity, telecommunication, and transport) that measure the 'hard infrastructure', and by computing the mean of the three variables (inputs and supplies, production technology, and storage facilities) that measure the 'soft infrastructure'. This created two new variables labeled as hard- and soft infrastructure. The syntaxes of these

transformations can be found in Appendix 6, and the characteristics and distribution of these variables are presented in Appendix 6, table 31 and 32. No abnormal or missing values or other errors have been noted. Next, we applied a new factor analysis with the two new variables to see if they together measure the 'product market' as expected based on the theory of Khanna & Palepu (2010).

Also here factor analysis is appropriate to use as KMO= .500, and Barlett's test= <.001 (see Appendix 6, table 33). Besides, the communalities are good, as table 34 in Appendix 6 show that they all have a greater value than 0.20. The Eigenvalue, and the Scree Plot in Appendix 6, table 35 and figure 5 show that one factor can be determined. The Eigenvalue for only the first factor is bigger than one and explains 77.6% of the variance. Besides, the Scree Plot shows a nod after factor one. Since one factor can be determined we again needed to look to the factor matrix. The factor matrix presented in Appendix 6, table 36 shows that each variable has a greater loading than .50, and therefore are significant. As a result, the two variables explain one construct that is labeled as the 'Product Market', which supports the theory of Khanna & Palepu (2010).

Finally we performed a reliability analysis. As shown in Appendix 6, table 37 the Cronbach's Alpha has a value of .710, which is good. Besides, table 38 in Appendix 6 shows that it is not possible to improve this value through the elimination of one of the items. We therefore may conclude that together the items measure the product market. We therefore created a composite measurement labeled as the 'Product Market'. The syntax of this transformation, and the distribution and characteristics of this new variable can be found in Appendix 6, table 39 and 40. Here we see that the variable is normal distributed and does not contain outliers. These values represent the product market, however these are not the values we used in QCA since we wanted to know the average values per region. Therefore we transformed these values into regional level values. First we calculated the mean score per region for the product market. This is shown in Appendix 6, table 98. Next we created a new variable labeled as 'Product Market regional level', and subsequently we assigned for each enterprise located in a specific regions the rounded mean score (demonstrated in table 98) associated with that particular region. Table 99 and 106 (Appendix 6) show the characteristics and distribution of this new variable. The variable is normal distributed and does not contain any outliers. As expected firms especially indicated that the condition is no obstacle, minor obstacle or moderate obstacle. In our data operationalization we noticed that in general, India mostly scores average for these indicators. This is supports our calibration process. In our next conducted QCA analyses we explained what kind of effect this has, in combination with the other factors, on the innovativeness of the firms.

Labor market

For the construct 'labor market' we did not have to perform a factor analysis since we measured it with only one variable from the ES. The values are presented as individual firm level values, and

therefore we needed to transform them into regional level values. We used the same procedure as we did for the product market. So, first we calculated the mean score per region (see Appendix 6, table 100). We assigned these mean values to the enterprises located in the corresponding regions in our new created variable that is labeled as 'Labor Market regional level'. The syntax for this transformation, and the characteristics and distribution of the new variable are presented in table 101 and 106 (Appendix 6). The variable does not contain any strange values and is normal distributed. Also here we expected that firms would mainly choose for the answer categories "no obstacle", "minor obstacle" or "moderate obstacle", and again we noticed in the tables that our way of calibration is supported by the results.

Capital market

Like the labor market we did not have to perform a factor analysis for the capital market since we also measured it with only one variable from the ES. But also here the values are presented as individual firm level values. Therefore we also had to transform these values into regional level values. We used the same procedures as we did for the product- and labor market (for the mean scores see Appendix 6, table 102). The syntax for this transformation, and the characteristics of the new variable are presented in table 103 and 106 (Appendix 6). The variable does not contain any strange values and is normal distributed. Also this condition shows that almost all SMEs choose for the first three Likert-scale values, so again our expectations and our anchor points are supported by the results.

Regulatory environment

Like Barasa et al. (2017) we divided the regulatory environment into level of corruption, rule of law, and regulatory quality. Besides, as explained in our theoretical framework, rule of law is subdivided into the degree courts, political instability, and crime, theft and disorder are obstacles. Regulatory quality is subdivided into tax rates, tax administration, customs and trade regulations, and business licensing and permits. The level of corruption is measured with one item and therefore no factor analysis is needed for this variable. We first examined whether the items really measure the same construct (rule of law, and regulatory quality), and after that we examined whether these three variables (corruption, rule of law, and regulatory quality) measure the same factor (labeled as 'Regulatory Environment').

So, we first examined whether courts, political instability, and crime, theft and disorder measure the construct labeled as 'rule of law', and whether tax rates, tax administration, customs and trade regulations, and business licensing and permits measure the construct named 'regulatory quality'. As shown in Appendix 5, table 24 the sample sizes for these items are sufficient. Also the KMO and Barlett's test indicate, as shown in Appendix 6, table 41 that factor analysis is an appropriate technique to use (Rule of law: KMO= .619, and Barlett's test= <.001, Regulatory quality: KMO= .690, and Barlett's

test= <.001). Besides, as shown in Appendix 6, table 42 all items related to rule of law (except two; item i30 with a value of 0.196, and item d30b with a value of 0.183) have a greater extraction value than 0.20, and therefore this assumption is met. Because the values of the two items are slightly lower than 0.20 we did not delete both items immediately. We first looked whether the other assumptions are met. The item values related to regulatory quality do comply with the assumption. Table 43, presented in Appendix 6, shows that we can extract one factor for both constructs (rule of law, and regulatory quality) as only the Eigenvalue of the first factor has a greater value than one (Rule of law: % of variance= 56.5%, and Regulatory quality: % of variance= 56.4%). This shows that for both constructs one factor can be determined. Therefore we needed to use the factor matrices presented in Appendix 6, table 44. The factor loadings of all items, for both constructs, have a value above .50 (except for 'crime, theft, and disorder' (.443), and 'customs and trade regulations' (.428) which are also acceptable values), and therefore are significant. Since the items 'crime, theft, and disorder' and 'customs and trade regulations' have slightly smaller extraction values, and smaller factor loadings we looked at the reliability analysis to see whether we have to extract these variables.

So, after this we constructed a reliability analysis to measure the consistency of the items loading on both constructs. The results of analyses are shown in Appendix 6, table 45 and 46. The reliability analysis for rule of law shows a Cronbach's Alpha of .609. The reliability analysis for regulatory quality indicate a Cronbach's Alpha of .734. These are both good values, and cannot be improved by elimination of one or more of the items. We therefore concluded that we do not remove the two items that just did not met the extraction values and factor loadings, since it does not significantly improve the reliability of the construct. The reliability analysis shows these items are valuable to include in the analysis. Thus, we may conclude that previous mentioned items measure rule of law, and regulatory quality, and that the consistency of these items is good. Like Barasa et al. (2017) we are able to conclude that tax rates, tax administration, customs and trade regulations, and business licensing and permits explain one construct labeled as 'regulatory quality'. And that courts, political instability, and crime theft and disorder measure the construct labeled as 'rule of law'.

Next, we created a composite measurement in order to form these two new variables. We did this by computing the mean of the three variables (courts, political instability, and crime, theft and disorder) that measure 'rule of law', and by computing the mean of the four variables (tax rates, tax administration, customs and trade regulations, and business licensing and permits) that measure 'regulatory quality'. This created two new variables labeled as 'rule of law', and 'regulatory quality'. The syntaxes for these transformations, and the characteristics and distribution of these variables are presented in Appendix 6, table 47 and 48. No abnormal or missing values or other errors have been noted. Next, we applied a new factor analysis with the three variables (corruption, rule of law, and regulatory quality) to see whether they measure the 'regulatory environment'.

Also here factor analysis is appropriate to use as KMO= .667, and Barlett's test= <.001 (see Appendix 6, table 49). Furthermore, the communalities are good as table 50 in Appendix 6 show that all three items have a value greater than 0.20. The Eigenvalue, and the Scree Plot in Appendix 6, table 51 and figure 7 show that one factor can be determined. The Eigenvalue for the first factor is bigger than one and explains 65.4% of the variance. Besides, the Scree Plot shows a nod after the first factor. Since one factor can be determined we again needed to look to the factor matrix. The factor matrix presented in Appendix 6, table 52 shows that each variable has a greater loading than .50, and therefore are significant. As a result, the three variables explain one construct that is labeled as the 'Regulatory Environment', which corresponds to the research of Barasa et al. (2017).

Finally we performed a reliability analysis. As shown in Appendix 6, table 53 the Cronbach's Alpha has a value of .700, which is good. Besides, table 54 in Appendix 6 shows that it is not possible to improve this value through the elimination of one of the variables. We therefore may conclude that all items together measure the regulatory environment. Next we created a composite measurement labeled as the 'Regulatory Environment'. The syntax for this transformation, and the distribution and characteristics of this new variable can be found in Appendix 6, table 55 and 56. Here we see that the variable is normal distributed and does not contain strange values or other errors. Now we possess the values of the regulatory environment, however these are not the values we use in QCA since we want to know the average value per region. To transform these values into regional level values we used the same procedures as earlier explained for the product- and labor market (for the mean scores see Appendix 6, table 104). The syntaxes and the characteristics of the new created variable are presented in table 105 and 106 (Appendix 6). The variable does not contain any outliers and is normal distributed.

After all these adjustments we obtained the region values for each market void. However, as explained in sub-section 3.3.2. we need to create a composite measurement of these four market voids. Therefore we examined whether they (the product, labor and capital market, and regulatory environment) measure the same factor (labeled as 'institutional voids'). As shown in Appendix 5, table 24 the sample sizes for these items are sufficient. Also the KMO and Barlett's test indicate, as shown in table 57 (Appendix 6), that factor analysis is an appropriate technique to use (KMO= .735, and Barlett's test= <.001). Besides, as shown in Appendix 6, table 58 all items have a greater extraction value than 0.20, and therefore this assumption is met. Only the Eigenvalue of the first factor is greater than one, indicating that one factor can be explained by these four items (see Appendix 6, table 59).

Next, we performed a reliability analysis to see whether the items are loading on the construct with a consistent value. The results are presented in Appendix 6, table 60 and 61. They present a Cronbach's Alpha of .880 which is very good. Besides, this value cannot be improved by the elimination of one of the items. We therefore may conclude that previous mentioned items measure one construct labeled as 'institutional voids'. Since we already transformed the individual markets into regional values we

already obtained the regional composite values by combining them. This resulted in a condition consisting of steps of 0.25. The syntax of this transformation can be found in Appendix 6.

Workforce educational level

According to Romer (1990) workforce educational level is an important component of human capital within an organization. As mentioned in our variable operationalization and calibration the ES has two items that can be linked to workforce educational level. To see whether these two items indeed measure the same construct labeled as 'educational level' we used factor analysis.

The sample sizes for both questions are sufficient, and therefore we are allowed to perform a factor analysis (see Appendix 5, table 24). Besides, as shown in Appendix 6, table 62 also the first assumption is met as KMO= .500, and Barlett's test= <.001. Therefore we are able to conclude that factor analysis is an appropriate technique to use. The extraction values in the communalities matrix presented in Appendix 6, table 63 all have a value above 0.20 which is good. Table 64 presented in Appendix 6 shows that one factor can be determined as only the Eigenvalue of the first factor is greater than one. This factor explains 75.3% of the variance. Also the Screeplot presented in figure 9 (Appendix 6) shows that we can extract one factor. Finally, the factor matrix (see Appendix 6, table 65) demonstrate that all factor loadings are greater than .50 which proves that they are significant.

After this we constructed a reliability analysis to measure the consistency of the items loading on the construct. The results of the analyses are shown in Appendix 6, table 66 and 67. The reliability analysis indicates a Cronbach's Alpha of .658. This is a good value, which cannot be improved by elimination of one of the items. We therefore may conclude that previous mentioned items measure workforce educational level and that the consistency of these items is good. Since we calibrated them as two independent items we did not have to create a composite measurement of the two items together.

Knowledge sources

Like Uden, Knoben, and Vermeulen (2016) we subdivided knowledge sources in the usage of information or ideas from competitors, suppliers, products or services, universities, consultancy firms, business associations, professional journals, internet, and customers. To measure whether these items indeed represent the knowledge sources in an organization we constructured a factor analysis.

As indicated in table 24 (Appendix 5) the sample size is adequate to carry out a factor analysis. The KMO and Barlett's values shown in Appendix 6, table 68 also indicate that factor analysis is an appropriate technique to use (KMO= .634, Barlett's test= <.001). However, in this case several items (b1b, b1d, b1e, b1f, and b1i) consist a lower extraction value than 0.20 (see Appendix 6, table 69). Besides, table 71 (Appendix 6) shows that variable b1i loads on more than one factor. Therefore, these variables are eligible for removal. We decided to delete item b1j since this item has the lowest

extraction value (0.038). After this we performed a new factor analysis without this item. We repeated the same steps in the analysis for four times (the whole process is explained in Appendix 6), which left us with four items (universities, consultancy firms, business associations, and professional journals). The fifth time we obtained the results shown in tables 88-91, Appendix 6. Again factor analysis is an appropriate technique to use (KMO= .588 Barlett's test= <.001). The extraction values all have a value above 0.20, which is good. One factor can be determined as only the Eigenvalue of the first factor is greater than one. The factor explains 45.6% of the variance. Finally, the pattern matrix (see Appendix 6, table 91) demonstrates that all factor loadings are greater than .50 (except item b1f with an acceptable value of .432), which proves that they are significant.

Next we constructed a reliability analysis to measure the consistency of the items loading on the construct. With an Cronbach's Alpha of .601, which cannot be improved by elimination of one of the items (see Appendix 6, table 94 and 95), we are able to conclude that previous mentioned items measure the importance of knowledge sources of an organization. As a result, the four items explain one construct that is labeled as 'knowledge sources', which partly corresponds to the research of Uden, Knoben & Vermeulen (2014). We only found proof for four items explaining the construct while Uden, Knoben & Vermeulen (2014) found evidence for all nine items loading on the same construct. Next we created a composite measurement labeled as 'knowledge sources'. The syntax for this transformation, and the distribution and characteristics of this new variable can be found in Appendix 6, table 96 and 97. Here we see that the variable is normal distributed and does not contain strange values or other errors.

Next we performed a qualitative comparative analysis (QCA) to see what kind of effect the configurations of these conditions have on the innovativeness of the small-, and medium sized enterprises in India.

4.2 Qualitative comparative analysis (QCA)

After we transformed and created the construct values in the factor analyses, that are applicable for the QCA, we organized our dataset in the freely available fuzzy set QCA software (fs/QCA) version 2.5 (Ragin & Davey, 2014). First we needed to make a so called "*.dat." file of our SPSS data. The syntax of this transformation can be found in Appendix 7.

In order to run the QCA we needed to calibrate the variables into fuzzy membership scores as explained in our method section (sub-section 3.3). We needed to do this manually since fs/QCA does not support to compute variables with 5 anchor points automatically. We therefore used the recode function. For the outcome variable, for example, we recoded Likert-scale category 2 (no introduction of any new or significant improved product or service) in anchor-point 0. We did this for every variable separately and in this way we created the anchor-points described in sub-section 3.3. The syntaxes of

these transformations can be found in the beginning of Appendix 7. For one variable (workforce educational level) we needed a different approach since we wanted to combine the calibration of the different items into one condition. This procedure for the conditions is explained below.

Workforce educational level

As explained in sub-section 3.3.2 we first needed to calibrate the two items (completion of a bachelor's degree and secondary school) separately using crisp set; anchor 1 (in the set) if 61-100% of the workforce completed secondary school and if 51-100% of the workforce completed their bachelor's degree, and anchor 0 (fully out) if 0-60% of the workforce completed their secondary school and if 0-50% of the workforce completed their bachelor's degree. So first of all we gave each enterprise the corresponding anchor point for both variables. However, we wanted to create one calibrated condition for workforce educational level. Therefore we added these scores together, and divided them by two. In this way the firm could get a score of 0, 0.5, or 1. Next we used the anchor points explained in sub-section 3.3.2. This gave us one calibrated condition out of the 2 items.

The distribution level of the new created conditions in combination with the outcome variable are shown in Appendix 7 table 107-115. After the transformation and calibration of our variables we continued with the four analyses mentioned in sub-section 3.4. We started with the analysis of necessary conditions in explaining the occurrence of the outcome, and after that we carried on with the analysis of sufficiency of the outcome. Next, we did the same two separate analyses in explaining the non-occurrence of the outcome. In these analyses we used the recommended consistency threshold of 0.90 for necessary conditions, and 0.75 for sufficient conditions (Schneider & Wagemann, 2012). Finally, we tried to identify sufficient configurations (combinations of conditions) leading to the outcome or non-outcome. An overview of the dataset is too big to include in this research but is available on request.

Analysis of necessary conditions leading to innovativeness

Necessary conditions are conditions that are always present for a particular (non-)outcome, the outcome is not present without the condition. In this analysis we tested whether there are conditions that are necessary, for SMEs, to be innovative (i.e. enterprises with an *innovativeness value of 1)*. To test this we performed the test for Necessary conditions in fs/QCA. Table 117 in Appendix 7 shows none of the conditions exceeds the threshold of 0.90. All consistency values ranged between 0.25 and 0.75, and therefore are not eligible as necessary conditions.

Analysis of sufficient conditions leading to innovativeness

Sufficient conditions are conditions that are present in cases with the same outcome. The judgement of sufficiency should always be based on a more case-oriented perspective by taking into account the

truth table, sufficiency value, and theoretical expectations (Schneider & Wagemann, 2012). Based on the consistency values shown in table 117 (Appendix 7) we noticed there is one condition that reached the consistency value of 0.75, namely managerial experience (fsmanagerialexp; 0.75). This indicates that SMEs with experienced managers are likely to be innovative. First we checked whether we are dealing with a so called redundant or contradictory condition (a condition that reached the threshold for the outcome and non-outcome). Therefore we also performed the analysis of necessary conditions for the non-outcome (~crispinnovative) which is shown in table 120 (Appendix 7). Here we noticed that the condition does not reach the threshold in this analysis, and therefore it is not a contradictory condition. Besides, we performed a Fuzzy Truth Table Algorithm in fs/QCA to check whether the condition is only present in cases with the same outcome. More information about the truth tables is given in the configuration analyses (later on in this chapter). In our data, nonetheless, also non-innovators (innovation < 0.5) have experienced managers (see Appendix 7, table 118), on the other hand some innovative firms have managers without experience (see Appendix 7 table 118). So, despite the consistency value of 0.75, we are not able to conclude that managerial experience is a sufficient condition for innovative firms. Also table 113 (Appendix 7) confirms this, as it shows a pattern that indicates SMEs with an experienced manager can be either innovative or non-innovative.

When we further analyzed the truth table for innovative and non-innovative firms (table 118 and 119, Appendix 7) we noticed that the condition well-educated workforce is sufficient for innovative firms, as the condition only is present in cases with the same outcome (innovativeness) but is not present in all configurations leading to the outcome. These are the characteristics of a sufficient condition. While the consistency value does not reach the threshold it is remarkable that all innovative firms consist a well-educated workforce in the configurations. Although we are not absolutely certain due to the low consistency value, it seems that the degree of education in a firm's workforce determines whether the firm is innovative or not. This is in line with various studies that found positive effects of educational level on the innovativeness of enterprises (Robson, Haugh, & Obeng, 2009; Romijn & Albaladejo, 2002; Mahemba & Bruijn, 2003; Hausman, 2005). Next we performed an additional analysis for the negative outcome. The non-outcome is not symmetric relative to the outcome, hence we cannot expect it gives us reverse results (Lu, Saka-Helmhout, & Piekkari, 2017).

Analysis of necessary conditions leading to non-innovativeness

In the test for necessary conditions, for non-innovative firms (see table 120, Appendix 7), we noticed one condition that almost reaches the threshold of 0.9, namely the absence of a well-educated workforce (~fseducational3; 0.87). While it just did not reach the threshold of 0.9, it came close to it. Therefore, we checked the truth table, presented in Appendix 7 (table 119), and here we noticed that for every configuration that is linked to non-innovativeness the firm did not have a well-educated

workforce. Stated differently; when a SME does not have a well-educated workforce, it is likely the firm is not innovative. In this sense the absence of well educated workers result into non-innovativeness. This is in line with the research of Barasa et al. (2017), and Robsen et al. (2009) that both found a positive relation between educational level and innovativeness, and indicated it may depend on the educational level of a workforce whether a firm is innovative or not. Therefore the presence of a well-educated workforce in a SME is important in order to not be or become non-innovative. Furthermore, we did not find any other conditions with acceptable consistency values representing necessary conditions; the other consistency values ranged between 0.13 and 0.71.

Analysis of sufficient conditions leading to non-innovativeness

Based on the consistency values shown in table 120 (Appendix 7) we noticed there are two conditions that reached a consistency value of respectively 0.70 (~knowledgesources), and 0.71 (fsmanagerialexp). These consistency values did not reach the threshold, however, to be sure they really are not sufficient, we checked the truth table (table 119, Appendix 7). The results show that both conditions are present for the outcome and non-outcome in the truth table. So unfortunately, we are not able to conclude that these conditions are sufficient.

Configurations Sufficient for Innovation and Non-innovation

Outcome	Innovation	Non-innovation	
Configurations	Configuration 1	Configuration 2	Configuration 3
Knowledge sources		⊖	
Institutional voids	●	⊖	⊖
Workforce educational level	●	⊖	
Managerial experience	⊖	⊖	⊖
Consistency	0.76	0.82	0.81
Raw coverage	0.10	0.15	0.17
Unique coverage	0.10	0.15	0.17
Overall solution consistency	0.74	0.82	

Notes: condition is present= ●; condition is absent= ⊖; core condition= large circles; peripheral condition= small circles

Table 127: Configuration chart for Innovation and Non-innovation

Table 127 shows the results of the configurations leading to the outcome, and non-outcome. These configurations are further explained below.

Configurations leading to innovativeness

To test this we used the fuzzy truth table algorithm instead of the XY plots, since our outcome variable is measured as a crisp set. XY plots would be useful to display the cases causal conditions, but in this case a firm is innovative or not and therefore the plot does not present a distribution line. The truth table is performed for the presence and absence (~) of all conditions, and the analyses contains two steps; (1) creating a truth table from the fuzzy data by determining which configurations to include in the analysis and by entering the outcome for all configurations, (2) defining the causal conditions and outcomes (Schneider & Wagemann, 2012).

So first we created the fuzzy truth table (shown in Appendix 7, table 118). The table includes 2^k rows, which means that it contains all possible combinations. After this we needed to choose which configurations to include in the analyses by selecting a threshold for the number of cases that are part of a specific configuration. For studies with a small N this frequency threshold is normally 1 or 2 and should capture approximately 75-80% of the cases. But for large N studies a bigger threshold should be used. Therefore we chose to use a frequency threshold of 12 as it captured still 91% of the cases (Ragin, 2008). For configurations with a lower observation value we used the process of logically minimization. Next we needed to assign a value of 1 to the configurations that meets or exceeds the 0.75 consistency threshold, meaning that the configuration could explain why a certain firm is innovative. We found two configurations that reached the threshold (with a deviation of max. 0.006). For further analyses we assigned a score of 1 to these configurations, while we assigned a score of 0 to all others. After this we performed the truth table analysis, in order to find the sufficient configuration(s).

This analysis made various combinations between the items of the two sufficient configurations, and showed that one of them is sufficient with a consistency value of 0.76 (coverage= 0.10). The outcomes of the analysis are presented in Appendix 7, table 121, 122 and 123, and are visualized in table 127. The coverage value explains how much the outcome is covered by the subset of conditions. The coverage value for this configuration is quite low (10%), which means that there are other conditions and/or combinations of conditions explaining the outcome better. However, also configurations with lower coverage levels may be useful as it explains part of the outcome (Schneider & Wagemann, 2012). The results show that SMEs in India that experience regional voids, that have a less experienced manager but possess a well-educated workforce are likely to be innovative. Some of these conditions differ from what we expected, based on our theoretical framework. For example, based on papers of Khanna & Palepu (2010), and Castellacci (2015) we expected voids would negatively influence innovation performance. Besides, we supposed that experienced managers would stimulate innovative practices (Hausman, 2005; Romer, 1990). However, these results show that in certain contexts, institutional voids and inexperienced managers may stimulate innovativeness, namely if the firm has a well-educated workforce. We come back to this in sub-section 5.1 Discussion.

Configurations leading to non-innovativeness

After the tests for the configurations leading to innovativeness we performed the analyses for the configurations leading to the non-outcome, to see what configurations are not favorable for SMEs as they lead to non-innovativeness. Again we chose to use the process of logically minimization for all configurations with less than 12 cases. This left us with the truth table presented in table 119 (Appendix 7). Here we noticed that one configuration exceeds the threshold of 0.75. Again, we assigned a value

of 1 to this configuration and a value of 0 to all others. After that we performed the truth table analysis, in order to find the sufficient configuration(s).

The outcomes are presented in Appendix 7, table 124, 125, 126. These findings reveal we can distract two sufficient configurations. We visualized them in table 127. Again the coverage values are not very high (configuration 2: 15%; configuration 3: 17%), and this means there are also other conditions and/or combinations of conditions explaining the outcome. Configuration two shows that SMEs in India that do not have knowledge sources, that do not experience any institutional voids, that do not have a well-educated workforce, and that do not have experienced managers are likely to be non-innovative. This is not very surprising since they do not have knowledge sources and therefore have a narrow knowledge breadth. Besides, these firms lack human capital resources and do not feel the impetus from institutional voids to innovate. Configuration three shows that the absence of institutional voids and experienced managers (where knowledge sources and workforce educational level are disregarded) also lead to non-innovative behavior. These configurations have in common that they both indicate that the absence of previous two mentioned conditions lead to non-innovative practices. Also here we found a few interesting and surprising conditions that, in combination with the other conditions, lead to the non-outcome. For example, the results show that the absence of institutional voids (in combination with the absence of the other conditions) lead to non-innovative behavior while we expected, based on our theoretical framework, that the absence of this condition (voids) would stimulate innovation. Anyhow, as human capital resources and knowledge sources are absent it still is not likely that it does improve innovativeness. We come back to this in sub-section 5.1 Discussion. However, the rest of the conditions in the configurations are in line with the theories used in our theoretical framework. For example, the absence of a well-educated workforce, an inexperienced manager and the absence of knowledge sources all are conditions other researchers individually linked to non-innovative practices (e.g. Hausman, 2005; Schündeln & Playforth, 2014; Uden, Knoben & Vermeulen, 2016; Laursen & Salter, 2006). Our study shows that these conditions in common also do not favor innovation. For one condition, however, it is a bit surprising it is present in these two configurations, namely; the absence of managerial experience. Earlier, in the subset regarding innovative SMEs, we found that the absence of managerial experience (in combination with the presence of a well-educated workforce, and institutional voids) lead to innovativeness. At the same time this condition is present in the configurations linked to non-innovativeness. Therefore we also compared the configurations of the outcome and non-outcome with each other. Here we noticed that educational level plays an important role. The results show that, when a firm has a well-educated workforce (in combination with the presence of institutional voids and the absence of an experienced manager) it leads to innovativeness, while firms with low-educated workers (in combination with the absence of the other conditions) are linked to non-innovative behavior. Besides, if we do not include

workforce educational level in our analysis the configuration also leads to non-innovativeness. So in this regard, this condition (workforce educational level) can determine whether a firm is innovative (when it is present) or non-innovative (when it is absent). This is something we also noticed in the analysis of necessary conditions, where the absence of an educated workforce turned out to be a necessary condition for non-innovativeness. Also institutional voids (condition) are important, as the results show that the voids are present in the configuration leading to innovation, while they are absent in the configurations leading to non-innovation. However, in the analysis for sufficiency and necessity we did not find prove that it is a necessary or sufficient condition. So therefore we are not able to state that this condition changed the direction of the configurations. Besides, it is interesting that the results indicate managerial experience (condition) is not a contributor to the subset of conditions driving innovation. The configurations even show that the opposite may be true. We come back to this in sub-section 5.1 Discussion.

4.3 Robustness check

To check the robustness of the results we tried to be as transparent as possible in our data operationalization, calibration and in the analyses we performed. Besides, we tried various ways of data calibration to see whether substantial differences in the outcome occurs. We tried various analyses, anchor points and consistency levels to see whether this resulted in interesting or different results. The syntaxes for these new calibrated conditions can be found in Appendix 7.

We started by recalibrating the managerial experience condition. In the distribution table we noticed that many enterprises (innovative or not) have an experienced manager (see table 113 Appendix 7). Therefore we decided to spread our anchor points more across the values (see syntaxes Appendix 7). We labeled this new condition as *fsexperience3*. Table 128, 129, and 130 (Appendix 7) indicates that a change occurred. After the change the consistency values in the truth table and in the test for necessary conditions became lower, indicating that the other anchor points explained the condition better. Next to that we also tried several small changes regarding the anchor points to check the robustness; we changed for example the crossover point from 0.51 to 0.49 to see whether this changed the results. All syntaxes for the recalibrations of the condition can be found in Appendix 7 and did not gave us other insights, indicating that the results are robust.

Next we recalibrated the institutional voids condition (product, labor and capital market, and regulatory institutional environment). First we made some small adjustment to the anchor points to see how robust the results are. The syntaxes for this recalibration are shown in Appendix 7. Table 131, 132 and 133 (Appendix 7) show the results and point out that they mostly stayed the same. The consistency values are still low, so based on this we are able to state that our results are robust. After these small adjustments we tried several bigger changes; we tried wider spread anchor points, and we

inserted the four voids separately into the analysis (syntaxes and results are presented in Appendix 7, table 131, 132, and 133). Only the anchor point adjustments gave higher consistency values in the test for necessary conditions. Therefore we included this recalibrated condition in the truth table analysis. However, this did not result in sufficient configurations (see table 133, Appendix 7). Therefore we stick to our first anchor points.

After this, we recalibrated our workforce educational condition. In our first analysis this condition showed that especially enterprises with a well-educated workforce are innovative while firms without a well-educated workforce are less innovative. Therefore we tried new anchor points that made it more ambitious to become fully-in the set (only companies with a very well-educated workforce are located in the set). The syntaxes for the recalibrations and the results can be found in Appendix 7, table 134, 135, and 136. Here we see that the consistency values increased, which indicates that indeed firms with more educated workers are likely to be more innovative. Next we checked whether it would be useful to use this calibration in our analysis. The truth table, however, shows that is does not explain whether certain configurations lead to the outcome or non-outcome. Therefore, we decided to stick to our first calibrated condition. We also tried several smaller adjustments to see whether the results are robust. The syntaxes for these adjustments are presented in Appendix 7, table 134 and 135, and show that it did not affect our results. So, no other interesting results arose from this recalibration.

Finally, we recalibrated our knowledge source conditions. We made some small additions in the calibration process to see whether this changed the results. The syntaxes for this recalibration and the corresponding results are shown in table 137, 138 and 139 (Appendix 7). The consistency values almost did not change and also the truth table changed just a little. It still presents 3 sufficient configurations, where one of them has slightly less observations. So also here we are able to conclude that our results are robust and does not change when making small adjustments.

4.3 Summary

Our results showed that the absence of all conditions lead to non-innovative behavior. Besides, we found evidence that the absence of managerial experience and institutional voids (without the other conditions) also lead to non-innovative practices. Furthermore, our results showed that innovativeness occurs as a firm experiences institutional voids, possesses a well-educated workforce and does not have an experienced manager. The recalibration of the data indicated that small adjustments of the anchor points did not cause large differences in the results. As said before we may speak of a high robustness if marginal differences occur after these changes. Therefore we are able to conclude our results are robust (Schneider & Wagemann, 2012). In the next chapter we discussed these results by comparing them with our theoretical framework, and if necessary with new information sources. Besides we made a short conclusion of our findings.

5 Discussion and conclusion

The aim of this research was to study what combination of conditions lead or do not lead to an innovative SME in India. We did this by indicating what conditions and/or configurations are sufficient or necessary to become innovative. We selected several conditions which were important factors in other studies regarding firm innovation, namely; knowledge sources, managerial experience, institutional voids, and workforce educational level. In this chapter we discussed these results by comparing them with our theoretical framework, and if necessary with new information sources. After that we gave a short conclusion of our findings. Later in this chapter we discussed our theoretical and practical implications in order to make our most important findings clear for researchers, managers and all others that are interested in the findings. Besides, we gave a short reflection about our research procedure. Also this research has some limitations, which we highlighted after our reflection. We ended up with some recommendations regarding future research.

5.1 Discussion

Innovative SMEs in India

The results show that SMEs that experience regional voids, that do not have an experienced manager but that have a well-educated workforce, together lead to innovativeness within the firm. Especially the first two conditions are surprising as we expected, based on our theoretical framework, that the absence of regional voids and the presence of experienced managers would stimulate innovative practices. However, the opposite turns out to be true for small- and medium sized enterprises in India. Therefore we again analyzed some research papers. Here we noticed voids are indeed often linked to unfavorable influences to organizations, as explained in our theoretical framework. However, Khanna & Palepu (2010) spend a whole chapter to the business opportunities these voids can give. They stated that especially (local) firms with local knowledge can exploit voids and turn them into a competitive advantage. To deal with these often called 'obstructing conditions', innovative ideas are required. This is also supported by Agostini, Marques, and Bossle (2016) who stated that innovative practices help to take advantage of, and fill institutional voids. According to them innovation is a good response to institutional voids. For SMEs this may be a reason to stimulate internal creativity and innovation in order to deal with these market conditions. Also Mair & Marti (2009) showed that institutional voids can stimulate entrepreneurial initiatives, which can result in innovation, as effort to overcome these voids. So, it is not always essential that companies located in areas with a lot of voids are immediately non-innovative, it also depends on other conditions. Having said this, it is not our intention to refute other researches who argued this, but it is remarkable and quite a shortcoming (missed point) that the perception regarding voids is often one-sided explained as an unsatisfactory condition for firms. Nonetheless, we found a combination of conditions, including the presence of voids that lead to

innovative enterprises. So it can be seen as an opportunity stimulating creativity and innovativeness. The second condition, in the subset, plays an important role resulting in the outcome, namely the presence of a well-educated workforce. This is in line with various researches we mentioned in our theoretical framework (e.g. Robson et al., 2009; Hausman, 2005). These studies mentioned the importance of well-educated employees in an organization regarding innovation performance. Their skills and ability to learn depends on their educational background, and workers who are more developed in this regard are able to stimulate and improve innovative ideas. In turn, the workforce is guided by a manager, someone who earns a lot of respect from employees in India (Mind Tools, n.d.). However, for managerial experience (as condition), we found a somewhat controversial finding in comparison to our theoretical framework. Our results display that managers without experience, in combination with previous mentioned conditions, stimulate innovation within a SME. Based on our theoretical framework you would expect to find the reverse, as it indicated that more experienced managers have more market knowledge and therefore are able to come with more innovative ideas (Hausman, 2005; Romer, 1990). That is why we again did some theoretical research. In the literature we found some papers that explained that young talent, without a lot of experience, may stimulate innovative practices as they are not part of the daily routine of activities and because they have different views on market circumstances (such as opportunities and threats). They are less biased by their experiences and are open to new developments that are not always obvious. This may ensure that firms are not sticking to the things they normally do and this in turn may encourage innovative ideas (Zenger & Folkman, 2015). Baumol (2004) agrees with this statement and explained in his own research that often innovative ideas "are carefully designed to prevent unwelcome surprises and to keep risk to a minimum. As a result there is little of the free-wheeling, imaginative, and risk-taking approach that characterizes the entrepreneur" (p. 327). Also the results of Daveri & Parisi (2015) showed that inexperienced managers may encourage innovativeness as they found that the level of managerial experience is negatively correlated to innovation. Although we could not find a study specifically directed towards SMEs in India regarding inexperienced managers stimulating innovation, it seems that inexperienced managers also could play a role for SMEs to become innovative. But again, in our research this only counts in combination with the other conditions, and in this regard especially a well-educated workforce is important. Without educated workers the firm becomes non-innovative (also if the other conditions stay the same). So, a well-educated workforce solves the weaknesses that a less-experienced manager and/or voids involve; such as the absence of specific knowledge an inexperienced manager has, and the unfavorable influences of regional voids. This brings us to the configurations regarding the non-outcome.

Non-Innovative SMEs in India

Our results indicate that if a well-educated workforce is absent (not included in the configuration or absent in a SME), the firm becomes non-innovative. So especially the absence of this condition is very influential and important in the configurations. This is in line with, and supports the studies that also indicated that the educational level of employees could affect the innovation performance of an organization; in a negative sense if the organization does not have well-educated workers (Schündeln & Playforth, 2014; Romer, 1990). Also the absence of an experienced manager (in configurations two and three) leading to non-innovativeness is partly in line with the theories we found. Like Romer (1990), and Hausman (2005) we found that less experienced managers may reduce the innovation performance, depending on other influences. However, we are not able to conclude that this condition really makes the difference to become innovative or non-innovative, as the condition is not necessary nor sufficient. The condition is both absent in the configurations of the outcome and non-outcome, and therefore it indicates that it does not really matter whether the firm has an experienced or non-experienced manager; it can both lead to innovative or non-innovative behavior depending on the other conditions in the subset. The same is true for the institutional voids. The configurations for the non-outcome show that the absence of voids lead to non-innovative SMEs. This is a bit surprising if we compare it to our theoretical framework where various studies indicated that the absence of voids stimulate innovative practices as enterprises are not hindered by unfavorable market conditions. We can give two reasons for our findings; (1) in both configurations a well-educated workforce is absent. So in this sense, the configuration leads to the non-outcome due to the absence of a well-educated workforce (not because of the absence of voids). The configuration is not sufficient when this condition (workforce educational level) is present so this may explain the outcome. Therefore, a well-educated workforce has more impact on the organization, something we also found in the analysis for necessity. (2) SMEs do not feel the pressure to innovate from the environment where they operate, because the environment is well developed and does not require a lot of creativity to deal with obstructing conditions. Something that fosters innovation in regions where regional institutional voids are present, as we found in the configuration leading to innovativeness (Agostini, Marques & Bossle, 2016; Khanna & Palepu, 2010). However, in the analysis for sufficiency and necessity we did not find prove that the absence of the condition is necessary or sufficient for the non-outcome. And therefore we cannot say that this condition changed the direction of the configurations.

5.2 Conclusion

Our findings show that an educated workforce plays an important role to become innovative as SME in India. Firms with well-educated workers are more likely to be or become innovative. The other conditions we used can both have positive and/or negative effects on SME innovativeness, depending

on the conditions of the firm. An inexperienced manager, for example, may stimulate innovative practices but only in combination with the presence of institutional voids and well-educated workers. On the other hand it may discourage innovation if the firm does not experience any voids and does not possess well-educated employees. Besides, our findings show that institutional voids do not always negatively influence enterprises, we can also see them as opportunities. Our results show that the presence of voids in combination with a well-educated workforce, and an inexperienced manager stimulate innovation of a SME. At the same time it may even be that the absence of voids, in combination with an inexperienced manager and a poorly educated workforce, lead to non-innovative behavior. Especially a high workforce educational level is an important condition to become innovative.

5.3 Theoretical implications

Most studies focused on separate conditions of the institutional- and resource-based view. Both views are important and have influence on the innovation performance of SMEs (Sleuwaegen & Goedhuys, 2002; Murphy, 2002; Castellacci, 2015). Especially its combination can add its value (Peng et al., 2009; Gao et al., 2010). However, to the best of our knowledge no study examined the four conditions we used in combination to examine what kind of influence they commonly have on innovative practices of SMEs in India (Goedhuys, Janz, & Mohneny, 2014; Lu, Tsang, & Peng, 2008). The conditions we used are; knowledge sources, managerial experience, workforce educational level, and regional institutional voids.

We showed it is possible and useful to take this comprehensive view into account, as our outcomes showed sometimes contradictory results in comparison to studies that examined individual variables in relation to the outcome and non-outcome. We indicated that several conditions commonly lead to innovativeness while others do not. For example, while some studies only indicated that voids have negative effects on organizations, our research showed that this not necessarily has to be the case. It depends on the circumstances of the organization. Our research showed that voids may have positive effects on the innovation performance, and that it even may have negative effects if regions does not consist voids at all. It depends on the other conditions and that is where this research added its theoretical value. Conditions cannot be seen as separate parts, everything is connected and influences each other. Firms have to deal with all these conditions at the same time. So this research showed that researchers should pay attention to a holistic view of conditions. Mistakes in decisions and recommendations can be made if conditions are not seen in context with each other. Our research plays a part here, as we combined various variables from two theories (resource-based view, and institutional theory). But also this research does not give a complete and comprehensive view of all conditions in the market. With the conditions we took into account, we showed that workforce

educational level has an important role regarding the innovativeness of a SME. The absence of a well-educated workforce leads to non-innovativeness. Besides, we saw that firms located in areas without any voids, that do not have an experienced manager and a well-educated workforce are linked to non-innovative behavior. Fortunately, there is also good news; to become innovative a SME, located in a region with voids, should have an inexperienced manager, and most importantly the firm needs well-educated workers.

5.4 Practical implications

In this research we studied the influences of firm resources and institutional conditions on the innovation performance of SMEs in India. Our results are especially valuable for managers running a SME in an emerging market, who are wondering how to improve their innovation performance. Based on our findings we have several practical implications. The study indicated that if a firm aims for a good innovation performance it is important that it possesses a well-educated workforce. This can be done by hiring educated employees or by training/educating the current employees in order to develop them. This condition has a lot of influence on the innovation performance and can help to increase the innovativeness of a SME. Besides, our research showed that an experienced manager will not always positively influence the innovation performance. For some SMEs it may be valuable to hire an inexperienced manager. Especially for firms with a well-educated workforce, located in regions with institutional voids it may be worthwhile to appoint a manager without experience. However, for firms located in regions without any voids and without well-educated workers this may be less beneficial as we noticed this well lead to non-innovativeness. Besides, the results showed it is important for each manager to take all conditions, which may influence the organization, into account. Managers should not focus on every condition separately, as all circumstances influence each other. Some conditions may be beneficial in combination, while the same condition may be individually unfavorable. So managers of SMEs should carefully analyze the environment to see how the conditions influence each other and how this may lead to a specific outcome or non-outcome. But, if a SME want to increase its innovation performance, a well-educated workforce is necessary.

5.5 Limitations

Of course our research also suffers from some limitations, like other studies. First, our research does not cover all the regions in India. Since not all regions where covered in the interviews we were not able to generalize our results to all regions in India. As India heavily differs across the regions this may influence our results. Second, since we could not carry out the data collection ourselves we were dependent on the data received from the World Bank, Tilburg University, and from the persons that executed the interviews. Therefore we were not able to monitor the process of data collection and processing. For example, we noticed during the study that some questions related to trust had many

missing values. Because we did not perform the interviews ourselves it was very difficult to find out why this was the case. In the end we needed to delete these variables as we had some question marks regarding their validity and reliability. Besides, the questionnaires they used during the interviews were not specifically designed for our study. We needed to choose the questions that most matched with this study and with the variables we wanted to include. In general, we found enough questions that could be used. However, for some variables we only found one or a few questions that were appropriate to use (for example for the labor- and capital market). So unfortunately we were not able to include our own questions directly related to the topic. Nevertheless, the use of external data does not have to be a limitation as also other studies showed the value of it (e.g. Barasa et al., 2017). Another limitation in our research is the outcome variable. We measured innovation with the question that asked respondents whether they introduced a new or significantly improved product or service during the last three years. According to various studies this is a good question to measure innovation. However, for some interviewees it could be difficult to say whether they introduced a new product or service since it could differ per person whether he or she sees something as really new and innovative. This makes the question a bit subjective. A more objective measurement would have been the amount of patents the enterprises applied for. In our research this was not possible since it is not very common in India to apply for patents; we noticed that only 42 out of 554 enterprises requested one or more patents (Nair, Guldiken, Fainshmidt, & Pezeshkan, 2015). However, this may change in the future and should certainly be monitored in future researches as MNEs in India already show a growth in the application for patents (Nair, Guldiken, Fainshmidt, & Pezeshkan, 2015). Besides, in this research we measured the institutional voids on regional level. Therefore we assumed that the sampled firms are representative for the population of firms in a given region, which was not always the case. Another limitation in this research is that we used two separate questionnaires that were performed in two different years. The ES is performed in 2014 while the IFS in 2016. Therefore, we did not combine questions of the two surveys into one item/condition to prevent inconsistent outcomes. Finally, for the calibration process it was difficult to find the most sufficient anchor points since there are not many studies available indicating which compositions are most valuable. We tried to manage this by using substantive data, and by recalibrating the conditions in order to check the robustness of the results.

5.6 Implications for future research

In this research we used a relatively new research technique (fs/QCA) that is able to combine various conditions and can show whether the combinations of these conditions lead to the outcome or non-outcome. Most studies are focused on linear relations and forget to mention and measure the

combined effects of variables leading to a specific outcome. This research shows the value of the technique, and indicates that fs/QCA is a promising method for future research.

Our research focused on the integration of variables from two theories, namely the resource-based view and the institutional theory. However, according to Gao, Murray, Kotabe, and Lu (2010) there is also a third view that may influence an enterprise's strategy; the industry-based view. The industry-based view takes into account the circumstances of a particular industry and its influence on a business's strategy. It would be interesting to include variables from this view in future researches to get an even more complete picture of organizational influences. Besides, it would be interesting to include new conditions (of the theories we used) in further research. According to the coverage values in this research there are more conditions explaining the outcome and non-outcome. So, it would be valuable to see what (combination of) conditions may further explain innovation and non-innovation, such as trust or export (Robson, Haugh, & Obeng, 2009). Furthermore, it would be nice if future research is able to include all regions in India and at the same time additional emerging markets to see whether our results remain the same, and to see if they are applicable to these new areas. Barasa et al. (2017) for example showed that large differences in the institutional environment of a firm may affect innovation performance. Therefore, we can image this will vary across markets since countries differ in, among others, cultures, rules and/or habits. Moreover, it would be valuable to include larger firms in further research to see whether there are differences between smaller and larger firms. Baumol (2004) showed the differences in, among others, strengths and weaknesses between small-, and large firms related to innovativeness. So, it would be interesting to see if there are differences in circumstances influencing innovation of smaller- and larger firms. Moreover, our research showed that institutional voids, in combination with the previous mentioned conditions, may stimulate innovation. However, other researchers showed the negative sides of voids related to innovation. It would be worthwhile to research what it is that firms do to overcome these negative sides of voids. Finally, we found that inexperienced managers could improve, in combination with the other conditions mentioned earlier, the innovation performance of a SME. However, there are not a lot of researches explaining this outcome specifically directed towards SMEs in India. More research regarding this topic is necessary and would be useful for a more comprehensive explanation.

5.7 Reflection

This research focused on four important conditions influencing the innovativeness of SMEs. We chose these conditions based on existing theories. By using fs/QCA as research technique we were able to identify several configurations leading to the outcome and to the non-outcome. However, there were more conditions we tried to include in our research but that did not add any value. In this paragraph we highlighted these conditions as they may add some value to future studies. Among others, we tried

to include the conditions trust and network relations. Trust is an important ingredient, and condition in a network (Murphy, 2002; Putnam, Leonardi, & Nonetti, 1993; Woolcock, 1998). Putnam, Leonardi, and Nonetti (1993) explained the likelihood of collaboration increases as there is a high level of trust within the network, which subsequently will prompt innovation through information exchange (Murphy, 2002). However, when we included the condition in our missing value analysis, we noticed that three out of the four trust items had a very high missing value that we could not directly explain. Removing these observation would be at the expense of the power of the other variables. Therefore we decided to delete the trust variable in this study. Nonetheless, it could be an important condition in further researches, related to networks and/or knowledge sources. Furthermore, we also tried to include some items that measured the degree of (established) relations with four different stakeholders (buyers, suppliers, competitors, and institutional actors). However, when we used this in our analyses we noticed that almost all enterprises had a relation with these actors. Therefore we could not distinguish any innovative and non-innovative SMEs related to this condition. This has led us to delete the item from the research since it did not add any value.

Furthermore, our research process went well. No large setbacks, that are worthwhile to mention, occurred during the project. We sometimes made some small adjustments in the analyses to see whether large differences occurred, but this did not happen. During the project we received a lot of valuable information from various experts, which helped us to deliver this end result. It was a nice and educational project that, according to us, has become a success and offers enough potential and opportunities for further research.

Acknowledgements

Special thanks goes to Patrick Vermeulen, and Ayse Saka-Helmhout for the many helpful discussions, their valuable feedback, and their insightful comments and suggestions. Furthermore, we would also like to thank organizations like Tilburg University and the World Trade Organization for their effort of the data collection and for providing the gathered data. Finally, we would like to thank all others that supported or contributed to this project.

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7 Appendices

Appendix 1 – Survey Questions

3.3.1 Outcome variable

H.1	During the last three years, has this establishment introduced **new** or **significantly improved products** or services? **SHOW CARD 16**

INTERVIEWER: SHOW CARDS IN THIS SECTION CONTAIN EXAMPLES OF INNOVATIONS. THEY ARE MEANT AS EXAMPLES ONLY - THEY DO NOT CONTAIN ALL POSSIBLE INNOVATIONS.

Yes	1	
No	2	*GO TO QUESTION H.3*
DON'T KNOW (SPONTANEOUS)	-9	*GO TO QUESTION H.3*
	h1	

(World Bank Group, 2014, p. 20)

3.3.2 Conditions

Regional institutional voids

Product market:

Hard infrastructure:

						(SPONTANEOUS)	
	No obstacle	Minor obstacle	Moderate obstacle	Major obstacle	Very Severe Obstacle	**DON'T KNOW**	**DOES NOT APPLY**
Transport **d30a**	0	1	2	3	4	**-9**	**-7**

(World Bank Group, 2014, p. 18)

						(SPONTANEOUS)	
	No obstacle	Minor obstacle	Moderate obstacle	Major obstacle	Very Severe Obstacle	**DON'T KNOW**	**DOES NOT APPLY**
Electricity **c30a**	0	1	2	3	4	**-9**	**-7**
Telecommunications **c30b**	0	1	2	3	4	**-9**	**-7**

(World Bank Group, 2014, p. 9)

Soft infrastructure:

						(SPONTANEOUS)	
	No obstacle	Minor obstacle	Moderate obstacle	Major obstacle	Very Severe Obstacle	**DON'T KNOW**	**DOES NOT APPLY**
Access to inputs and supplies **SARd31b**	0	1	2	3	4	**-9**	**-7**
Access to production technology **SARd31c**	0	1	2	3	4	**-9**	**-7**
Availability of storage facilities, including cold storage facilities and warehouses **SARd31f**	0	1	2	3	4	**-9**	**-7**

(World Bank Group, 2014, p. 18)

Labor market:

						(SPONTANEOUS)	
	No obstacle	Minor obstacle	Moderate obstacle	Major obstacle	Very Severe Obstacle	DON'T KNOW	DOES NOT APPLY
Inadequately educated workforce **l30b**	0	1	2	3	4	-9	-7

(World Bank Group, 2014, p. 42)

Capital market:

						(SPONTANEOUS)	
	No obstacle	Minor obstacle	Moderate obstacle	Major obstacle	Very Severe Obstacle	DON'T KNOW	DOES NOT APPLY
Access to finance **k30**	0	1	2	3	4	-9	-7

(World Bank Group, 2014, p. 32)

Regulatory environment:

Level of corruption:

						(SPONTANEOUS)	
	No obstacle	Minor obstacle	Moderate obstacle	Major obstacle	Very Severe Obstacle	DON'T KNOW	DOES NOT APPLY
Corruption **j30f**	0	1	2	3	4	-9	-7

(World Bank Group, 2014, p. 36)

Rule of law:

						(SPONTANEOUS)	
	No obstacle	Minor obstacle	Moderate obstacle	Major obstacle	Very Severe Obstacle	DON'T KNOW	DOES NOT APPLY
Political instability **j30e**	0	1	2	3	4	-9	-7
Courts **h30**	0	1	2	3	4	-9	-7

(World Bank Group, 2014, p. 36)

						(SPONTANEOUS)	
	No obstacle	Minor obstacle	Moderate obstacle	Major obstacle	Very Severe Obstacle	DON'T KNOW	DOES NOT APPLY
Crime, theft and disorder **i30**	0	1	2	3	4	-9	-7

(World Bank Group, 2014, p. 27)

Regulatory quality:

		No obstacle	Minor obstacle	Moderate obstacle	Major obstacle	Very Severe Obstacle	(SPONTANEOUS) DON'T KNOW	(SPONTANEOUS) DOES NOT APPLY
Tax rates	j30a	0	1	2	3	4	-9	-7
Tax administration	j30b	0	1	2	3	4	-9	-7
Business licensing and permits	j30c	0	1	2	3	4	-9	-7

(World Bank Group, 2014, p. 36)

	No obstacle	Minor obstacle	Moderate obstacle	Major obstacle	Very Severe Obstacle	(SPONTANEOUS) DON'T KNOW	(SPONTANEOUS) DOES NOT APPLY
Customs and trade regulations d30b	0	1	2	3	4	-9	-7

(World Bank Group, 2014, p. 18)

Firm resources

Human resource capital:

B.7	How many years of experience working in this sector does the Top Manager have?

	Years
Manager's experience in sector	b7
LESS THAN ONE YEAR	1
DON'T KNOW (SPONTANEOUS)	-9

(World Bank Group, 2014, p. 5)

L.9b	What is the percentage of full-time permanent workers who completed secondary school?

	Percent
Percentage of full time permanent workers who completed secondary school	l9b
DON'T KNOW (SPONTANEOUS)	-9

(World Bank Group, 2014, p. 39)

INDL.9c	What is the percentage of full time permanent workers who have at least a bachelor's degree?

	Percent
Percentage of full time permanent workers who have at least a bachelor's degree	INDl9c
DON'T KNOW (SPONTANEOUS)	-9

(World Bank Group, 2014, p. 39)

Inter-organizational resource capital:

Network:

B.1b	Thinking about innovation, has this establishment used information or ideas **from competitors** for any innovation activity undertaken between fiscal year 2010 and fiscal year 2012?

Yes	1	
No	2	*SKIP TO B.1c*
DON'T KNOW (SPONTANEOUS)	-9	*SKIP TO B.1c*

b1b

(Tilburg University & The World Bank, 2016, p. 4)

B.1c	Thinking about innovation, has this establishment used information or ideas **from suppliers** for any innovation activity undertaken between fiscal year 2010 and fiscal year 2012?

Yes	1	
No	2	*SKIP TO B.1d*
DON'T KNOW (SPONTANEOUS)	-9	*SKIP TO B.1d*

b1c

(Tilburg University & The World Bank, 2016, p. 5)

B.1d	Thinking about innovation, has this establishment used information or ideas **from products or services available in the market (e.g., by reverse engineering, observation)** for any innovation activity undertaken between fiscal year 2010 and fiscal year 2012?

Yes	1	
No	2	*SKIP TO B.1e*
DON'T KNOW (SPONTANEOUS)	-9	*SKIP TO B.1e*

b1d

(Tilburg University & The World Bank, 2016, p. 5)

B.1e	Thinking about innovation, has this establishment used information or ideas **from universities and research institutes** for any innovation activity undertaken between fiscal year 2010 and fiscal year 2012?

Yes	1	
No	2	*SKIP TO B.1f*
DON'T KNOW (SPONTANEOUS)	-9	*SKIP TO B.1f*

b1e

(Tilburg University & The World Bank, 2016, p. 6)

B.1f	Thinking about innovation, has this establishment used information or ideas **from consultancy firms** for any innovation activity undertaken between fiscal year 2010 and fiscal year 2012?

Yes	1	
No	2	*SKIP TO B.1g*
DON'T KNOW (SPONTANEOUS)	-9	*SKIP TO B.1g*

b1f

(Tilburg University & The World Bank, 2016, p. 6)

B.1g	Thinking about innovation, has this establishment used information or ideas **from business associations and workshops, conferences, exhibits, and trade shows** for any innovation activity undertaken between fiscal year 2010 and fiscal year 2012?

Yes	1	
No	2	*SKIP TO B.1h*
DON'T KNOW (SPONTANEOUS)	-9	*SKIP TO B.1h*

b1g

(Tilburg University & The World Bank, 2016, p. 6)

B.1h	Thinking about innovation, has this establishment used information or ideas **from professional journals or trade publications** for any innovation activity undertaken between fiscal year 2010 and fiscal year 2012?

Yes	1	
No	2	*SKIP TO B.1i*
DON'T KNOW (SPONTANEOUS)	-9	*SKIP TO B.1i*

b1h

(Tilburg University & The World Bank, 2016, p. 7)

B.1i	Thinking about innovation, has this establishment used information or ideas **from the Internet** for any innovation activity undertaken between fiscal year 2010 and fiscal year 2012?

Yes	1	
No	2	*SKIP TO B.1j*
DON'T KNOW (SPONTANEOUS)	-9	*SKIP TO B.1j*

b1i

(Tilburg University & The World Bank, 2016, p. 7)

B.1j	Thinking about innovation, has this establishment used information or ideas **from customers' feedback** for any innovation activity undertaken between fiscal year 2010 and 2012?

Yes	1	
No	2	*SKIP TO B.2a*
DON'T KNOW (SPONTANEOUS)	-9	*SKIP TO B.2a*

b1j

(Tilburg University & The World Bank, 2016, p. 8)

Importance of the information

B.1b1	How important was the information or ideas from competitors for this establishment's innovative activity?

Not important	0
Moderately important	1
Very Important	2
DON'T KNOW (SPONTANEOUS)	-9

b1b1

(Tilburg University & The World Bank, 2016, p. 5)

B.1c1	How important was the information or ideas from suppliers for this establishment's innovative activity?

Not important	0
Moderately important	1
Very Important	2
DON'T KNOW (SPONTANEOUS)	-9

b1c1

(Tilburg University & The World Bank, 2016, p. 5)

B.1d1	How important was the information or ideas from products or services available in the market (e.g., by reverse engineering, observation) for this establishment's innovative activity?

Not important	0
Moderately important	1
Very Important	2
DON'T KNOW (SPONTANEOUS)	-9

b1d1

(Tilburg University & The World Bank, 2016, p. 5)

B.1e1	How important was the information or ideas from universities and research institutes for this establishment's innovative activity?

Not important	0
Moderately important	1
Very Important	2
DON'T KNOW (SPONTANEOUS)	-9

b1e1

(Tilburg University & The World Bank, 2016, p. 6)

B.1f1	How important was the information or ideas from consultancy firms for this establishment's innovative activity?

Not important	0
Moderately important	1
Very Important	2
DON'T KNOW (SPONTANEOUS)	-9

b1f1

(Tilburg University & The World Bank, 2016, p. 6)

B.1g1	How important was the information or ideas from business associations and workshops, conferences, exhibits, and trade shows for this establishment's innovative activity?

Not important	0
Moderately important	1
Very Important	2
DON'T KNOW (SPONTANEOUS)	-9

b1g1

(Tilburg University & The World Bank, 2016, p. 7)

B.1h1	How important was the information or ideas from professional journals and trade publications for this establishment's innovative activity?

Not important	0
Moderately important	1
Very Important	2
DON'T KNOW (SPONTANEOUS)	-9

b1h1

(Tilburg University & The World Bank, 2016, p. 7)

B.1i1	How important was the information or ideas from the Internet for this establishment's innovative activity?

Not important	0
Moderately important	1
Very Important	2
DON'T KNOW (SPONTANEOUS)	-9

b1i1

(Tilburg University & The World Bank, 2016, p. 7)

B.1j1	How important was the information or ideas from customers' feedback for this establishment's innovative activity?

Not important	0
Moderately important	1
Very Important	2
DON'T KNOW (SPONTANEOUS)	-9

b1j1

(Tilburg University & The World Bank, 2016, p. 8)

Appendix 2 – Planning

Part	Week number	Thesis week (start: January 30th, 2017)	Deadline (2017)
Conceptual model	5	1	***Submitting Conceptual model (February 5th)***
	6	2	Searching for usable literature and variables
Research proposal	7	3	Searching for usable literature and variables
	8	4	Working on Chapter 1
	9	5	Working on Chapter 1 + 2
	10	6	Working on Chapter 2
	11	7	Working on Chapter 2 + 3
	12	8	Working on Chapter 2 + 3
	13	9	***Submitting Research proposal (March 27th)***
	14	10	Exam week minor
Thesis	15	11	Working on chapter 4
	16	12	Working on chapter 4
	17	13	Working on chapter 4
	18	14	Working on chapter 4
	19	15	Working on chapter 5
	20	16	Working on chapter 5
	21	17	Working on chapter 5
	22	18	Working on chapter 6
	23	19	Working on chapter 6
	24	20	Finalizing phase
	25	21	***Submitting definitive thesis (June 19th)***
Defense	26	22	***Final pitch***
	27	23	***Final pitch***

Appendix 3 – Research Integrity Form

Research Integrity Form - Master Thesis

Name:	Student number:
Dennis van der Plaats	**4649664**
RU e-mail address:	Master specialisation:
D.vanderPlaats@student.ru.nl	**Strategic Management**

Thesis title: **A configurational approach to innovation focused on Small and Medium-sized manufacturing Enterprises in India**
Brief description of the study: **This study explores which configurations of regional institutional voids and firm resources, leads to the presence or absence of innovation of Small and Medium-sized manufacturing Enterprises in India.** **Qualitative Comparative Analysis (QCA) is used as configurational method for the analyses.**

It is my responsibility to follow the university's code of academic integrity and any relevant academic or professional guidelines in the conduct of my study. This includes:

- providing original work or proper use of references;
- providing appropriate information to all involved in my study;
- requesting informed consent from participants;
- transparency in the way data is processed and represented;
- ensuring confidentiality in the storage and use of data;

If there is any significant change in the question, design or conduct over the course of the research, I will complete another Research Integrity Form.

Breaches of the code of conduct with respect to academic integrity (as described / referred to in the thesis handbook) should and will be forwarded to the examination board. Acting contrary to the code of conduct can result in declaring the thesis invalid

Student's Signature: _____ **Date:**

To be signed by supervisor

I have instructed the student about ethical issues related to their specific study. I hereby declare that I will challenge him / her on ethical aspects through their investigation and to act on any violations that I may encounter.

Supervisor's Signature: _____ **Date:**

Appendix 4 – Research Ethics

Research ethics are the norms a research should meet. It is mainly intended to prevent unacceptable behavior during the research. A research should meet various norms, such as; honesty, objectivity, integrity, carefulness, openness, respect for participants and others that are involved in the research, and social responsible (Resnik, 2015).

In this research we used the data of the ES and ICS. Therefore we did not conduct our own questionnaire. As a result, we did not have any contact with our respondents. However, there were some other people involved in the research such as our supervisor and second reader. We involved them closely during the research, we were respectful, and we kept them up to date with our progress.

Since we used external data that is collected by others (collected by The World Bank and by Tilburg University in collaboration with the Enterprise Analysis Unit of The World Bank), we carefully handled the data, and gave insight into how we dealt with it and what analyses we performed. We did this stepwise to make sure others were able to see what we did, and how we did it. Furthermore, we shares our results, ideas, and resources. This ensured that others were able to judge our work, and were able to use it for further research purposes. The data we used is anonymous and therefore it is not possible to link the data to specific persons or companies.

This research has a social responsible goal, as we tried to identify the influences that promote or hamper the innovativeness of Small and Medium-sized manufacturing Enterprises in emerging markets (in particular India). Besides, we tried to advise these enterprises what they are able to do, to become innovative. Our goal was to help these enterprises in order that they can become more successful in the future. Besides, our goal was to add something new to the existing literature, and to stimulate further research.

We are always open to criticism, new ideas, suggestions and potential improvements!

Appendix 5 – Data Examination

Statistics

		Region	Firm size: Small or Medium (a6b)	Years of experience Top Manager (b7)	To what degree electricity is an obstacle (c30a)	To what degree telecommunication is an obstacle (c30b)	To what degree transport is an obstacle (d30a)	To what degree customs and trade regulations are obstacles (d30b)	To what degree access to inputs and supplies are obstacles (SARd31b)	To what degree access to production technology is an obstacle (SARd31c)	To what degree the availability of storage facilities is an obstacle (SARd31f)	Did the establishment introduce a new or significantly improved product or service during the last three years (h1)	To what degree crime, theft, and disorder is an obstacle (i30)	To what degree access to finance is an obstacle (k30)	To what degree tax rates are obstacles (j30a)
N	Valid	555	555	550	555	555	554	508	555	553	480	554	553	553	554
	Missing	0	0	5	0	0	1	47	0	2	75	1	2	2	1

To what degree tax administration is an obstacle (j30b)	To what degree business licensing and permits are obstacles (j30c)	To what degree political instability is an obstacle (j30e)	To what degree corruption is an obstacle (j30f)	To what degree courts are obstacles (h30)	Percentage of full time permanent workers who completed secondary school (l9b)	Percentage of full time permanent workers who have at least a bachelor's degree (INDl9c)	To what degree an inadequately educated workforce is an obstacle (l30b)	Number of patent applications between 2010/2011 to 2012/2013 (b05)	Has this establishment used information or ideas from competitors (b1b)	Has this establishment used information or ideas from suppliers (b1c)	Has this establishment used information or ideas from products or services available in the market (b1d)	Has this establishment used information or ideas from universities (b1e)	Has this establishment used information or ideas from consultancy firms (b1f)	Has this establishment used information or ideas from business associations (b1g)
553	553	554	555	541	541	535	552	552	541	541	541	541	541	541
2	2	1	0	14	14	20	3	3	14	14	14	14	14	14

Has this establishment used information or ideas from professional journal (b1h)	Has this establishment used information or ideas from the Internet (b1i)	Has this establishment used information or ideas from customers (b1j)	How important was the information or ideas obtained from competiors (b1b1)	How important was the information or ideas obtained from suppliers (b1c1)	How important was the information or ideas obtained from product or services available in the market (b1d1)	How important was the information or ideas obtained from universities (b1e1)	How important was the information or ideas obtained from consultancy firms (b1f1)	How important was the information or ideas obtained from business associations (b1g1)	How important was the information or ideas obtained from professional journal (b1h1)	How important was the information or ideas obtained from the internet (b1i1)	How important was the information or ideas obtained from customers (b1j1)
541	541	541	555	555	555	555	555	555	555	555	555
14	14	14	0	0	0	0	0	0	0	0	0

Table 3: Frequency table

Number of patent applications between 2010/2011 to 2012/2013? (b05)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	509	91,9	92,4	92,4
	1	30	5,4	5,4	97,8
	2	10	1,8	1,8	99,6
	3	2	,4	,4	100,0
	Total	551	99,5	100,0	
Missing	-9	3	,5		
Total		554	100,0		

Table 4: Number of patent requests

Table 4 shows whether the enterprises applied for one or more patents during the last three years. It indicates that only 42 out of the 554 enterprises did this.

Is this an Innovating firm? (a5)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	540	97,5	97,5	97,5
	No	14	2,5	2,5	100,0
	Total	554	100,0	100,0	

Table 5: An innovating firm or not

The IFS asks respondents whether they are innovative or not. The results of this questions are displayed in table 5. It shows us that only 14 out of the 553 enterprises said they are not innovative.

Syntax recoding *breath* variable

```
SORT CASES BY Information_universities (D).
SORT CASES BY Information_universities (A).
RECODE Information_competitor Information_suppliers Information_products_or_services
    Information_universities Information_consultancyfirms Information_businessassociations
    Information_professionaljournals Information_internet Information_customerfeedback (2=0).
EXECUTE.
```

Missing data

Univariate Statistics

	N	Mean	Std. Deviation	Missing Count	Missing Percent	No. of Extremes[a] Low	No. of Extremes[a] High
Managerial_experience	550	13,97	9,809	5	,9	0	22
Electricity	555	1,29	1,249	0	,0	0	0
Telecommunications	555	,42	,829	0	,0	0	21
Transport	554	1,03	,963	1	,2	0	51
Customs_and_trade_regulations	508	,76	1,036	47	8,5	0	41
Access_to_inputs_and_supplies	555	,88	,984	0	,0	0	0
Access_to_production_technology	553	,89	1,010	2	,4	0	0
Availability_of_storage_facilities	480	,45	,771	75	13,5	0	10
Introduction_of_new_or_improved_product_or_service	554	1,54	,499	1	,2	0	0
Crime_theft_and_disorder	553	,63	,931	2	,4	0	32
Access_to_finance	553	1,12	1,179	2	,4	0	0
Tax_rates	554	1,72	1,194	1	,2	0	0
Tax_administration	553	1,40	1,094	2	,4	0	0
Business_licensing_and_permits	553	1,17	1,123	2	,4	0	0
Political_instability	554	1,19	1,224	1	,2	0	0
Corruption	555	2,301	1,2666	0	,0	0	0
Courts	541	,84	1,056	14	2,5	0	49
Completed_secondary_school	541	42,82	30,789	14	2,5	0	0
Completed_bachelors_degree	535	22,06	23,091	20	3,6	0	37
Inadequately_educated_workforce	552	,96	1,028	3	,5	0	0
Patent	552	,10	,387	3	,5	.	.
Information_competitor	541	1,34	,474	14	2,5	0	0
Information_suppliers	541	1,35	,479	14	2,5	0	0
Information_products_or_services	541	1,48	,500	14	2,5	0	0
Information_universities	541	1,85	,355	14	2,5	.	.
Information_consultancyfirms	541	1,84	,371	14	2,5	.	.
Information_businessassociations	541	1,45	,498	14	2,5	0	0
Information_professionaljournals	541	1,50	,500	14	2,5	0	0
Information_internet	541	1,30	,457	14	2,5	0	0
Information_customerfeedback	541	1,05	,222	14	2,5	.	.
Importance_information_competitors	555	1,15	,914	0	,0	0	0
Importance_information_suppliers	555	1,08	,905	0	,0	0	0
Importance_information_productsandservices	555	,41	,758	0	,0	.	.
Importance_information_universities	555	,01	,147	0	,0	.	.
Importance_information_consultancyfirms	555	,06	,337	0	,0	.	.
Importance_information_businessassociations	555	,90	,900	0	,0	0	0
Importance_information_professionaljournals	555	,75	,855	0	,0	0	0
Importance_information_internet	555	1,09	,841	0	,0	0	0
Importance_information_customerfeedback	555	1,77	,573	0	,0	.	.
Relations_with_buyers	555	4,74	,959	0	,0	3	0
Relations_with_suppliers	555	4,45	1,061	0	,0	20	0
Relations_with_competitors	550	4,12	1,090	5	,9	1	0
Relations_with_institutional_actors	552	4,51	1,074	3	,5	23	0
Region_IFS	555			0	,0		
Firmsize_IFS	555			0	,0		

a. Number of cases outside the range (Q1 - 1.5*IQR, Q3 + 1.5*IQR).

Table 6: Univariate statistics

Table 6 gives an overview of the missing data in our dataset. It shows us that especially three variables have a high missing value; see the red marks.

EM Means									
Managerial experience	Electricity	Telecommuni-cations	Transport	Customs and trade regulations	Access to inputs and supplies	Access to production technology	Availability of storage facilities	Introduction of new or improved product or service	Crime theft and disorder
13,97	1,29	,42	1,03	,74	,88	,89	,50	1,54	,64

Access to finance	Tax rates	Tax administration	Business licensing and permits	Political instability	Corruption	Courts	Completed secondary school	Completed bachelor's degree	Inadequately educated workforce
1,12	1,72	1,40	1,17	1,19	2,31	,85	42,77	21,83	,96

Patent	Information competitor	Information suppliers	Information product or services	Information universities	Information consultancy firms	Information business associations	Information professional journals	Information internet	Information customer feedback
0,10	1,35	1,37	1,48	1,85	1,84	1,46	1,51	1,31	1,07

Importance information competitor	Importance information suppliers	Importance information product or services	Importance information universities	Importance information consultancy firms	Importance information business associations	Importance information professional journals	Importance information internet	Importance information customer feedback
1,15	1,08	0,41	0,01	0,06	0,90	0,75	1,09	1,77

a. Little's MCAR test: Chi-Square = 2059,949, DF = 1661, Sig. = ,000

Table 7: Little's MCAR test

Table 7 shows the Little's MCAR test, which indicates whether the missing data is at random (MAR), or completely at random (MCAR). This test is significant (P= < .001) and therefore shows that the missing values are at random (MAR).

EM Means[a]	
Managerial experience	13,97
Electricity	1,29
Telecommunications	,42
Transport	1,03
Access to inputs and supplies	,88
Introduction of new or improved product or service	1,54
Crime theft and disorder	,64
Patent	,10
Access to finance	1,12
Tax rates	1,72
Tax administration	1,40
Business licensing and permits	1,17
Political instability	1,19
Corruption	2,301
Access to production technology	,89
Inadequately educated workforce	,96
Importance information competitors	1,15
Importance information suppliers	1,08
Importance information products and services	,41
Importance information universities	,01
Importance information consultancy firms	,06
Importance information businessassociations	,90
Importance information professionaljournals	,75
Importance information internet	1,09
Importance information customer feedback	1,77

a. Little's MCAR test: Chi-Square = 272,502, DF = 262, Sig. = ,315

Table 8: Little's MCAR test (for variables with missing value of about 1%)

Table 8 shows the Little's MCAR test, which indicates whether the missing data is at random (MAR), or completely at random (MCAR). This test is not significant (P= ,315) and therefore shows that the missing values are completely at random (MCAR).

EM Means[a]

Courts	,84
Completed secondary school	42,77
Completed bachelors degree	21,77
Information competitor	1,34
Information professional journals	1,51
Information products or services	1,35
Information products or services	1,48
Information universities	1,85
Information consultancy firms	1,84
Information business associations	1,45
Information internet	1,30
Information customer feedback	1,05

a. Little's MCAR test: Chi-Square = 104,839, DF = 66, Sig. = ,002

Table 9: Little's MCAR test (for variables with missing value ranging from 1 - 10%)

Table 9 shows the Little's MCAR test, which indicates whether the missing data is at random (MAR), or completely at random (MCAR). This test is significant (P= ,002) and therefore shows that the missing values are at random (MAR).

EM Means[a]

Courts	,84
Completed secondary school	42,82
Completed bachelors degree	21,75
Customs and trade regulations	,76

a. Little's MCAR test: Chi-Square = 23,949, DF = 23, Sig. = ,407

Table 10: (for variables with missing value ranging from 1 - 10%)

Table 10 shows the Little's MCAR test, which indicates whether the missing data is at random (MAR), or completely at random (MCAR). This test is not significant (P= ,407) and therefore shows that the missing values are completely at random (MCAR).

EM Means[a]

Courts	Completed_secondary_school	Completed_bachelors_degree	Customs_and_trade_regulations	Availability_of_storage_facilities
,84	42,82	21,75	,76	,50

a. Little's MCAR test: Chi-Square = 114,163, DF = 51, Sig. = ,000

Table 10a: Little's MCAR test (for the storage facility variable)

Table 11 shows the Little's MCAR test, which indicates whether the missing data is at random (MAR), or completely at random (MCAR). This test is not significant (P= < ,001) and therefore shows that the missing values are at random (MAR).

To what degree the availability of storage facilities is an obstacle (SARd31f)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No obstacle	323	58,2	67,3	67,3
	Minor obstacle	112	20,2	23,3	90,6
	Moderate obstacle	35	6,3	7,3	97,9
	Major obstacle	4	,7	,8	98,8
	Very severe obstacle	6	1,1	1,3	100,0
	Total	480	86,5	100,0	
Missing	-9	10	1,8		
	-7	65	11,7		
	Total	75	13,5		
Total		555	100,0		

Table 11: Frequencies table SARd31f

To what degree the availability of storage facilities is an obstacle (SARd31f) * Industry (a3) Crosstabulation

Count

		Industry (a3)																	
		Basic metals	Chemicals	Electronics	Fabricated metal products	Food	Furniture	Garments	Leather	Machinery and equipment	Non metallic mineral products	Paper	Plastics & rubber	Publishing, printing, and Recorded media	Textiles	Tobacco	Transport machines	Wood	Total
To what degree the availability of storage facilities is an obstacle (SARd31f)	Do not know	0	1	2	1	1	0	0	0	0	1	1	2	0	1	0	0	0	10
	Does not apply	5	3	11	9	1	2	0	1	5	1	3	6	3	2	6	6	0	64
	No obstacle	30	35	27	31	17	4	15	5	43	19	8	31	3	25	3	23	4	323
	Minor obstacle	5	10	15	15	11	1	2	4	10	0	5	18	0	4	0	10	2	112
	Moderate obstacle	5	7	1	2	7	0	0	0	6	2	1	1	0	1	0	2	0	35
	Major obstacle	1	0	0	0	1	0	0	0	0	0	0	0	0	1	0	1	0	4
	Very severe obstacle	0	0	0	0	6	0	0	0	0	0	0	0	0	0	0	0	0	6
Total		46	56	56	58	44	7	17	10	64	23	18	58	6	34	9	42	6	554

Table 12: Cross table between SARd31f and a3

To what degree the availability of storage facilities is an obstacle (SARd31f) * Firm size: Small or Medium (a6b) Crosstabulation

Count

		Firm size: Small or Medium (a6b)		Total
		Small	Medium	
To what degree the availability of storage facilities is an obstacle (SARd31f)	Do not know	3	7	10
	Does not apply	28	37	65
	No obstacle	123	200	323
	Minor obstacle	37	75	112
	Moderate obstacle	18	17	35
	Major obstacle	0	4	4
	Very severe obstacle	3	3	6
Total		212	343	555

Table 13: Cross table between SARd31f and a6b

To what degree the availability of storage facilities is an obstacle (SARd31f) * Region Crosstabulation

Count

		Region														Total
		Bihar	Chhattisgarh	Delhi	Gujarat	Haryana	Jharkhand	Madhya Pradesh	Maharashtra	Orissa	Punjab	Rajasthan	Uttar Pradesh	Uttaranchal	West Bengal	
To what degree the availability of storage facilities is an obstacle (SARd31f)	Do not know	4	0	1	0	1	0	0	0	0	0	0	1	3	0	10
	Does not apply	1	7	19	0	0	0	23	1	0	0	0	7	5	2	65
	No obstacle	15	29	28	60	16	10	15	34	29	20	12	14	9	32	323
	Minor obstacle	12	0	5	6	11	21	7	13	0	11	0	14	8	4	112
	Moderate obstacle	6	0	0	0	2	2	1	4	0	7	0	11	1	1	35
	Major obstacle	0	0	0	0	0	0	1	1	0	0	0	2	0	0	4
	Very severe obstacle	0	0	0	0	0	0	0	0	0	4	0	2	0	0	6
Total		38	36	53	66	30	33	47	53	29	42	12	51	26	39	555

Table 14: Cross table between SARd31f and region

EM Means[a]

High level of mutual trust	4,54
Partners are always frank and truthful	4,52
Partners stand by their words	4,45
Establishment trust other organizations	4,26

a. Little's MCAR test: Chi-Square = 123,417, DF = 4, Sig. = ,000

Table 15: Little's MCAR test (for the trust variables)

Table 15 shows the Little's MCAR test, which indicates whether the missing data is at random (MAR), or completely at random (MCAR). This test is not significant (P= < ,001) and therefore shows that the missing values are at random (MAR).

Extend to trust its partners: have a high level of mutual trust (c5a) * Extent to have a very well established relation with buyers (c6a) Crosstabulation

Count

		Extent to have a very well established relation with buyers (c6a)						
		Strongly disagree	Disagree	Neutral	Agree	Strongly agree	Completely agree	Total
Extend to trust its partners: have a high level of mutual trust (c5a)	Does not apply	3	7	5	56	55	30	156
	Completely disagree	0	0	0	0	0	3	3
	Strongly disagree	0	0	0	1	0	0	1
	Disagree	0	0	1	3	1	0	5
	Neutral	0	1	1	10	6	0	18
	Agree	0	0	5	108	30	3	146
	Strongly agree	0	0	2	32	55	24	113
	Completely agree	0	1	1	8	21	81	112
Total		3	9	15	218	168	141	554

Table 16: Cross table between c5a and c6a

Table 16 shows the combination of the level of trust enterprises have in its partners and to what extent these enterprises have an established relation with its buyers, to see whether the high missing value is a result of a low established relation with buyers. The red mark shows this is not the case.

Extend to trust its partners: have a high level of mutual trust (c5a) * Extent to have a very well established relation with suppliers (c6b) Crosstabulation

Count

		Extent to have a very well established relation with suppliers (c6b)							
		Completely disagree	Strongly disagree	Disagree	Neutral	Agree	Strongly agree	Completely agree	Total
Extend to trust its partners: have a high level of mutual trust (c5a)	Does not apply	0	2	6	6	57	65	20	156
	Completely disagree	0	0	0	0	1	0	2	3
	Strongly disagree	0	0	0	0	1	0	0	1
	Disagree	0	0	0	2	2	1	0	5
	Neutral	0	0	1	2	12	3	0	18
	Agree	0	0	4	21	93	24	4	146
	Strongly agree	0	0	2	17	51	32	11	113
	Completely agree	1	2	2	9	11	18	69	112
Total		1	4	15	57	228	143	106	554

Table 17: Cross table between c5a and c6b

Table 17 shows the combination of the level of trust enterprises have in its partners and to what extent these enterprises have an established relation with its suppliers, to see whether the high missing value is a result of a low established relation with suppliers. The red mark shows this is not the case.

Extend to trust its partners: have a high level of mutual trust (c5a) * Extent to have a very well established relation with competitors (c6c) Crosstabulation

Count

		Extent to have a very well established relation with competitors (c6c)							
		Completely disagree	Strongly disagree	Disagree	Neutral	Agree	Strongly agree	Completely agree	Total
Extend to trust its partners: have a high level of mutual trust (c5a)	Does not apply	0	1	3	27	79	28	16	154
	Completely disagree	0	0	0	2	0	0	1	3
	Strongly disagree	0	0	0	1	0	0	0	1
	Disagree	0	0	1	2	1	1	0	5
	Neutral	0	0	1	3	10	3	1	18
	Agree	0	1	7	47	65	22	2	144
	Strongly agree	0	1	6	27	40	30	8	112
	Completely agree	1	1	3	18	20	25	44	112
Total		1	4	21	127	215	109	72	549

Table 18: Cross table between c5a and c6c

Table 18 shows the combination of the level of trust enterprises have in its partners and to what extent these enterprises have an established relation with its competitors, to see whether the high missing value is a result of a low established relation with competitors. The red mark shows this is not the case.

Extend to trust its partners: have a high level of mutual trust (c5a) * Extent to have a very well established relation with institutional actors (c6d) Crosstabulation

Count

		Extent to have a very well established relation with institutional actors (c6d)						
		Completely disagree	Disagree	Neutral	Agree	Strongly agree	Completely agree	Total
Extend to trust its partners: have a high level of mutual trust (c5a)	Does not apply	0	12	18	57	41	26	154
	Completely disagree	0	1	0	0	0	2	3
	Strongly disagree	0	0	0	1	0	0	1
	Disagree	0	0	2	2	1	0	5
	Neutral	0	0	1	12	3	2	18
	Agree	3	5	15	91	26	6	146
	Strongly agree	0	0	3	41	56	12	112
	Completely agree	0	2	7	13	25	65	112
Total		3	20	46	217	152	113	551

Table 19: Cross table between c5a and c6d

Table 19 shows the combination of the level of trust enterprises have in its partners and to what extent these enterprises have an established relation with institutional actors, to see whether the high missing value is a result of a low established relation with institutional actors. The red mark shows this is not the case.

Extend to trust its partners: have a high level of mutual trust (c5a) * Firm size: Small or Medium (a6b) Crosstabulation

Count

		Firm size: Small or Medium (a6b)		
		Small	Medium	Total
Extend to trust its partners: have a high level of mutual trust (c5a)	Does not apply	61	95	156
	Completely disagree	1	2	3
	Strongly disagree	1	0	1
	Disagree	1	4	5
	Neutral	6	12	18
	Agree	61	85	146
	Strongly agree	39	74	113
	Completely agree	41	71	112
Total		211	343	554

Table 20: Cross table between c5a and a6b

Table 20 shows the combination of the level of trust enterprises have in its partners and to what extent these are small, or medium sized enterprises. We see there are no large differences between them.

Extend to trust its partners: have a high level of mutual trust (c5a) * Industry (a3) Crosstabulation

Count

		Industry (a3)																	
		Basic metals	Chemicals	Electronics	Fabricated metal products	Food	Furniture	Garments	Leather	Machinery and equipment	Non metallic mineral products	Paper	Plastics & rubber	Publishing, printing, and Recorded media	Textiles	Tobacco	Transport machines	Wood	Total
Extend to trust its partners: have a high level of mutual trust (c5a)	Does not apply	16	22	14	22	10	2	3	0	24	6	7	11	1	9	0	7	2	156
	Completely disagree	0	0	0	1	0	0	0	0	1	0	0	0	0	1	0	0	0	3
	Strongly disagree	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1
	Disagree	0	1	1	0	1	0	0	0	0	0	0	2	0	0	0	0	0	5
	Neutral	1	1	4	1	3	0	0	0	2	1	0	2	0	1	0	1	1	18
	Agree	16	13	7	10	20	3	4	3	15	7	5	19	0	9	1	12	2	146
	Strongly agree	8	11	12	11	5	0	5	3	11	4	5	14	2	8	5	8	1	113
	Completely agree	5	8	18	13	5	2	5	4	11	5	1	10	3	6	3	13	0	112
Total		46	56	56	58	44	7	17	10	64	23	18	58	6	34	9	42	6	554

Table 21: Cross table between c5a and a3

Table 21 shows the combination of the level of trust enterprises have in its partners and the industry of these enterprises. The red mark shows that enterprises who stated that trust in partners does not apply for their company, do not belong to a specific industry.

Extend to trust its partners: have a high level of mutual trust (c5a) * Region Crosstabulation

Count

		Region													
		Bihar	Chhattisgarh	Delhi	Gujarat	Haryana	Jharkhand	Madhya Pradesh	Maharashtra	Orissa	Punjab	Rajasthan	Uttar Pradesh	Uttaranchal	West Bengal	Total
Extend to trust its partners: have a high level of mutual trust (c5a)	Does not apply	0	31	1	50	0	0	16	25	22	0	0	8	1	2	156
	Completely disagree	0	0	1	0	0	0	0	2	0	0	0	0	0	0	3
	Strongly disagree	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1
	Disagree	2	0	0	0	0	0	1	0	1	0	0	1	0	0	5
	Neutral	5	0	1	0	1	0	4	1	1	3	0	2	0	0	18
	Agree	26	3	20	4	5	12	6	2	3	30	9	17	3	6	146
	Strongly agree	5	1	8	9	8	17	10	4	2	8	2	13	7	19	113
	Completely agree	0	1	22	3	16	4	10	19	0	0	1	10	15	11	112
Total		38	36	53	66	30	33	47	53	29	42	12	51	26	38	554

Table 22: Cross table between c5a and region

Table 22 shows the combination of the level of trust enterprises have in its partners and the region where these enterprises are located. Especially enterprises located in Chhattisgarh, Gujarat, Maharashtra, Orissa, and Madhya Pradesh stated that trust in partners does not apply for their company.

Statistics

		Region	Firm size: Small or Medium (a6b)	Years of experience Top Manager (b7)	To what degree electricity is an obstacle (c30a)	To what degree telecommunication is an obstacle (c30b)	To what degree transport is an obstacle (d30a)	To what degree customs and trade regulations are obstacles (d30b)	To what degree access to inputs and supplies are obstacles (SARd31b)	To what degree access to production technology is an obstacle (SARd31c)	To what degree the availability of storage facilities is an obstacle (SARd31f)	Did the establishment introduce a new or significantly improved product or service during the last three years (h1)	To what degree crime, theft, and disorder is an obstacle (i30)
N	Valid	392	392	392	392	392	392	392	392	392	392	392	392
	Missing	0	0	0	0	0	0	0	0	0	0	0	0
Mean			1,63	13,27	1,20	,42	1,01	,60	,78	,83	,44	1,53	,59
Median			2,00	10,00	1,00	,00	1,00	,00	1,00	1,00	,00	2,00	,00
Mode			2	10	0	0	1	0	0	0	0	2	0
Skewness			-,552	1,710	,687	2,507	1,094	1,493	,891	,838	2,148	-,133	1,644
Std. Error of Skewness			,123	,123	,123	,123	,123	,123	,123	,123	,123	,123	,123
Kurtosis			-1,704	3,395	-,675	7,409	1,545	2,048	,244	-,100	5,609	-1,992	2,356
Std. Error of Kurtosis			,246	,246	,246	,246	,246	,246	,246	,246	,246	,246	,246

To what degree access to finance is an obstacle (k30)	To what degree tax rates are obstacles (j30a)	To what degree tax administration is an obstacle (j30b)	To what degree business licensing and permits are obstacles (j30c)	To what degree political instability is an obstacle (j30e)	To what degree corruption is an obstacle (j30f)	To what degree courts are obstacles (h30)	Percentage of full time permanent workers who completed secondary school (l9b)	Percentage of full time permanent workers who have at least a bachelor's degree (INDl9c)	To what degree an inadequately educated workforce is an obstacle (l30b)	Number of patent applications between 2010/2011 to 2012/2013 (b05)	Has this establishment used information or ideas from competitors (b1b)	Has this establishment used information or ideas from suppliers (b1c)
392	392	392	392	392	392	392	392	392	392	390	392	392
0	0	0	0	0	0	0	0	0	0	2	0	0
1,02	1,65	1,30	1,11	1,08	2,15	,78	44,79	22,71	,91	,07	,68	,65
1,00	2,00	1,00	1,00	1,00	2,00	,00	40,00	15,00	1,00	,00	1,00	1,00
0	1	2	1	0	2	0	100	10	0	0	1	1
,865	,244	,317	,674	,853	-,105	1,187	,388	1,772	,932	5,144	-,780	-,622
,123	,123	,123	,123	,123	,123	,123	,123	,123	,123	,124	,123	,123
-,190	-,700	-,340	,037	-,240	-,988	,508	-1,094	2,761	,450	30,483	-1,398	-1,621
,246	,246	,246	,246	,246	,246	,246	,246	,246	,246	,247	,246	,246

Has this establishment used information or ideas from products or services available in the market (b1d)	Has this establishment used information or ideas from universities (b1e)	Has this establishment used information or ideas from consultancy firms (b1f)	Has this establishment used information or ideas from business associations (b1g)	Has this establishment used information or ideas from professional journal (b1h)	Has this establishment used information or ideas from the Internet (b1i)	Has this establishment used information or ideas from customers (b1j)
392	392	392	392	392	392	392
0	0	0	0	0	0	0
,54	,14	,17	,53	,46	,69	,96
1,00	,00	,00	1,00	,00	1,00	1,00
1	0	0	1	0	1	1
-,144	2,110	1,779	-,123	,154	-,845	-4,501
,123	,123	,123	,123	,123	,123	,123
-1,990	2,466	1,172	-1,995	-1,986	-1,293	18,353
,246	,246	,246	,246	,246	,246	,246

Table 24: Frequency table without trust variables and missing values

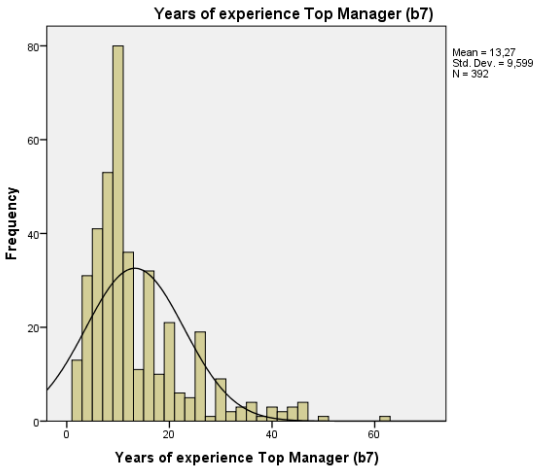


Figure 1: Histogram b7

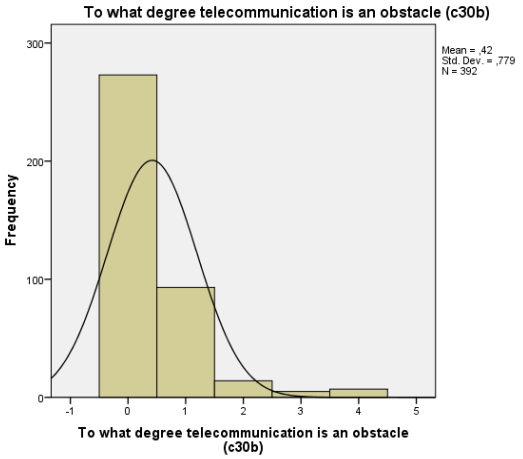


Figure 2: Histogram c30b

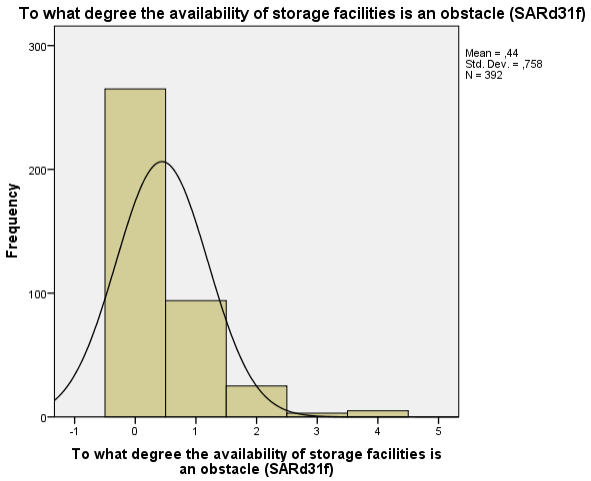


Figure 3: Histogram SARd31f

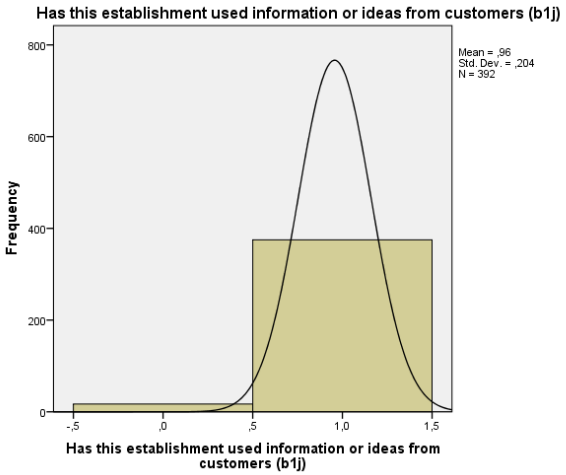


Figure 3a: Histogram b1j

Appendix 6 – Results (Factor Analysis)

Factor analysis for hard infrastructure (left), and soft infrastructure (right)

Syntax hard infrastructure:

```
FACTOR
  /VARIABLES Electricity Telecommunications Transport
  /MISSING LISTWISE
  /ANALYSIS Electricity Telecommunications Transport
  /PRINT INITIAL KMO EXTRACTION ROTATION
  /FORMAT SORT BLANK(.10)
  /PLOT EIGEN
  /CRITERIA MINEIGEN(1) ITERATE(25)
  /EXTRACTION PAF
  /CRITERIA ITERATE(300) DELTA(0)
  /ROTATION OBLIMIN
  /METHOD=CORRELATION.
```

Syntax soft infrastructure:

```
FACTOR
  /VARIABLES Customs_and_trade_regulations Access_to_inputs_and_supplies
    Access_to_production_technology
  /MISSING LISTWISE
  /ANALYSIS Customs_and_trade_regulations Access_to_inputs_and_supplies
    Access_to_production_technology
  /PRINT INITIAL KMO EXTRACTION ROTATION
  /FORMAT SORT BLANK(.10)
  /PLOT EIGEN
  /CRITERIA MINEIGEN(1) ITERATE(25)
  /EXTRACTION PAF
  /CRITERIA ITERATE(300) DELTA(0)
  /ROTATION OBLIMIN
  /METHOD=CORRELATION.
```

KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		,656
Bartlett's Test of Sphericity	Approx. Chi-Square	172,170
	df	3
	Sig.	,000

KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		,635
Bartlett's Test of Sphericity	Approx. Chi-Square	412,232
	df	3
	Sig.	,000

Table 25: KMO and Barlett's test (left: hard infrastructure, right: soft infrastructure)

Communalities

	Initial	Extraction
To what degree electricity is an obstacle (c30a)	,251	,445
To what degree telecommunication is an obstacle (c30b)	,253	,452
To what degree transport is an obstacle (d30a)	,195	,316

Extraction Method: Principal Axis Factoring.

Communalities

	Initial	Extraction
To what degree access to inputs and supplies are obstacles (SARd31b)	,580	,843
To what degree access to production technology is an obstacle (SARd31c)	,550	,646
To what degree the availability of storage facilities is an obstacle (SARd31f)	,239	,271

Extraction Method: Principal Axis Factoring.

Table 26: Communalities (left: hard infrastructure, right: soft infrastructure)

Total Variance Explained

Factor	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	1,802	60,059	60,059	1,212	40,416	40,416
2	,648	21,586	81,646			
3	,551	18,354	100,000			

Extraction Method: Principal Axis Factoring.

Total Variance Explained

Factor	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	2,103	70,095	70,095	1,760	58,664	58,664
2	,639	21,307	91,402			
3	,258	8,598	100,000			

Extraction Method: Principal Axis Factoring.

Table 27: Total Variance Explained (left: hard infrastructure, right: soft infrastructure)

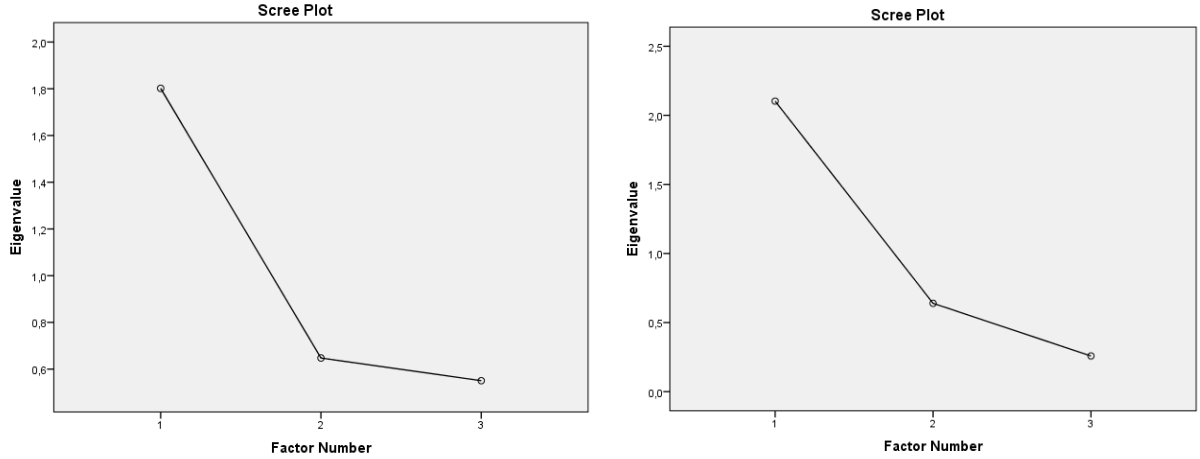


Figure 4: Scree Plot (left: hard infrastructure, right: soft infrastructure)

Factor Matrix[a]

	Factor
	1
To what degree telecommunication is an obstacle (c30b)	,672
To what degree electricity is an obstacle (c30a)	,667
To what degree transport is an obstacle (d30a)	,562

Extraction Method: Principal Axis Factoring.

a. 1 factors extracted. 8 iterations required.

Factor Matrix[a]

	Factor
	1
To what degree access to inputs and supplies are obstacles (SARd31b)	,918
To what degree access to production technology is an obstacle (SARd31c)	,804
To what degree the availability of storage facilities is an obstacle (SARd31f)	,521

Extraction Method: Principal Axis Factoring.

a. 1 factors extracted. 19 iterations required.

Table 28: Factor Matrix (left: hard infrastructure, right: soft infrastructure)

Reliability analysis for hard infrastructure (left), and soft infrastructure (right)

Syntax hard infrastructure:

```
RELIABILITY
  /VARIABLES=Electricity Telecommunications Transport
  /SCALE('ALL VARIABLES') ALL
  /MODEL=ALPHA
  /STATISTICS=DESCRIPTIVE SCALE CORR
  /SUMMARY=TOTAL.
```

Syntax soft infrastructure:

```
RELIABILITY
  /VARIABLES=Access_to_inputs_and_supplies Access_to_production_technology
    Availability_of_storage_facilities
  /SCALE('ALL VARIABLES') ALL
  /MODEL=ALPHA
  /STATISTICS=DESCRIPTIVE SCALE CORR
  /SUMMARY=TOTAL.
```

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
,645	,667	3

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
,785	,782	3

Table 29: Cronbach's Alpha (left: hard infrastructure, right: soft infrastructure)

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
To what degree electricity is an obstacle (c30a)	1,43	1,893	,493	,251	,545
To what degree telecommunication is an obstacle (c30b)	2,22	3,117	,503	,253	,522
To what degree transport is an obstacle (d30a)	1,62	3,008	,437	,195	,577

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
To what degree access to inputs and supplies are obstacles (SARd31b)	1,27	2,039	,738	,580	,580
To what degree access to production technology is an obstacle (SARd31c)	1,22	1,944	,683	,550	,645
To what degree the availability of storage facilities is an obstacle (SARd31f)	1,61	2,806	,480	,239	,848

Table 30: Cronbach's Alpha if Item Deleted (top table: hard infrastructure, bottom table: soft infrastructure)

Syntax: compute items into hard infrastructure variable (mean of the three items):

```
COMPUTE Hard_infrastructure=(Electricity+Telecommunications+Transport)/3.
 COMPUTE Hard_infrastructure=RND(Hard_infrastructure).
```

Syntax: compute items into soft infrastructure variable (mean of the three items):

```
COMPUTE Soft_infrastructure=(Access_to_inputs_and_supplies+Access_to_production_technology+
Availability_of_storage_facilities)/3.
  COMPUTE Soft_infrastructure=RND(Soft_infrastructure).
```

Hard infrastructure compute variable: electricity, telecommunication, and transport

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No obstacle	155	39,5	39,5	39,5
	Minor obstacle	174	44,4	44,4	83,9
	Moderate obstacle	48	12,2	12,2	96,2
	Major obstacle	11	2,8	2,8	99,0
	Very severe obstacle	4	1,0	1,0	100,0
	Total	392	100,0	100,0	

Table 31: Frequency table Hard infrastructure

Soft infrastructure compute variable: access to inputs and supplies, access to production technology, and availability of storage facilties

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No obstacle	189	48,2	48,2	48,2
	Minor obstacle	143	36,5	36,5	84,7
	Moderate obstacle	49	12,5	12,5	97,2
	Major obstacle	11	2,8	2,8	100,0
	Total	392	100,0	100,0	

Table 32: Frequency table Soft infrastructure

Factor analysis for the product market

Syntax:

```
FACTOR
  /VARIABLES Hard_infrastructure Soft_infrastructure
  /MISSING LISTWISE
  /ANALYSIS Hard_infrastructure Soft_infrastructure
  /PRINT INITIAL KMO EXTRACTION ROTATION
  /FORMAT SORT BLANK(.10)
  /PLOT EIGEN
  /CRITERIA MINEIGEN(1) ITERATE(25)
  /EXTRACTION PAF
  /CRITERIA ITERATE(300) DELTA(0)
  /ROTATION OBLIMIN
  /METHOD=CORRELATION.
```

KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		,500
Bartlett's Test of Sphericity	Approx. Chi-Square	141,028
	df	1
	Sig.	,000

Table 33: KMO and Barlett's test (factor analysis Product Market)

Communalities

	Initial	Extraction
Hard infrastructure compute variable: electricity, telecommunication, and transport	,304	,550
Soft infrastructure compute variable: access to inputs and supplies, access to production technology, and availability of storage facilties	,304	,550

Extraction Method: Principal Axis Factoring.

Table 34: Communalities (factor analysis Product Market)

Total Variance Explained

Factor	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	1,551	77,558	77,558	1,100	55,019	55,019
2	,449	22,442	100,000			

Extraction Method: Principal Axis Factoring.

Table 35: Total Variance Explained (factor analysis Product Market)

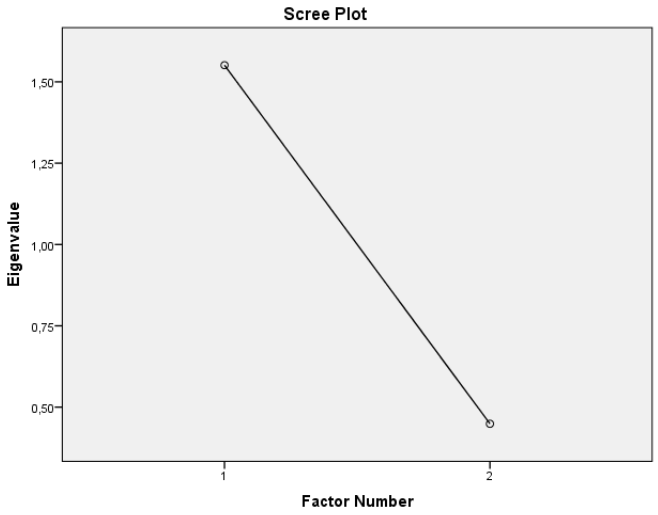


Figure 5: Scree Plot (factor analysis Product Market)

Factor Matrix[a]

	Factor
	1
Hard infrastructure compute variable: electricity, telecommunication, and transport	,742
Soft infrastructure compute variable: access to inputs and supplies, access to production technology, and availability of storage facilties	,742

Extraction Method: Principal Axis Factoring.

a. 1 factors extracted. 8 iterations required.

Table 36: Factor Matrix (factor analysis Product Market)

Reliability analysis for the product market

Syntax:

```
RELIABILITY
  /VARIABLES=Hard_infrastructure Soft_infrastructure
  /SCALE('ALL VARIABLES') ALL
  /MODEL=ALPHA
  /STATISTICS=DESCRIPTIVE SCALE CORR
  /SUMMARY=TOTAL.
```

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
,710	,711	2

Table 37: Cronbach's Alpha (reliability analysis Product Market)

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
Hard infrastructure compute variable: electricity, telecommunication, and transport	,70	,630	,551	,304	.
Soft infrastructure compute variable: access to inputs and supplies, access to production technology, and availability of storage facilties	,81	,689	,551	,304	.

Table 38: Cronbach's Alpha if Item Deleted (reliability analysis Product Market)

Syntax: compute items into Product Market (mean of the two items):

```
COMPUTE Product_Market=(Hard_infrastructure+Soft_infrastructure)/2.
   COMPUTE Product_market=RND(Product_market).
```

Statistics

Product Market compute variable: hard

N	Valid	392
	Missing	0
Mean		,94
Median		1,00
Mode		1
Skewness		,973
Std. Error of Skewness		,123
Kurtosis		1,506
Std. Error of Kurtosis		,246

Table 39: Statistics table Product Market

Product Market compute variable: hard infrastructure, and soft infrastructure

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No obstacle	115	29,3	29,3	29,3
	Minor obstacle	207	52,8	52,8	82,1
	Moderate obstacle	52	13,3	13,3	95,4
	Major obstacle	14	3,6	3,6	99,0
	Very severe obstacle	4	1,0	1,0	100,0
	Total	392	100,0	100,0	

Table 40: Frequency table Product Market

Factor analysis rule of law (left), and regulatory quality (right)

Syntax rule of law:

```
FACTOR
  /VARIABLES Courts Political_instability Crime_theft_and_disorder
  /MISSING LISTWISE
  /ANALYSIS Courts Political_instability Crime_theft_and_disorder
  /PRINT INITIAL KMO EXTRACTION ROTATION
  /FORMAT SORT BLANK(.10)
  /PLOT EIGEN
  /CRITERIA MINEIGEN(1) ITERATE(25)
  /EXTRACTION PAF
  /CRITERIA ITERATE(300) DELTA(0)
  /ROTATION OBLIMIN
  /METHOD=CORRELATION.
```

Syntax regulatory quality:

```
FACTOR
  /VARIABLES Tax_rates Tax_administration Business_licensing_and_permits
    Customs_and_trade_regulations
  /MISSING LISTWISE
  /ANALYSIS Tax_rates Tax_administration Business_licensing_and_permits
    Customs_and_trade_regulations
  /PRINT INITIAL KMO EXTRACTION ROTATION
  /FORMAT SORT BLANK(.10)
  /PLOT EIGEN
  /CRITERIA MINEIGEN(1) ITERATE(25)
  /EXTRACTION PAF
  /CRITERIA ITERATE(300) DELTA(0)
  /ROTATION OBLIMIN
  /METHOD=CORRELATION.
```

KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		,619
Bartlett's Test of Sphericity	Approx. Chi-Square	132,172
	df	3
	Sig.	,000

KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		,690
Bartlett's Test of Sphericity	Approx. Chi-Square	370,573
	df	6
	Sig.	,000

Table 41: KMO and Barlett's test (left: rule of law, right: regulatory quality)

Communalities

	Initial	Extraction
To what degree political instability is an obstacle (j30e)	,231	,498
To what degree courts are obstacles (h30)	,210	,381
To what degree crime, theft, and disorder is an obstacle (i30)	,121	,196

Extraction Method: Principal Axis Factoring.

Communalities

	Initial	Extraction
To what degree tax rates are obstacles (j30a)	,393	,480
To what degree tax administration is an obstacle (j30b)	,458	,653
To what degree business licensing and permits are obstacles (j30c)	,316	,399
To what degree customs and trade regulations are obstacles (d30b)	,166	,183

Extraction Method: Principal Axis Factoring.

Table 42: Communalities (left: rule of law, right: regulatory quality)

Total Variance Explained

Factor	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	1,686	56,205	56,205	1,075	35,837	35,837
2	,753	25,106	81,311			
3	,561	18,689	100,000			

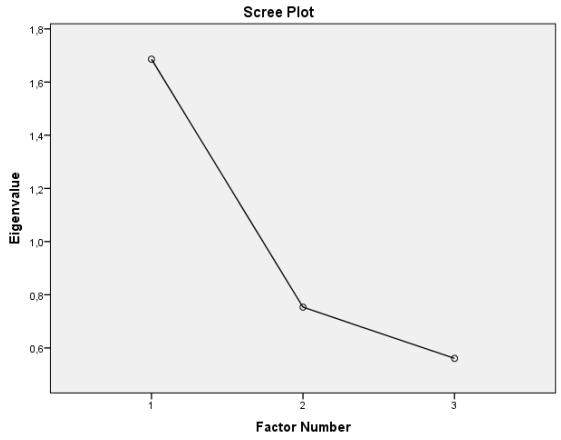
Extraction Method: Principal Axis Factoring.

Total Variance Explained

Factor	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	2,234	55,848	55,848	1,714	42,861	42,861
2	,829	20,713	76,561			
3	,576	14,392	90,954			
4	,362	9,046	100,000			

Extraction Method: Principal Axis Factoring.

Table 43: Total Variance Explained (left: rule of law, right: regulatory quality)



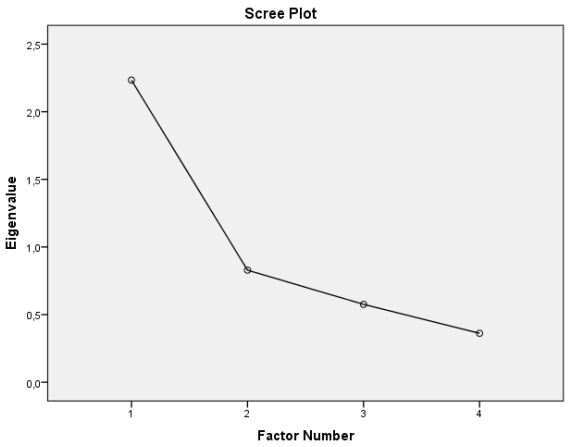


Figure 6: Scree Plot (left: rule of law, right: regulatory quality)

Factor Matrix[a]

	Factor
	1
To what degree political instability is an obstacle (j30e)	,706
To what degree courts are obstacles (h30)	,617
To what degree crime, theft, and disorder is an obstacle (i30)	,443

Extraction Method: Principal Axis Factoring.

a. 1 factors extracted. 15 iterations required.

Factor Matrix[a]

	Factor
	1
To what degree tax administration is an obstacle (j30b)	,808
To what degree tax rates are obstacles (j30a)	,693
To what degree business licensing and permits are obstacles (j30c)	,631
To what degree customs and trade regulations are obstacles (d30b)	,428

Extraction Method: Principal Axis Factoring.

a. 1 factors extracted. 11 iterations required.

Table 44: Factor Matrix (left: rule of law, right: regulatory quality)

Reliability analysis for rule of law (left), and regulatory quality (right)

Syntax rule of law:

```
RELIABILITY
  /VARIABLES=Courts Political_instability Crime_theft_and_disorder
  /SCALE('ALL VARIABLES') ALL
  /MODEL=ALPHA
  /STATISTICS=DESCRIPTIVE SCALE CORR
  /SUMMARY=TOTAL.
```

Syntax regulatory quality

```
RELIABILITY
  /VARIABLES=Tax_rates Tax_administration Business_licensing_and_permits
    Customs_and_trade_regulations
  /SCALE('ALL VARIABLES') ALL
  /MODEL=ALPHA
  /STATISTICS=DESCRIPTIVE SCALE CORR
  /SUMMARY=TOTAL.
```

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
,609	,608	3

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
,734	,731	4

Table 45: Cronbach's Alpha: (left: rule of law, right: regulatory quality)

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
To what degree crime, theft, and disorder is an obstacle (i30)	1,85	3,475	,347	,121	,603
To what degree political instability is an obstacle (j30e)	1,37	2,340	,475	,231	,424
To what degree courts are obstacles (h30)	1,67	2,815	,448	,210	,464

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
To what degree customs and trade regulations are obstacles (d30b)	4,06	6,401	,379	,166	,747
To what degree tax rates are obstacles (j30a)	3,02	4,813	,558	,393	,656
To what degree tax administration is an obstacle (j30b)	3,36	4,988	,635	,458	,608
To what degree business licensing and permits are obstacles (j30c)	3,55	5,312	,542	,316	,664

Table 46: Cronbach's Alpha if Item Deleted (top table: rule of law, bottom table: regulatory quality)

Syntax: compute items into rule of law (mean of the three items):

```
COMPUTE Rule_of_law=(Courts+Political_instability+Crime_theft_and_disorder)/3.
   COMPUTE Rule_of_law=RND(Rule_of_Law).
```

Syntax: compute items into soft regulatory quality (mean of the four items):

```
COMPUTE Regulatory_Quality=(Tax_rates+Tax_administration+Business_licensing_and_permits+
Customs_and_trade_regulations)/4.
  COMPUTE Regulatory_quality=RND(Regulatory_Quality).
```

Rule of law compute variable: courts, and political instability

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No obstacle	168	42,9	42,9	42,9
	Minor obstacle	145	37,0	37,0	79,8
	Moderate obstacle	68	17,3	17,3	97,2
	Major obstacle	9	2,3	2,3	99,5
	Very severe obstacle	2	,5	,5	100,0
	Total	392	100,0	100,0	

Table 47: Frequency table Rule of law

Regulatory quality compute variable: tax rates, tax administration, customs and trade regulations, and business licensing and permits

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No obstacle	58	14,8	14,8	14,8
	Minor obstacle	184	46,9	46,9	61,7
	Moderate obstacle	127	32,4	32,4	94,1
	Major obstacle	20	5,1	5,1	99,2
	Very severe obstacle	3	,8	,8	100,0
	Total	392	100,0	100,0	

Table 48: Frequency table Regulatory quality

Factor analysis for the regulatory environment

Syntax:

```
FACTOR
  /VARIABLES Corruption Rule_of_law Regulatory_Quality
  /MISSING LISTWISE
  /ANALYSIS Corruption Rule_of_law Regulatory_Quality
  /PRINT INITIAL KMO EXTRACTION ROTATION
  /FORMAT SORT BLANK(.10)
  /PLOT EIGEN
  /CRITERIA MINEIGEN(1) ITERATE(25)
  /EXTRACTION PAF
  /CRITERIA ITERATE(300) DELTA(0)
  /ROTATION OBLIMIN
  /METHOD=CORRELATION.
```

KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		,667
Bartlett's Test of Sphericity	Approx. Chi-Square	260,793
	df	3
	Sig.	,000

Table 49: KMO and Barlett's test (factor analysis regulatory environment)

Communalities

	Initial	Extraction
To what degree corruption is an obstacle (j30f)	,240	,329
Rule of law compute variable: courts, and political instability	,378	,604
Regulatory quality compute variable: tax rates, tax administration, customs and trade regulations, and business licensing and permits	,361	,541

Extraction Method: Principal Axis Factoring.

Table 50: Communalities (factor analysis regulatory environment)

Total Variance Explained

Factor	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	1,962	65,415	65,415	1,473	49,114	49,114
2	,610	20,350	85,765			
3	,427	14,235	100,000			

Extraction Method: Principal Axis Factoring.

Table 51: Total variance explained (factor analysis regulatory environment)

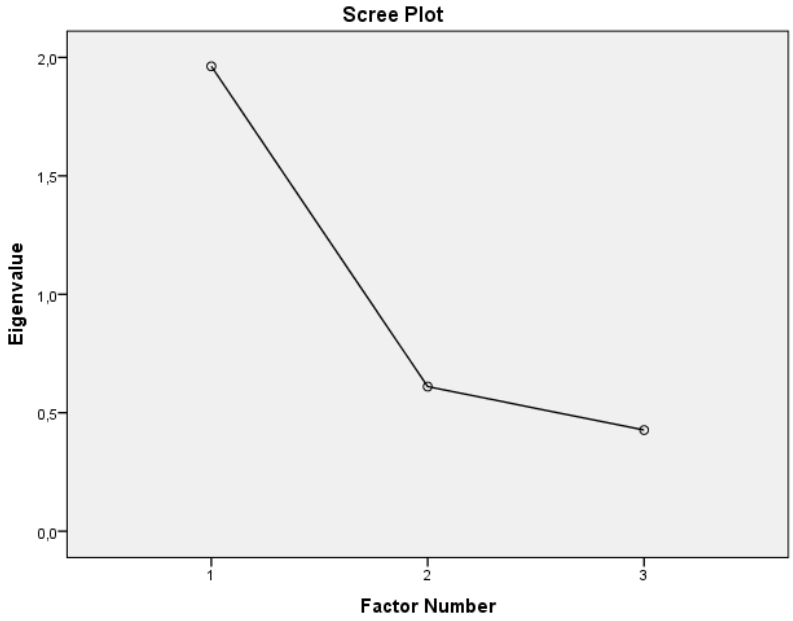


Figure 7: Scree Plot (factor analysis regulatory environment)

Factor Matrix[a]

	Factor
	1
Rule of law compute variable: courts, and political instability	,777
Regulatory quality compute variable: tax rates, tax administration, customs and trade regulations, and business licensing and permits	,735
To what degree corruption is an obstacle (j30f)	,574

Extraction Method: Principal Axis Factoring.

a. 1 factors extracted. 11 iterations required.

Table 52: Factor matrix (factor analysis regulatory environment)

Reliability analysis for the regulatory environment

Syntax:

```
RELIABILITY
  /VARIABLES=Corruption Rule_of_law Regulatory_Quality
  /SCALE('ALL VARIABLES') ALL
  /MODEL=ALPHA
  /STATISTICS=DESCRIPTIVE SCALE CORR
  /SUMMARY=TOTAL.
```

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
,700	,734	3

Table 53: Cronbach's Alpha (reliability analysis regulatory environment)

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
To what degree corruption is an obstacle (j30f)	2,11	2,137	,489	,240	,727
Rule of law compute variable: courts, and political instability	3,45	3,118	,582	,378	,553
Regulatory quality compute variable: tax rates, tax administration, customs and trade regulations, and business licensing and permits	2,95	3,251	,561	,361	,583

Table 54: Cronbach's Alpha if Item Deleted (reliability analysis regulatory environment)

Syntax: compute items into Regulatory Environment (mean of the three items):

```
COMPUTE Regulatory_environment=(Corruption+Rule_of_Law+Regulatory_Quality)/3.
   COMPUTE Regulatory_environment=RND(Regulatory_environment).
```

Statistics

Regulatory Environment compute varia

N	Valid	392
	Missing	0
Mean		1,44
Median		1,00
Mode		1
Skewness		,164
Std. Error of Skewness		,123
Kurtosis		-,288
Std. Error of Kurtosis		,246

Table 55: Statistics table Regulatory Environment

Regulatory Environment compute variable: Corruption, Rule of law, Regulatory Quality

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No obstacle	42	10,7	10,7	10,7
	Minor obstacle	173	44,1	44,1	54,8
	Moderate obstacle	142	36,2	36,2	91,1
	Major obstacle	34	8,7	8,7	99,7
	Very severe obstacle	1	,3	,3	100,0
	Total	392	100,0	100,0	

Table 56: Frequency table Regulatory Environment

Factor analysis for institutional voids

Syntax:

```
FACTOR
  /VARIABLES ProductMarketregio LaborMarketregio CapitalMarketregio RegulatoryEnvironmentregio
  /MISSING LISTWISE
  /ANALYSIS ProductMarketregio LaborMarketregio CapitalMarketregio RegulatoryEnvironmentregio
  /PRINT INITIAL KMO EXTRACTION ROTATION
  /FORMAT SORT BLANK(.10)
  /PLOT EIGEN
  /CRITERIA MINEIGEN(1) ITERATE(25)
  /EXTRACTION PAF
  /CRITERIA ITERATE(300) DELTA(0)
  /ROTATION OBLIMIN
  /METHOD=CORRELATION.
```

KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		,735
Bartlett's Test of Sphericity	Approx. Chi-Square	1205,728
	df	6
	Sig.	,000

Table 57: KMO and Barlett's test (factor analysis institutional voids)

Communalities

	Initial
Product Market compute regional level variable: hard infrastructure, and soft infrastructure	,870
Labor Market compute regional level variable: inadequately educated workforce	,803
Capital Market compute regional level variable: access to finance	,560
Regulatory Environment compute regional level variable: Corruption, Rule of law, Regulatory Quality	,514

Extraction Method: Principal Axis Factoring.

Table 58: KMO and Barlett's test (factor analysis institutional voids)

Total Variance Explained

Factor	Initial Eigenvalues		
	Total	% of Variance	Cumulative %
1	3,017	75,436	75,436
2	,615	15,385	90,821
3	,281	7,022	97,843
4	,086	2,157	100,000

Extraction Method: Principal Axis Factoring.

Table 59: Total variance explained (factor analysis institutional voids)

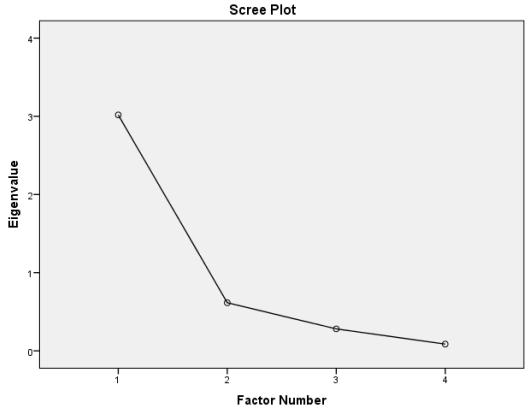


Figure 8: Scree Plot (factor analysis institutional voids)

Reliability analysis for institutional voids

Syntax:

```
RELIABILITY
  /VARIABLES=ProductMarketregio LaborMarketregio CapitalMarketregio RegulatoryEnvironmentregio
  /SCALE('ALL VARIABLES') ALL
  /MODEL=ALPHA
  /STATISTICS=DESCRIPTIVE SCALE CORR
  /SUMMARY=TOTAL.
```

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
,880	,888	4

Table 60: Cronbach's Alpha (reliability analysis institutional voids)

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
Product Market compute regional level variable: hard infrastructure, and soft infrastructure	3,42	2,684	,919	,870	,770
Labor Market compute regional level variable: inadequately educated workforce	3,53	2,981	,842	,803	,807
Capital Market compute regional level variable: access to finance	3,40	2,834	,656	,560	,896
Regulatory Environment compute regional level variable: Corruption, Rule of law, Regulatory Quality	2,95	3,795	,620	,514	,893

Table 61: Cronbach's Alpha if item Deleted (reliability analysis educational level)

Factor analysis for workforce educational level

Syntax:

```
FACTOR
  /VARIABLES Completed_secondary_school Completed_bachelors_degree
  /MISSING LISTWISE
  /ANALYSIS Completed_secondary_school Completed_bachelors_degree
  /PRINT INITIAL KMO EXTRACTION ROTATION
  /FORMAT SORT BLANK(.10)
  /PLOT EIGEN
  /CRITERIA MINEIGEN(1) ITERATE(25)
  /EXTRACTION PAF
  /CRITERIA ITERATE(300) DELTA(0)
  /ROTATION OBLIMIN
  /METHOD=CORRELATION.
```

KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		,500
Bartlett's Test of Sphericity	Approx. Chi-Square	114,825
	df	1
	Sig.	,000

Table 62: KMO and Barlett's test (factor analysis educational level)

Communalities

	Initial	Extraction
Percentage of full time permanent workers who completed secondary school (I9b)	,255	,504
Percentage of full time permanent workers who have at least a bachelor's degree (INDI9c)	,255	,504

Extraction Method: Principal Axis Factoring.

Table 63: Communalities (factor analysis educational level)

Total Variance Explained

Factor	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	1,505	75,265	75,265	1,009	50,432	50,432
2	,495	24,735	100,000			

Extraction Method: Principal Axis Factoring.

Table 64: Total Variance Explained (factor analysis educational level)

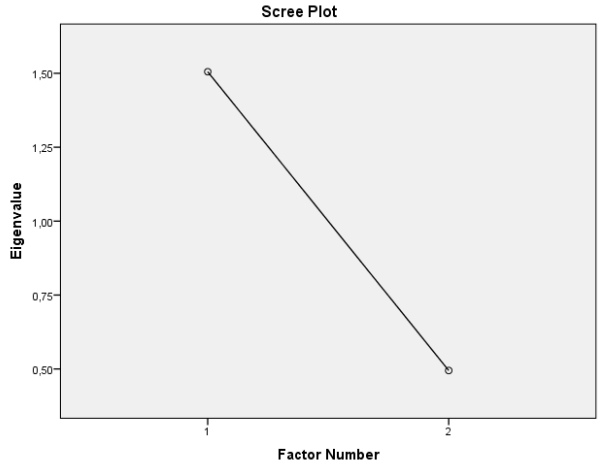


Figure 9: Scree Plot (factor analysis educational level)

Factor Matrix[a]

	Factor
	1
Percentage of full time permanent workers who have at least a bachelor's degree (INDI9c)	,710
Percentage of full time permanent workers who completed secondary school (I9b)	,710

Extraction Method: Principal Axis Factoring.

a. 1 factors extracted. 8 iterations required.

Table 65: Factor Matrix (factor analysis educational level)

Reliability analysis for workforce educational level

Syntax:

```
RELIABILITY
  /VARIABLES=Completed_secondary_school Completed_bachelors_degree
  /SCALE('ALL VARIABLES') ALL
  /MODEL=ALPHA
  /STATISTICS=DESCRIPTIVE SCALE CORR
  /SUMMARY=TOTAL.
```

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
,658	,671	2

Table 66: Cronbach's Alpha (reliability analysis educational level)

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
Percentage of full time permanent workers who completed secondary school (I9b)	22,71	583,353	,505	,255	.
Percentage of full time permanent workers who have at least a bachelor's degree (INDI9c)	44,79	955,905	,505	,255	.

Table 67: Cronbach's Alpha if item Deleted (reliability analysis educational level)

Factor analysis for knowledge sources

Syntax:

```
FACTOR
  /VARIABLES Information_competitor Information_suppliers Information_products_or_services
    Information_universities Information_consultancyfirms Information_businessassociations
    Information_professionaljournals Information_internet Information_customerfeedback
  /MISSING LISTWISE
  /ANALYSIS Information_competitor Information_suppliers Information_products_or_services
    Information_universities Information_consultancyfirms Information_businessassociations
    Information_professionaljournals Information_internet Information_customerfeedback
  /PRINT INITIAL KMO EXTRACTION ROTATION
  /FORMAT SORT BLANK(.10)
  /PLOT EIGEN
  /CRITERIA MINEIGEN(1) ITERATE(25)
  /EXTRACTION PAF
  /CRITERIA ITERATE(300) DELTA(0)
  /ROTATION OBLIMIN
  /METHOD=CORRELATION.
```


After the first analysis (shown in sub-section 4.1), we decided to delete item b1j since this item has the lowest extraction value (0.038). After this we performed a new factor analysis without this item. The results in tables 72-75 (Appendix 6) show that factor analysis can still be performed (KMO= .634 Barlett's test= <.001). There are two items (b1b, b1d) with an extraction value below 0.20. Besides, there is again one double loader (b1i). We decided to extract this double loader from the analysis. After the extraction of this item, we again performed a factor analysis which we are still allowed to do, as shown in table 76 Appendix 6 (KMO= .593 Barlett's test= <.001). The results are shown in tables 77-79 (Appendix 6). Here we see there are two items (b1c, and b1d) that have a lower value than 0.20. Besides, there is again one double loader (b1f). Since item b1d has the lowest value (0.141) we decided to delete this item. This left us with the results shown in tables 80-83 (Appendix 6). These results show we are again allowed to perform a factor analysis (KMO= .571 Barlett's test= <.001). Besides, it demonstrates there is still one item (b1c) with a value slightly lower than 0.20 (.186). Since it is only a fraction less than the threshold, we decided to see whether the other assumptions are met. There are no double loaders anymore and also the other assumptions are met. To check whether these items really measure the same construct, we performed a reliability analysis (see table 92 and 93, Appendix 6). Unfortunately, the Cronbach's Alpha is way too low (.456) indicating that these items together do not represent one construct. Therefore, we needed to extract item b1c from the factor analysis. Tables 84-87 (Appendix 6) demonstrate the results after deletion. After the removal of this variable a factor analysis can still be performed (KMO= .587 Barlett's test= <.001). Furthermore, we noticed there is again one variable representing a too low extraction value (b1b; 0.009) while there are no double loaders. Therefore we deleted this item. The fifth analysis is explained in sub-section 4.1.

KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		,634
Bartlett's Test of Sphericity	Approx. Chi-Square	351,978
	df	36
	Sig.	,000

Table 68: KMO and Barlett's test (factor analysis knowledge sources)

Communalities

	Initial	Extraction
Has this establishment used information or ideas from competitors (b1b)	,078	,143
Has this establishment used information or ideas from suppliers (b1c)	,114	,436
Has this establishment used information or ideas from products or services available in the market (b1d)	,088	,152
Has this establishment used information or ideas from universities (b1e)	,134	,452
Has this establishment used information or ideas from consultancy firms (b1f)	,137	,204
Has this establishment used information or ideas from business associations (b1g)	,324	,406
Has this establishment used information or ideas from professional journal (b1h)	,389	,764
Has this establishment used information or ideas from the Internet (b1i)	,147	,199
Has this establishment used information or ideas from customers (b1j)	,034	,038

Extraction Method: Principal Axis Factoring.

Table 69: Communalities (factor analysis knowledge sources)

Total Variance Explained

Factor	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings[a]
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total
1	2,131	23,683	23,683	1,603	17,814	17,814	1,476
2	1,343	14,921	38,604	,658	7,311	25,125	,696
3	1,163	12,918	51,522	,533	5,919	31,044	1,014
4	,955	10,610	62,131				
5	,868	9,647	71,778				
6	,781	8,682	80,459				
7	,684	7,604	88,063				
8	,661	7,348	95,411				
9	,413	4,589	100,000				

Extraction Method: Principal Axis Factoring.

a. When factors are correlated, sums of squared loadings cannot be added to obtain a total variance.

Table 70: Total Variance Explained (factor analysis knowledge sources)

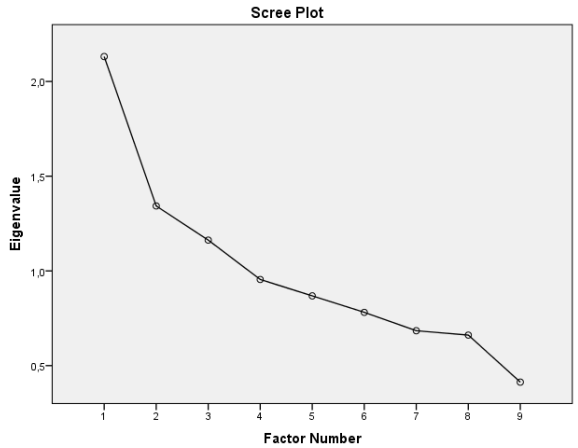


Figure 10: Scree Plot (factor analysis knowledge sources)

Pattern Matrix[a]

	Factor		
	1	2	3
Has this establishment used information or ideas from professional journal (b1h)	,862		
Has this establishment used information or ideas from business associations (b1g)	,622		
Has this establishment used information or ideas from the Internet (b1i)	,332	,242	
Has this establishment used information or ideas from suppliers (b1c)		,645	
Has this establishment used information or ideas from competitors (b1b)	-,144	,375	
Has this establishment used information or ideas from customers (b1j)		,161	
Has this establishment used information or ideas from universities (b1e)	-,104		,704
Has this establishment used information or ideas from consultancy firms (b1f)	,145		,380
Has this establishment used information or ideas from products or services available in the market (b1d)			,379

Extraction Method: Principal Axis Factoring.
Rotation Method: Oblimin with Kaiser Normalization.

a. Rotation converged in 6 iterations.

Table 71: Pattern Matrix (factor analysis knowledge sources)

```
FACTOR
  /VARIABLES Information_competitor Information_suppliers Information_products_or_services
    Information_universities Information_consultancyfirms Information_businessassociations
    Information_professionaljournals Information_internet
  /MISSING LISTWISE
  /ANALYSIS Information_competitor Information_suppliers Information_products_or_services
    Information_universities Information_consultancyfirms Information_businessassociations
    Information_professionaljournals Information_internet
  /PRINT INITIAL KMO EXTRACTION ROTATION
  /FORMAT SORT BLANK(.10)
  /PLOT EIGEN
  /CRITERIA MINEIGEN(1) ITERATE(25)
  /EXTRACTION PAF
  /CRITERIA ITERATE(300) DELTA(0)
  /ROTATION OBLIMIN
  /METHOD=CORRELATION.
```


KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		,634
Bartlett's Test of Sphericity	Approx. Chi-Square	339,034
	df	28
	Sig.	,000

Table 72: KMO and Barlett's test (factor analysis knowledge sources)

Communalities

	Initial	Extraction
Has this establishment used information or ideas from competitors (b1b)	,070	,117
Has this establishment used information or ideas from suppliers (b1c)	,110	,504
Has this establishment used information or ideas from products or services available in the market (b1d)	,086	,148
Has this establishment used information or ideas from universities (b1e)	,134	,459
Has this establishment used information or ideas from consultancy firms (b1f)	,137	,203
Has this establishment used information or ideas from business associations (b1g)	,324	,419
Has this establishment used information or ideas from professional journal (b1h)	,381	,738
Has this establishment used information or ideas from the Internet (b1i)	,147	,202

Extraction Method: Principal Axis Factoring.

Table 73: Communalities (factor analysis knowledge sources)

Total Variance Explained

Factor	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings[a]
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total
1	2,110	26,379	26,379	1,582	19,776	19,776	1,466
2	1,306	16,321	42,700	,673	8,407	28,183	,658
3	1,157	14,463	57,164	,536	6,695	34,878	1,005
4	,872	10,896	68,060				
5	,787	9,842	77,901				
6	,685	8,567	86,468				
7	,664	8,295	94,764				
8	,419	5,236	100,000				

Extraction Method: Principal Axis Factoring.

a. When factors are correlated, sums of squared loadings cannot be added to obtain a total variance.

Table 74: Total Variance Explained (factor analysis knowledge sources)

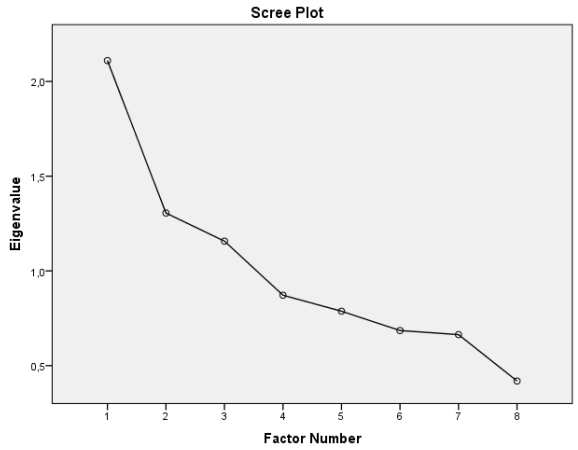


Figure 11: Scree Plot (factor analysis knowledge sources)

Pattern Matrix[a]

	Factor		
	1	2	3
Has this establishment used information or ideas from professional journal (b1h)	,841		
Has this establishment used information or ideas from business associations (b1g)	,632		
Has this establishment used information or ideas from the Internet (b1i)	,369	,224	
Has this establishment used information or ideas from suppliers (b1c)	,158	,679	
Has this establishment used information or ideas from competitors (b1b)		,336	
Has this establishment used information or ideas from universities (b1e)	-,109		,708
Has this establishment used information or ideas from consultancy firms (b1f)	,148		,375
Has this establishment used information or ideas from products or services available in the market (b1d)			,375

Extraction Method: Principal Axis Factoring.
Rotation Method: Oblimin with Kaiser Normalization.

a. Rotation converged in 5 iterations.

Table 75: Pattern Matrix (factor analysis knowledge sources)

```
FACTOR
  /VARIABLES Information_competitor Information_suppliers Information_products_or_services
    Information_universities Information_consultancyfirms Information_businessassociations
    Information_professionaljournals
  /MISSING LISTWISE
  /ANALYSIS Information_competitor Information_suppliers Information_products_or_services
    Information_universities Information_consultancyfirms Information_businessassociations
    Information_professionaljournals
  /PRINT INITIAL KMO EXTRACTION ROTATION
  /FORMAT SORT BLANK(.10)
  /PLOT EIGEN
  /CRITERIA MINEIGEN(1) ITERATE(25)
  /EXTRACTION PAF
  /CRITERIA ITERATE(300) DELTA(0)
  /ROTATION OBLIMIN
  /METHOD=CORRELATION.
```

KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		,593
Bartlett's Test of Sphericity	Approx. Chi-Square	277,585
	df	21
	Sig.	,000

Table 76: KMO and Barlett's test (factor analysis knowledge sources)

Communalities

	Initial	Extraction
Has this establishment used information or ideas from competitors (b1b)	,070	,307
Has this establishment used information or ideas from suppliers (b1c)	,072	,194
Has this establishment used information or ideas from products or services available in the market (b1d)	,085	,141
Has this establishment used information or ideas from universities (b1e)	,134	,499
Has this establishment used information or ideas from consultancy firms (b1f)	,136	,204
Has this establishment used information or ideas from business associations (b1g)	,321	,470
Has this establishment used information or ideas from professional journal (b1h)	,352	,658

Extraction Method: Principal Axis Factoring.

Table 77: Communalities (factor analysis knowledge sources)

Total Variance Explained

	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings[a]
Factor	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total
1	1,957	27,952	27,952	1,427	20,390	20,390	1,303
2	1,223	17,475	45,427	,564	8,057	28,446	,989
3	1,129	16,123	61,550	,481	6,874	35,320	,485
4	,833	11,904	73,454				
5	,764	10,912	84,366				
6	,670	9,573	93,939				
7	,424	6,061	100,000				

Extraction Method: Principal Axis Factoring.

a. When factors are correlated, sums of squared loadings cannot be added to obtain a total variance.

Table 78: Total Variance Explained (factor analysis knowledge sources)

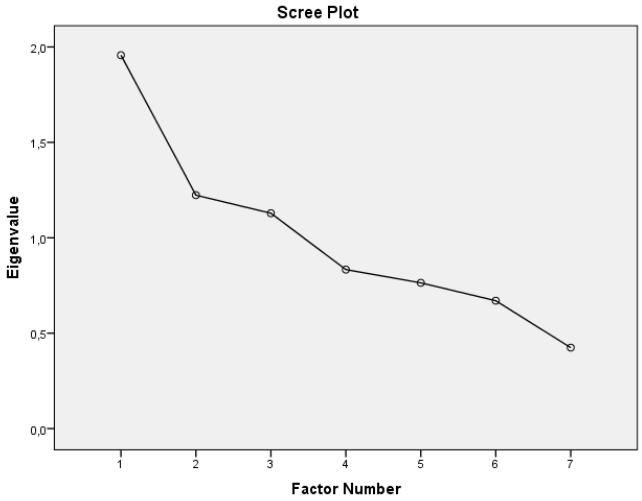


Figure 12: Scree Plot (factor analysis knowledge sources)

Pattern Matrix[a]

	Factor		
	1	2	3
Has this establishment used information or ideas from professional journal (b1h)	,795		
Has this establishment used information or ideas from business associations (b1g)	,683		
Has this establishment used information or ideas from universities (b1e)	-,111	,741	
Has this establishment used information or ideas from products or services available in the market (b1d)		,359	
Has this establishment used information or ideas from consultancy firms (b1f)	,174	,354	
Has this establishment used information or ideas from competitors (b1b)	-,136		,547
Has this establishment used information or ideas from suppliers (b1c)	,106		,420

Extraction Method: Principal Axis Factoring.
Rotation Method: Oblimin with Kaiser Normalization.

a. Rotation converged in 5 iterations.

Table 79: Pattern Matrix (factor analysis knowledge sources)

```
FACTOR
  /VARIABLES Information_competitor Information_suppliers Information_universities
    Information_consultancyfirms Information_businessassociations
Information_professionaljournals
  /MISSING LISTWISE
  /ANALYSIS Information_competitor Information_suppliers Information_universities
    Information_consultancyfirms Information_businessassociations
Information_professionaljournals
  /PRINT INITIAL KMO EXTRACTION ROTATION
  /FORMAT SORT BLANK(.10)
  /PLOT EIGEN
  /CRITERIA MINEIGEN(1) ITERATE(25)
  /EXTRACTION PAF
  /CRITERIA ITERATE(300) DELTA(0)
  /ROTATION OBLIMIN
  /METHOD=CORRELATION.
```

KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		,571
Bartlett's Test of Sphericity	Approx. Chi-Square	243,478
	df	15
	Sig.	,000

Table 80: KMO and Barlett's test (factor analysis knowledge sources)

Communalities

	Initial	Extraction
Has this establishment used information or ideas from competitors (b1b)	,070	,326
Has this establishment used information or ideas from suppliers (b1c)	,071	,186
Has this establishment used information or ideas from universities (b1e)	,091	,281
Has this establishment used information or ideas from consultancy firms (b1f)	,132	,296
Has this establishment used information or ideas from business associations (b1g)	,316	,433
Has this establishment used information or ideas from professional journal (b1h)	,352	,708

Extraction Method: Principal Axis Factoring.

Table 81: Communalities (factor analysis knowledge sources)

Total Variance Explained

	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings[a]
Factor	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total
1	1,851	30,855	30,855	1,361	22,679	22,679	1,283
2	1,222	20,372	51,227	,487	8,124	30,803	,488
3	1,035	17,256	68,483	,381	6,351	37,154	,782
4	,776	12,942	81,424				
5	,688	11,460	92,884				
6	,427	7,116	100,000				

Extraction Method: Principal Axis Factoring.

a. When factors are correlated, sums of squared loadings cannot be added to obtain a total variance.

Table 82: Total Variance Explained (factor analysis knowledge sources)

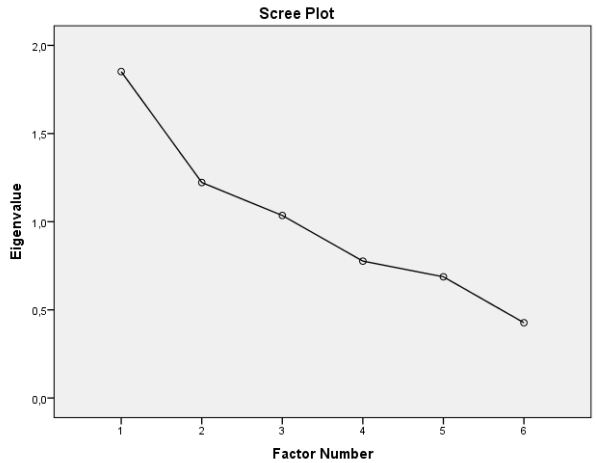


Figure 13: Scree Plot (factor analysis knowledge sources)

Pattern Matrix[a]

	Factor		
	1	2	3
Has this establishment used information or ideas from professional journal (b1h)	,823		
Has this establishment used information or ideas from business associations (b1g)	,648		
Has this establishment used information or ideas from competitors (b1b)	-,143	,564	
Has this establishment used information or ideas from suppliers (b1c)	,117	,408	
Has this establishment used information or ideas from universities (b1e)			,546
Has this establishment used information or ideas from consultancy firms (b1f)	,101		,494

Extraction Method: Principal Axis Factoring.
Rotation Method: Oblimin with Kaiser Normalization.

a. Rotation converged in 4 iterations.

Table 83: Pattern Matrix (factor analysis knowledge sources)

```
FACTOR
  /VARIABLES Information_competitor Information_universities Information_consultancyfirms
    Information_businessassociations Information_professionaljournals
  /MISSING LISTWISE
  /ANALYSIS Information_competitor Information_universities Information_consultancyfirms
    Information_businessassociations Information_professionaljournals
  /PRINT INITIAL KMO EXTRACTION ROTATION
  /FORMAT SORT BLANK(.10)
  /PLOT EIGEN
  /CRITERIA MINEIGEN(1) ITERATE(25)
  /EXTRACTION PAF
  /CRITERIA ITERATE(300) DELTA(0)
  /ROTATION OBLIMIN
  /METHOD=CORRELATION.
```


KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		,587
Bartlett's Test of Sphericity	Approx. Chi-Square	215,237
	df	10
	Sig.	,000

Table 84: KMO and Barlett's test (factor analysis knowledge sources)

Communalities

	Initial	Extraction
Has this establishment used information or ideas from competitors (b1b)	,015	,009
Has this establishment used information or ideas from universities (b1e)	,091	,346
Has this establishment used information or ideas from consultancy firms (b1f)	,132	,249
Has this establishment used information or ideas from business associations (b1g)	,316	,526
Has this establishment used information or ideas from professional journal (b1h)	,340	,595

Extraction Method: Principal Axis Factoring.

Table 85: Communalities (factor analysis knowledge sources)

Total Variance Explained

Factor	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings[a]
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total
1	1,839	36,776	36,776	1,325	26,491	26,491	1,274
2	1,039	20,787	57,563	,401	8,030	34,521	,769
3	,987	19,734	77,297				
4	,700	13,991	91,288				
5	,436	8,712	100,000				

Extraction Method: Principal Axis Factoring.

a. When factors are correlated, sums of squared loadings cannot be added to obtain a total variance.

Table 86: Total Variance Explained (factor analysis knowledge sources)

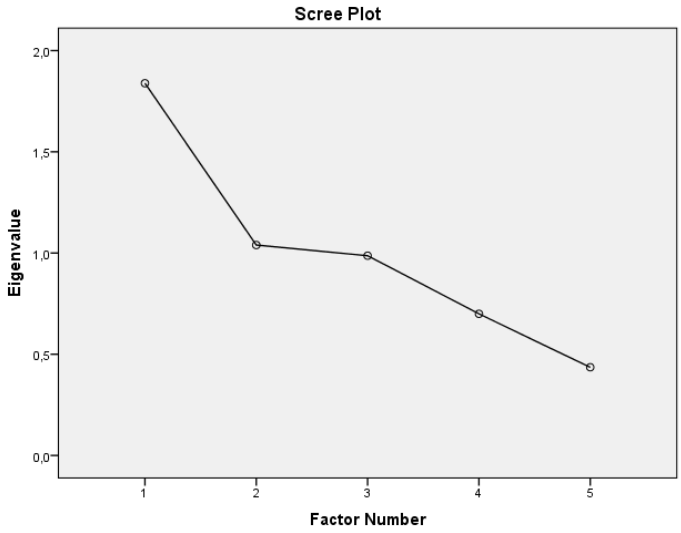


Figure 14: Scree Plot (factor analysis knowledge sources)

Pattern Matrix[a]

	Factor	
	1	2
Has this establishment used information or ideas from professional journal (b1h)	,756	
Has this establishment used information or ideas from business associations (b1g)	,755	
Has this establishment used information or ideas from competitors (b1b)		
Has this establishment used information or ideas from universities (b1e)		,614
Has this establishment used information or ideas from consultancy firms (b1f)	,152	,414

Extraction Method: Principal Axis Factoring.
Rotation Method: Oblimin with Kaiser Normalization.

a. Rotation converged in 4 iterations.

Table 87: Pattern Matrix (factor analysis knowledge sources)

KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		,588
Bartlett's Test of Sphericity	Approx. Chi-Square	209,458
	df	6
	Sig.	,000

Table 88: KMO and Barlett's test (factor analysis knowledge sources)

Communalities

	Initial	Extraction
Has this establishment used information or ideas from universities (b1e)	,090	,337
Has this establishment used information or ideas from consultancy firms (b1f)	,131	,257
Has this establishment used information or ideas from business associations (b1g)	,316	,617
Has this establishment used information or ideas from professional journal (b1h)	,332	,516

Extraction Method: Principal Axis Factoring.

Table 89: Communalities (factor analysis knowledge sources)

Total Variance Explained

	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings[a]
Factor	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total
1	1,826	45,640	45,640	1,318	32,959	32,959	1,251
2	1,026	25,662	71,302	,409	10,227	43,186	,774
3	,708	17,707	89,009				
4	,440	10,991	100,000				

Extraction Method: Principal Axis Factoring.

a. When factors are correlated, sums of squared loadings cannot be added to obtain a total variance.

Table 90: Total Variance Explained (factor analysis knowledge sources)

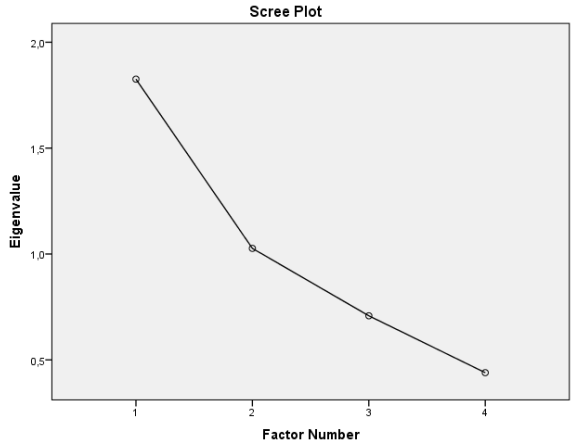


Figure 15: Scree Plot (factor analysis knowledge sources)

Pattern Matrix[a]

	Factor	
	1	2
Has this establishment used information or ideas from business associations (b1g)	,810	
Has this establishment used information or ideas from professional journal (b1h)	,673	,100
Has this establishment used information or ideas from universities (b1e)		,605
Has this establishment used information or ideas from consultancy firms (b1f)	,145	,432

Extraction Method: Principal Axis Factoring.
Rotation Method: Oblimin with Kaiser Normalization.

a. Rotation converged in 4 iterations.

Table 91: Pattern Matrix (factor analysis knowledge sources)

Reliability analysis knowledge sources

Syntax:

```
RELIABILITY
  /VARIABLES=Information_competitor Information_suppliers Information_universities
    Information_consultancyfirms Information_businessassociations
Information_professionaljournals
  /SCALE('ALL VARIABLES') ALL
  /MODEL=ALPHA
  /STATISTICS=DESCRIPTIVE SCALE CORR
  /SUMMARY=TOTAL.
```

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
,456	,455	6

Table 92: Cronbach's Alpha (reliability analysis knowledge sources)

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
Has this establishment used information or ideas from competitors (b1b)	1,95	1,713	,010	,070	,530
Has this establishment used information or ideas from suppliers (b1c)	1,98	1,514	,170	,071	,444
Has this establishment used information or ideas from universities (b1e)	2,49	1,673	,169	,091	,439
Has this establishment used information or ideas from consultancy firms (b1f)	2,46	1,538	,285	,132	,385
Has this establishment used information or ideas from business associations (b1g)	2,10	1,285	,361	,316	,321
Has this establishment used information or ideas from professional journal (b1h)	2,17	1,254	,393	,352	,297

Table 93: Cronbach's Alpha if item Deleted (reliability analysis knowledge sources)

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
,601	,590	4

Table 94: Cronbach's Alpha (reliability analysis knowledge sources)

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
Has this establishment used information or ideas from universities (b1e)	1,16	1,097	,229	,090	,626
Has this establishment used information or ideas from consultancy firms (b1f)	1,13	,988	,339	,131	,562
Has this establishment used information or ideas from business associations (b1g)	,77	,736	,461	,316	,464
Has this establishment used information or ideas from professional journal (b1h)	,84	,700	,518	,332	,408

Table 95: Cronbach's Alpha if item Deleted (reliability analysis knowledge sources)

Syntax: compute items into knowledge sources:

```
COMPUTE Knowlede_sources=Information_universities+Information_consultancyfirms+
    Information_businessassociations+Information_professionaljournals.
```

Statistics

Knowledge sources: universities, cons

N	Valid	392
	Missing	0
Mean		1,30
Median		1,00
Mode		0
Skewness		,496
Std. Error of Skewness		,123
Kurtosis		-,680
Std. Error of Kurtosis		,246

Table 96: Statistics table Knowledge sources

Knowledge sources: universities, consultancy firms, business associations, and professional journals

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No information sources	132	33,7	33,7	33,7
	One information source	90	23,0	23,0	56,6
	Two information sources	109	27,8	27,8	84,4
	Three information sources	43	11,0	11,0	95,4
	Four information sources	18	4,6	4,6	100,0
	Total	392	100,0	100,0	

Table 97: Frequency table Knowledge sources

Syntax regional mean values Product Market:


```
EXAMINE VARIABLES=Product_market BY Region_IFS
  /PLOT BOXPLOT STEMLEAF
  /COMPARE GROUPS
  /STATISTICS DESCRIPTIVES
  /CINTERVAL 95
  /MISSING LISTWISE
  /NOTOTAL.
```

Descriptives

	Region		Statistic
Product Market compute variable: hard infrastructure, and soft infrastructure	Bihar	Mean	1,53
	Chhattis	Mean	,68
	Delhi	Mean	,45
	Gujarat	Mean	,24
	Haryana	Mean	1,25
	Jharkhan	Mean	1,52
	Madhya P	Mean	,80
	Maharash	Mean	,59
	Orissa	Mean	.67
	Punjab	Mean	1.10
	Rajastha	Mean	,71
	Uttar Pr	Mean	1,97
	Uttaranc	Mean	1.41
	West Ben	Mean	,72

Table 98: Regional mean values Product Market

Product Market compute regional level variable: hard infrastructure, and soft infrastructure

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No obstacle	92	23,5	23,5	23,5
	Minor obstacle	204	52,0	52,0	75,5
	Moderate obstacle	96	24,5	24,5	100,0
	Total	392	100,0	100,0	

Table 99: Frequency table Product Market

Syntax regional mean values Labor Market:

```
EXAMINE VARIABLES=Inadequately_educated_workforce BY Region_IFS
  /PLOT BOXPLOT STEMLEAF
  /COMPARE GROUPS
  /STATISTICS DESCRIPTIVES
  /CINTERVAL 95
  /MISSING LISTWISE
  /NOTOTAL.
```

Descriptives

	Region		Statistic
To what degree an inadequately educated workforce is an obstacle (I30b)	Bihar	Mean	1,67
	Chhattis	Mean	1,04
	Delhi	Mean	,48
	Gujarat	Mean	.21
	Haryana	Mean	1,04
	Jharkhan	Mean	1,45
	Madhya P	Mean	,85
	Maharash	Mean	,89
	Orissa	Mean	,33
	Punjab	Mean	,55
	Rajastha	Mean	,57
	Uttar Pr	Mean	1,73
	Uttaranc	Mean	1,24
	West Ben	Mean	,72

Table 100: Regional mean values Labor Market

Labor Market compute regional level variable: inadequately educated workforce

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No obstacle	101	25,8	25,8	25,8
	Minor obstacle	228	58,2	58,2	83,9
	Moderate obstacle	63	16,1	16,1	100,0
	Total	392	100,0	100,0	

Table 101: Frequency table Labor Market

Syntax regional mean values Capital Market:

```
EXAMINE VARIABLES=Access_to_finance BY Region_IFS
  /PLOT BOXPLOT STEMLEAF
  /COMPARE GROUPS
  /STATISTICS DESCRIPTIVES
  /CINTERVAL 95
  /MISSING LISTWISE
  /NOTOTAL.
```

Descriptives

	Region		Statistic
To what degree access to finance is an obstacle (k30)	Bihar	Mean	1,73
	Chhattis	Mean	,29
	Delhi	Mean	,83
	Gujarat	Mean	,19
	Haryana	Mean	1,04
	Jharkhan	Mean	1,73
	Madhya P	Mean	1,00
	Maharash	Mean	1,68
	Orissa	Mean	,67
	Punjab	Mean	,10
	Rajastha	Mean	,71
	Uttar Pr	Mean	2,06
	Uttaranc	Mean	1,47
	West Ben	Mean	1,03

Table 102: Regional mean values Capital Market

Capital Market compute regional level variable: access to finance

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No obstacle	120	30,6	30,6	30,6
	Minor obstacle	139	35,5	35,5	66,1
	Moderate obstacle	133	33,9	33,9	100,0
	Total	392	100,0	100,0	

Table 103: Frequency table Capital Market

Syntax regional mean values Regulatory Environment:

```
EXAMINE VARIABLES=Regulatory_environment BY Region_IFS
  /PLOT BOXPLOT STEMLEAF
  /COMPARE GROUPS
  /STATISTICS DESCRIPTIVES
  /CINTERVAL 95
  /MISSING LISTWISE
  /NOTOTAL.
```


Descriptives

	Region		Statistic
Regulatory Environment compute variable: Corruption, Rule of law, Regulatory Quality	Bihar	Mean	1,70
	Chhattis	Mean	1,32
	Delhi	Mean	1,38
	Gujarat	Mean	1,03
	Haryana	Mean	1,86
	Jharkhan	Mean	1,61
	Madhya P	Mean	1,60
	Maharash	Mean	,95
	Orissa	Mean	,89
	Punjab	Mean	1,72
	Rajastha	Mean	1,00
	Uttar Pr	Mean	2,30
	Uttaranc	Mean	1,76
	West Ben	Mean	,93

Table 104: Regional mean values Regulatory Environment

Regulatory Environment compute regional level variable: Corruption, Rule of law, Regulatory Quality

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Minor obstacle	202	51,5	51,5	51,5
	Moderate obstacle	190	48,5	48,5	100,0
	Total	392	100,0	100,0	

Table 105: Frequency table Regulatory Environment

Statistics

		Product Market compute regional level variable: hard infrastructure, and soft infrastructure	Labor Market compute regional level variable: inadequately educated workforce	Capital Market compute regional level variable: access to finance	Regulatory Environment compute regional level variable: Corruption, Rule of law, Regulatory Quality
N	Valid	392	392	392	392
	Missing	0	0	0	0
Mean		1,01	,90	1,03	1,48
Median		1,00	1,00	1,00	1,00
Mode		1	1	1	1
Skewness		-,014	,088	-,060	,061
Std. Error of Skewness		,123	,123	,123	,123
Kurtosis		-,911	-,576	-1,449	-2,006
Std. Error of Kurtosis		,246	,246	,246	,246

Table 106: Statistics Product-, Labor- & Capital Market, and Regulatory Environment

Syntax regional mean values Institutional Voids:

```
COMPUTE Institutional_voids_regional=(ProductMarketregio+LaborMarketregio+CapitalMarketregio+
    RegulatoryEnvironmentregio)/4.
```

Appendix 7 – Results (QCA)

*Syntax SPSS file to *.dat. file:*

```
SAVE TRANSLATE
OUTFILE='C:\Users\denni\Documents\Opleiding\Universiteit\Master\Thesis\Innovation '+
    'in Emerging Markets (India)\Survey\NEW NEW NEW zonder missing values and needed
variables.dat'
  /TYPE=TAB
  /ENCODING='UTF8'
  /MAP
  /REPLACE
  /FIELDNAMES
  /CELLS=VALUES.

Data written to C:\Users\...\Survey\NEW NEW NEW zonder missing values and needed
variables.dat.
47 variables and 392 cases written.
Variable: Region_IFS         Type: String   Width:  14
Variable: Firmsize_IFS       Type: Number   Width:  11   Dec: 0
Variable: Managerial_experience   Type: Number   Width:  11   Dec: 0
Variable: Electricity        Type: Number   Width:  11   Dec: 0
Variable: Telecommunications   Type: Number   Width:  11   Dec: 0
Variable: Transport          Type: Number   Width:  11   Dec: 0
Variable: Customs_and_trade_regulations   Type: Number   Width:  11   Dec: 0
Variable: Access_to_inputs_and_supplies   Type: Number   Width:  11   Dec: 0
Variable: Access_to_production_technology   Type: Number   Width:  11   Dec: 0
Variable: Availability_of_storage_facilities   Type: Number   Width:  11   Dec: 0
Variable: Introduction_of_new_or_improved_product_or_service  Type: Number Width:  11   Dec: 0
Variable: Crime_theft_and_disorder   Type: Number   Width:  11   Dec: 0
Variable: Access_to_finance   Type: Number   Width:  11   Dec: 0
Variable: Tax_rates          Type: Number   Width:  11   Dec: 0
Variable: Tax_administration   Type: Number   Width:  11   Dec: 0
Variable: Business_licensing_and_permits   Type: Number   Width:  11   Dec: 0
Variable: Political_instability   Type: Number   Width:  11   Dec: 0
Variable: Corruption         Type: Number   Width:  11   Dec: 0
Variable: Courts             Type: Number   Width:  11   Dec: 0
Variable: Completed_secondary_school   Type: Number   Width:  11   Dec: 0
Variable: Completed_bachelors_degree   Type: Number   Width:  11   Dec: 0
Variable: Inadequately_educated_workforce   Type: Number   Width:  11   Dec: 0
Variable: Patent             Type: Number   Width:  11   Dec: 0
Variable: Information_competitor   Type: Number   Width:  11   Dec: 0
Variable: Information_suppliers   Type: Number   Width:  11   Dec: 0
Variable: Information_products_or_services   Type: Number   Width:  11   Dec: 0
Variable: Information_universities   Type: Number   Width:  11   Dec: 0
Variable: Information_consultancyfirms   Type: Number   Width:  11   Dec: 0
Variable: Information_businessassociations   Type: Number   Width:  11   Dec: 0
Variable: Information_professionaljournals   Type: Number   Width:  11   Dec: 0
Variable: Information_internet   Type: Number   Width:  11   Dec: 0
Variable: Information_customerfeedback   Type: Number   Width:  11   Dec: 0
Variable: Relations_with_buyers   Type: Number   Width:  11   Dec: 0
Variable: Relations_with_suppliers   Type: Number   Width:  11   Dec: 0
Variable: Relations_with_competitors   Type: Number   Width:  11   Dec: 0
Variable: Relations_with_institutional_actors   Type: Number   Width:  11   Dec: 0
Variable: Hard_infrastructure   Type: Number   Width:  11   Dec: 0
Variable: Soft_infrastructure   Type: Number   Width:  11   Dec: 0
Variable: Product_Market     Type: Number   Width:  11   Dec: 0
Variable: Rule_of_law        Type: Number   Width:  11   Dec: 0
Variable: Regulatory_quality   Type: Number   Width:  11   Dec: 0
Variable: Regulatory_environment   Type: Number   Width:  11   Dec: 0
Variable: Knowlede_sources   Type: Number   Width:  11   Dec: 0
Variable: Product_Market_regional_level   Type: Number   Width:  11   Dec: 0
Variable: Labor_Market_regional_level   Type: Number   Width:  11   Dec: 0
Variable: Capital_Market_regional_level   Type: Number   Width:  11   Dec: 0
Variable: Regulatory_Environment_regional_level   Type: Number   Width:  11   Dec: 0
```

Syntaxes calibration of the conditions:

Syntax SME innovativeness (outcome variable):

```
recode: crispinnovative = introductionofn (2=0)
```

Syntaxes regional institutional voids:

```
compute: fsvoids6 = (productmarketre+labormarketregi+capitalmarketre+regulatoryenvir)/4 →
(this is the construct institutional voids consisting of the 4 markets)

recode: fsvoids7 = fsvoids6 (0 thru 0.99=0)(1=0.5)(1.01 thru Hi=1)
```

Region	Product market	Labor market	Capital market	Regulatory environment	Institutional voids
Bihar	0.51	0.51	0.51	0.51	**1**
Chhattisgarh	0.25	0.25	0	0.25	**0**
Delhi	0	0	0.25	0.25	**0**
Gujarat	0	0	0	0.25	**0**
Haryana	0.25	0.25	0.25	0.51	**1**
Jharkhand	0.51	0.25	0.51	0.51	**1**
Madhya Pradesh	0.25	0.25	0.25	0.51	**1**
Maharashtra	0.25	0.25	0.51	0.25	**1**
Orissa	0.25	0	0.25	0.25	**0**
Punjab	0.25	0.25	0	0.51	**0.5**
Rajasthan	0.25	0.25	0.25	0.25	**0.5**
Uttar Pradesh	0.51	0.51	0.51	0.51	**1**
Uttaranchal	0.25	0.25	0.25	0.51	**1**
West Bengal	0.25	0.25	0.25	0.25	**0.5**

N= 392 *Table 107: Distribution Institutional Voids across regions*
Missing= 0

	Institutional voids			Total
Innovative	0	0.5	1	
1 (yes)	40 31%	34 52.3%	109 55.1%	183
0 (no)	89 69%	31 47.7%	89 44.9%	209

N= 392 *Table 108: Cross-table Innovativeness and Product market*
Missing= 0

	Product market			Total
Innovative	0	0.25	0.51	
1 (yes)	28 30.4%	95 46.6%	60 62.5%	183
0 (no)	64 69.6%	109 53.4%	36 37.5%	209

N= 392 *Table 109: Cross-table Innovativeness and Labor market*
Missing= 0

	Labor market			Total
Innovative	0	0.25	0.51	
1 (yes)	32 31.7%	115 50.4%	36 57.1%	182
0 (no)	69 68.3%	113 49.6%	27 42.9%	219

N= 392 *Table 110: Cross-table Innovativeness and Labor market*
Missing= 0

	Capital market			Total
Innovative	0	0.25	0.51	
1 (yes)	24 20%	88 63.3%	71 53.4%	183
0 (no)	96 80%	51 36.7%	62 46.6%	209

N= 392 *Table 111: Cross-table Innovativeness and Capital market*
Missing= 0

	Regulatory environment		Total
Innovative	0.25	0.51	
1 (yes)	75 37.1%	108 56.8%	183
0 (no)	127 62.9%	82 43.2%	209

N= 392 *Table 112: Cross-table Innovativeness and Regulatory Environment*
Missing= 0

Syntaxes managerial experience:

```
recode: fsmanagerialexper = managerialexper (11 thru Hi=1)(8 thru 10=0.75)(7=0.51)(4 thru
6=0.25)(0 thru 3=0)
```

	Managerial experience					Total
Innovative	0	0.25	0.51	0.75	1	
1 (yes)	13 41.9%	25 46.3%	2 22.2%	51 41.1%	92 52.9%	183
0 (no)	18 58.1%	29 53.7%	7 77.8%	73 58.9%	82 47.1%	209

N= 392 *Table 113: Cross-table Innovativeness and Managerial experience*
Missing= 0

Syntaxes workforce educational level:

Secondary school: `recode: cssecondary2 = completedsecond (0 thru 60=0)(61 thru 100=1)`

Bachelor degree: `recode: csbachelor2 = completedbachel (0 thru 50=0)(51 thru 100=1)`

`compute: fseducational2 = (cssecondary2+csbachelor2)/2` → `(anchor 0, 0.5, and 1)`

`recode: fseducational3 = fseducational2 (0.5=0.51)`

`recode: fseducational4 = fseducational2 (0.5=0.51)`

	Educational level			Total
Innovative	0	0.51	1	
1 (yes)	100 38.3%	68 62.4%	15 68.2%	183
0 (no)	161 61.7%	41 37.6%	7 31.8%	209

N= 392 *Table 114: Cross-table Innovativeness and Educational level*
Missing= 0

Table 114 shows that firms with a more educated workforce are most of the time (more than half) innovative. While firms with a less educated workforce are mostly non-innovative.

Syntaxes inter-organizational resource capital:

```
recode: fsknowledgesources = knowledesources (4=1)(3=0.75)(2=0.51)(1=0.25)(0=0)
```

	Knowledge sources					Total
Innovative	0	0.25	0.51	0.75	1	
1 (yes)	50 37.9%	44 48.9%	57 52.3%	23 53.5%	9 50%	182
0 (no)	82 62.1%	46 51.1%	52 47.7%	20 46.5%	9 50%	219

N= 401 *Table 115: Cross-table Innovativeness and Network*
Missing= 0

Table 115 shows that SMEs with less knowledge sources are in general less innovative, while firms with more knowledge sources are more innovative.

Has this establishment used information or ideas from universities (b1e)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	338	86,2	86,2	86,2
	Yes	54	13,8	13,8	100,0
	Total	392	100,0	100,0	

Has this establishment used information or ideas from consultancy firms (b1f)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	326	83,2	83,2	83,2
	Yes	66	16,8	16,8	100,0
	Total	392	100,0	100,0	

Has this establishment used information or ideas from business associations (b1g)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	184	46,9	46,9	46,9
	Yes	208	53,1	53,1	100,0
	Total	392	100,0	100,0	

Has this establishment used information or ideas from professional journal (b1h)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	211	53,8	53,8	53,8
	Yes	181	46,2	46,2	100,0
	Total	392	100,0	100,0	

Table 116: Distribution knowledge sources

Condition	**Innovative**	
	Consistency	**Coverage**
fsknowledgesources	0.362404	0.516752
~fsknowledgesources	0.637596	0.442540
fsvoids7	0.688525	0.546638
~fsvoids7	0.311475	0.352941
fseducational3	0.271475	0.640289
~fseducational3	0.728525	0.424032
fsmanagerialexp	0.751475	0. 482374
~fsmanagerialexp	0.248525	0.425405

Table 117: Test for Necessary conditions (innovative)

fsknowledges...	fsvoids7	fseducational3	fsmanagerial...	number	crispinnovative	raw consist.	PRI consist.	SYM consist
0	0	0	1	50 (15%)	0	0.363356	0.363356	0.363356
1	1	0	1	41 (27%)	0	0.460336	0.460336	0.460336
1	1	1	1	37 (39%)	0	0.631324	0.631324	0.631324
0	1	0	1	37 (50%)	0	0.536174	0.536174	0.536174
1	0	0	1	31 (59%)	0	0.497115	0.497115	0.497115
0	1	1	1	30 (69%)	0	0.632405	0.632405	0.632405
0	0	0	0	20 (75%)	0	0.176486	0.176486	0.176486
1	1	1	0	14 (79%)	1	0.749690	0.749690	0.749689
0	1	1	0	14 (83%)	1	0.743427	0.743427	0.743427
0	1	0	0	13 (87%)	0	0.511106	0.511106	0.511106
1	1	0	0	12 (91%)	0	0.584801	0.584801	0.584801

Table 118: Fuzzy Truth Table Algorithm (innovative)

fsknowledges...	fsvoids7	fseducational3	fsmanagerial...	number	~crispinnovat...	raw consist.	PRI consist.	SYM consist
0	0	0	1	50 (15%)	0	0.636645	0.636645	0.636644
1	1	0	1	41 (27%)	0	0.539664	0.539664	0.539664
1	1	1	1	37 (39%)	0	0.368676	0.368676	0.368676
0	1	0	1	37 (50%)	0	0.463826	0.463826	0.463826
1	0	0	1	31 (59%)	0	0.502885	0.502885	0.502885
0	1	1	1	30 (69%)	0	0.367595	0.367595	0.367595
0	0	0	0	20 (75%)	1	0.823514	0.823514	0.823514
1	1	1	0	14 (79%)	0	0.250311	0.250311	0.250311
0	1	1	0	14 (83%)	0	0.256573	0.256573	0.256573
0	1	0	0	13 (87%)	0	0.488894	0.488894	0.488894
1	1	0	0	12 (91%)	0	0.415199	0.415199	0.415199

Table 119: Fuzzy Truth Table Algorithm (non-innovative)

Condition	**Non-innovative**	
	Consistency	**Coverage**
fsknowledgesources	0.296746	0.483248
~fsknowledgesources	0.703254	0.557460
fsvoids7	0.500000	0.453362
~fsvoids7	0.500000	0.647059
fseducational3	0.133541	0.359711
~fseducational3	0.866459	0.575968
fsmanagerialexp	0.706077	0.517626
~fsmanagerialexp	0.293923	0.574595

Table 120: Test for Necessary conditions (non-innovative)

Algorithm: Quine-McCluskey True: 1			
--- COMPLEX SOLUTION --- frequency cutoff: 12.000000 consistency cutoff: 0.743427			
	Raw coverage	Unique coverage	Consistency
fsvoids7*fseducational3*~fsmanagerialexp	0.101858	0.101858	0.762061
Solution coverage: 0.101858			
Solution consistency: 0.762061			

Table 121: Truth table analysis (Complex solution; innovative)

Algorithm: Quine-McCluskey True: 1-L			
--- PARSIMONIOUS SOLUTION --- frequency cutoff: 12.000000 consistency cutoff: 0.743427			
	Raw coverage	Unique coverage	Consistency
fseducational3*~fsmanagerialexp	0.111421	0.111421	0.686301
Solution coverage: 0.111421			
Solution consistency: 0.686301			

Table 122: Truth table analysis (Parsimonious solution; innovative)

Algorithm: Quine-McCluskey True: 1 0 Matrix: 0L			
--- INTERMEDIATE SOLUTION --- frequency cutoff: 12.000000 consistency cutoff: 0.743427			
	Raw coverage	Unique coverage	Consistency
~fsmanagerialexp*fseducational3*fsvoids7	0.101858	0.101858	0.762061
Solution coverage: 0.101858			
Solution consistency: 0.762061			

Table 123: Truth table analysis (Intermediate solution; innovative)

Algorithm: Quine-McCluskey True: 1			
--- COMPLEX SOLUTION --- frequency cutoff: 12.000000 consistency cutoff: 0.743427			
	Raw coverage	Unique coverage	Consistency
~fsknowledgesour*~fsvoids7*~fseducational3*~fsmanagerialexp	0.150478	0. 150478	0.823514
Solution coverage: 0.150478			
Solution consistency: 0.823514			

Table 124: Truth table analysis (Complex solution; non-innovative)

Algorithm: Quine-McCluskey True: 1-L			
--- PARSIMONIOUS SOLUTION --- frequency cutoff: 12.000000 consistency cutoff: 0.743427			
	Raw coverage	Unique coverage	Consistency
~fsvoids7*~fsmanagerialexp	0.169665	0.169665	0.811256
Solution coverage: 0.169665			
Solution consistency: 0.811256			

Table 125: Truth table analysis (Parsimonious solution; non-innovative)

Algorithm: Quine-McCluskey True: 1 0 Matrix: 0L			
--- INTERMEDIATE SOLUTION --- frequency cutoff: 12.000000 consistency cutoff: 0.743427			
	Raw coverage	Unique coverage	Consistency
~fsmanagerialexp*~fseducational3*~fsvoids7*~fsknowledgesour	0.150478	0.150478	0.823514
Solution coverage: 0.150478			
Solution consistency: 0.823514			

Table 126: Truth table analysis (Intermediate solution; non-innovative)

Syntaxes recalibration of the conditions:

Syntaxes recoding managerial experience

```
recode: fsexperience2 = fsmanagerialexp (0.51=0.49

recode: fsexperience3 = managerialexper (0 thru 4=0)(5 thru 9=0.25)(10 thru 14=0.49)(15 thru
19=0.75)(20 thru Hi=1)

recode: fsexperience4 = fsmanagerialexp3 (0.49=0.51)
```

Condition	**Innovative**	
	Consistency	**Coverage**
fsexperience2	0.751257	0.482538
~fsexperience2	0.248743	0.425063
fsexperience3	0.547760	0.502910
~fsexperience3	0.452240	0.429520
fsexperience4	0.553333	0.502083
~fsexperience4	0.446667	0.429487

Table 128: Test for Necessary conditions (innovative)

Condition	**Non-Innovative**	
	Consistency	**Coverage**
fsexperience2	0.705407	0.517462
~fsexperience2	0.294593	0.574937
fsexperience3	0.474067	0.497090
~fsexperience3	0.525933	0.570480
fsexperience4	0.480478	0.497918
~fsexperience4	0.519522	0.570513

Table 129: Test for Necessary conditions (non-innovative)

fsknowledges...	fsvoids7	fseducational3	fsexperience3	number	crispinnovative	raw consist.	PRI consist.	SYM consist
0	0	0	0	63		0.242547	0.242547	0.242547
1	1	1	0	37		0.689272	0.689272	0.689272
1	1	0	0	36		0.514982	0.514982	0.514982
0	1	0	0	35		0.500183	0.500183	0.500183
0	1	1	0	34		0.690046	0.690046	0.690046
1	0	0	1	19		0.490956	0.490956	0.490956
1	1	0	1	17		0.472406	0.472406	0.472406
1	0	0	0	17		0.418410	0.418410	0.418410
0	1	0	1	15		0.555823	0.555823	0.555823
1	1	1	1	14		0.625859	0.625859	0.625859

Table 130: Fuzzy Truth Table Algorithm

Syntaxes recoding regional institutional voids:

```
recode: fsproductm2 = productmarketre (0=0)(1=0.5)(2 thru Hi=1)

recode: fslaborm2 = labormarketregi (0=0)(1=0.5)(2 thru Hi=1)

recode: fscapitalm2 = capitalmarketre (0=0)(1=0.5)(2 thru Hi=1)

recode: fsregulatorym2 = regulatoryenvir (0=0)(1=0.5)(2 thru Hi=1)


compute: csvoids = (fsproductm2+fslaborm2+fscapitalm2+fsregulatorym2)/4

recode: fsvoids = csvoids (0 thru 0.49=0)(0.5=0.5)(0.51 thru 1=1)


compute: csvoids2 = (productmarketre+labormarketregi+capitalmarketre+regulatoryenvir)/4

recode: fsvoids2 = csvoids2 (0 thru 0.5=0)(1 thru 1.5=0.5)(2 thru Hi=1)


recode: fsvoids3 = csvoids2 (0 thru 0.99=0)(1 thru 1.99=0.25)(2 thru 2.99=0.51)(3 thru
3.99=0.75)(4 thru 4.99=1)
```

Condition	**Innovative**	
	Consistency	**Coverage**
fsproductm2	0.587432	0.542929
~fsproductm2	0.412568	0.389175
fslaborm2	0.510929	0.528249
~fslaborm2	0.489071	0.416279
fscapitalm2	0.628415	0.567901
~fscapitalm2	0.371585	0.358839
fsregulatorym2	0.795082	0.500000
~fsregulatorym2	0.204918	0.371287
fsvoids	0.688525	0.546638
~fsvoids	0.311475	0.352941
fsvoids2	0.603825	0.476293
~fsvoids2	0.260929	0.298438
fsvoids3	0.246503	0.549251
~fsvoids3	0.753497	0.444993

Table 131: Test for Necessary conditions (innovative)

Condition	**Non-Innovative**	
	Consistency	**Coverage**
fsproductm2	0.433014	0.457071
~fsproductm2	0.566986	0.610825
fslaborm2	0.399522	0.471751
~fslaborm2	0.600478	0.583721
fscapitalm2	0.418660	0.432099
~fscapitalm2	0.581340	0.641161
fsregulatorym2	0.696172	0.500000
~fsregulatorym2	0.303828	0.628713
fsvoids	0.500000	0.453362
~fsvoids	0.500000	0.647059

fsvoids2	0.462919	0.417026
~fsvoids2	0.418660	0.546875
fsvoids3	0.177129	0.450749
~fsvoids3	0.822871	0.555007

Table 132: Test for Necessary conditions (non-innovative)

fsknowledges...	fsvoids3	fseducational3	fsmanagerial...	number	crispinnovative	raw consist.	PRI consist.	SYM consist
0	0	0	1	104		0.448617	0.448617	0.448617
1	0	0	1	72		0.482245	0.482245	0.482245
0	0	1	1	48		0.613092	0.613092	0.613092
1	0	1	1	35		0.612154	0.612154	0.612153
0	0	0	0	34		0.357722	0.357722	0.357722
1	1	0	1	18		0.515725	0.515725	0.515725
1	0	0	0	15		0.532944	0.532944	0.532944
0	1	0	1	14		0.529845	0.529845	0.529845
0	0	1	0	14		0.669736	0.669736	0.669736
1	1	1	1	13		0.647989	0.647989	0.647989

Table 133: Fuzzy Truth Table Algorithm

Syntaxes recoding workforce educational level:

```
compute: fseducational2 = (cssecondary2+csbachelor2)/2 → (anchor 0, 0.5, and 1)
recode: fseducational4 = fseducational2 (0.5=0.51) → (anchor 0, 0.51, and 1)
recode: cssecondary3 = completedsecond (0 thru 70=0)(71 thru 100=1)
recode: csbachelor3 = completedbachel (0 thru 60=0)(61 thru 100=1)
compute: fseducational5 = (cssecondary3+csbachelor3)/2 → (anchor 0, 0.5, and 1)
recode: fseducational6 = fseducational5 (0.5=0.51) → (anchor 0, 0.51, and 1)
recode: fseducational7 = fseducational5 (0.5=0.49) → (anchor 0, 0.49, and 1)
```


Condition	**Innovative**	
	Consistency	**Coverage**
fseducation2	0.267760	0.640523
~fseducation2	0.732240	0.424723
fseducation4	0.264044	0.640764
~fseducation4	0.735956	0.425408
fseducation5	0.218579	0.650407
~fseducation5	0.781421	0.432678
fseducation6	0.221421	0.650297
~fseducation6	0.778579	0.432164
fseducation7	0.215738	0.650519
~fseducation7	0.784262	0.433189

Table 134: Test for Necessary conditions (innovative)

Condition	**Non-Innovative**	
	Consistency	**Coverage**
fseducation2	0.131579	0.359477
~fseducation2	0.868421	0.575277
fseducation4	0.129617	0.359236
~fseducation4	0.870383	0.574592
fseducation5	0.102871	0.349593

~fseducation5	0.897129	0.567322
fseducation6	0.104258	0.349703
~fseducation6	0.895742	0.567836
fseducation7	0.101483	0.349481
~fseducation7	0.898517	0.566811

Table 135: Test for Necessary conditions (non-innovative)

csbachelor6	fsknowledges...	fsvoids7	fsmanagerial...	number	crispinnovative	raw consist.	PRI consist.	SYM consist
0	0	0	1	52		0.364304	0.364304	0.364304
0	1	1	1	47		0.468590	0.468590	0.468590
0	0	1	1	42		0.535287	0.535287	0.535286
0	1	0	1	36		0.496777	0.496777	0.496777
1	1	1	1	31		0.616387	0.616387	0.616387
1	0	1	1	25		0.636364	0.636364	0.636364
0	0	0	0	20		0.176486	0.176486	0.176486
0	0	1	0	16		0.519773	0.519773	0.519773
0	1	1	0	14		0.584691	0.584691	0.584691
1	1	1	0	12		0.735934	0.735934	0.735934

Table 136: Fuzzy Truth Table Algorithm

Syntaxes recoding inter-organizational resource capital (knowledge sources):

```
recode: fsknowledge2 = fsknowledgesources (0.51=0.49)

recode: fsknowledge3 = fsknowledgesources (0.51=0.50)
```


Condition	**Innovative**	
	Consistency	**Coverage**
fsknowledge2	0.356175	0.516646
~fsknowledge2	0.643825	0.443199
fsknowledge3	0.359290	0.516699
~fsknowledge3	0.640710	0.442871

Table 137: Test for Necessary conditions (innovative)

Condition	**Non-Innovative**	
	Consistency	**Coverage**
fsknowledge2	0.291770	0.483354
~fsknowledge2	0.708230	0.556801
fsknowledge3	0.294258	0.483301
~fsknowledge3	0.705742	0.557129

Table 138: Test for Necessary conditions (non-innovative)

fsknowledge3	fsvoids7	fseducational3	fsmanagerial...	number	crispinnovative	raw consist.	PRI consist.	SYM consist
0	0	0	1	50 (21%)		0.363766	0.363766	0.363766
0	1	0	1	37 (37%)		0.535652	0.535652	0.535652
0	1	1	1	30 (50%)		0.631946	0.631946	0.631946
0	0	0	0	20 (59%)		0.176609	0.176609	0.176609
1	1	0	1	15 (65%)		0.460481	0.460481	0.460481
0	1	1	0	14 (71%)		0.743204	0.743204	0.743204
0	1	0	0	13 (77%)		0.511321	0.511321	0.511322
1	0	0	1	12 (82%)		0.496755	0.496755	0.496755
0	0	1	1	10 (87%)		0.577019	0.577019	0.577019
1	1	1	1	8 (90%)		0.631782	0.631782	0.631782
1	1	1	0	8 (93%)		0.750000	0.750000	0.750000

Table 139: Fuzzy Truth Table Algorithm