The determinants of firm innovation in Emerging Economies

A study to show the importance of Women on top and R&D expenses in Emerging Economies

Author:	Cheyenne van den Berg
Student number:	s1043379
Supervisor:	prof. dr. A.U. Saka-Helmhout
2 nd Supervisor:	Ass. prof. Erik Poutsma
Date:	08-06-2021



Abstract: This research examines the drivers of firm innovation in emerging economies. Emerging economies are growing and their importance for innovation as well. The drivers of interest in this study are women in top management, R&D expenditure and political stability. In order to find the answer to the question, the study made use of data from the World Bank Enterprise Survey. This resulted in data stemming from 10,434 firms divided over 8 countries. To test the research question, a logistic regression analysis was used. The outcomes revealed that women in top management have a positive direct effect on firm innovation and that it does not differ with respect to political stability. However, the result of the relationship between R&D expenditure and firm innovation is negative. Also when being moderated by political stability, the R&D expenditure of a firm had a negative influence on firm innovation.

Key words: Emerging economies, firm innovation, women in top management, R&D expenditure, political stability, institutional environment, external environment

Paper type: Master's thesis

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1 Introduction

1.1 Background

For emerging economies the importance of innovation is continuously growing (Grossman & Helpman, 1991; Basile, 2001). By taking into consideration the globalization the world is facing, the importance for emerging economies to participate in innovation increases even more (e.g., Basile, 2001; Grossman & Helpman, 1991; Zeschky, Widenmayer & Gassman, 2015). Where innovation is an important ingredient for economic growth (Grossman & Helpman, 1991; Basile, 2001), there is still a lack of information about drivers or hinderances of firm innovation in emerging markets (Krammer & Jiménez, 2020).

Gender diversity in the top management team enhances the performance of a firm (Chong, Ong & Tan, 2018; Yap, Chang & Zainudin, 2017) and is more often seen as a key contributor for firm innovation (Sing & Belwal, 2007; Ritter-Hayashi, Vermeulen & Knoben, 2019). The direct, and indirect effects, women's characteristics have on the innovation level of a firm are the reasons behind (Belitski & Desai, 2019). Although female participation in the top management is proven to have a positive impact on improving the quality of a firm's earnings and innovation process (Adams & Ferreira, 2009), most extant emerging economies literature is technology driven and resource intensive. Until today, emerging economies are dealing with limited resources to achieve innovation (Descubes, Timsit & Truong, 2013). Emerging economy firms that invest in R&D are able to come up with innovative output wherefore R&D is an important driver of firm innovation (Barasa, Knoben, Vermeulen, Kimuyu & Kinyanjui, 2017). Additionally, the expenditure in R&D is a crucial factor in the innovation process a firm is going through (Levin et al., 1987; Kumar & Basu, 2008) wherefore R&D expenditure is often used as an input measure for innovation (Arundel et al., 2007).

Whether those can influence firm innovation dependents on the quality of the (regional) institutions (Barasa et al., 2017). Therefore, the value extraction of a firm's resources should be considered in a broader context. This means looking at the external part of the firm (Barney, Wright & Ketchen, 2001) as firm innovation depends on a firm's environment (Sirmon, Hitt & Ireland, 2007). The possible value to extract from firm innovation is constrained when the environment is unstable (Ghura & Mercereau, 2004). The latter can be defined as the environment not having the capacity and/or resilience to support firms doing business in that environment (Garud & Jain, 1996; Bruton & Alhstrom, 2003).

1.2 Problem statement

The power of the East part of the world has increased because of the financial crisis of 2008. Therefore, emerging economies became key players in the field and that increase makes innovations more important than ever for those countries (Zou & Fu, 2011). Although, most firm innovation research is focussed on developed economies and as such, there is more research necessary for the determinants of innovation in emerging economies (Wang & Kafouros, 2009).

The influence of women in top management is important for firm survival, economic growth and development (Sing & Belwal, 2007). Women especially improve a firms' innovation level (Ritter-Hayashi et al., 2019). The interest in the relationship between women in top management and firm innovation has grown over the years (Tezer, 2001; Burke & Winnicombe, 2008) but despite, there is a call for more research to justify the reasons behind (Srinidhi, Gul & Tsui, 2011; Saeed, Belhitar & Yousaf, 2016). Additionally, the analyses of a firm's resources related to innovation in the extant literature are not that extensive, and what is available is often inconclusive in nature (Herrera & Sánchez-González, 2012). Although, Barasa et al. (2017) presented a positive relationship between R&D and firm innovation, but they are also asking for a deeper understanding of the reasons behind.

The impact of women in top management and R&D expenditure on firm innovation can be expected to vary among countries where there are institutional differences (Haar & Ernst, 2016). Institutional differences are related to whether a country is politically stable or not, and a stable political environment is vital for the economic development of a firm (Durlauf, Johnson & Temple, 2005). The absence of political rights results in a negative effect on a country's political stability and a firm's performance (Badinger & Nindl, 2014). Within a stable political country, the government encourages women's participation in top management (Na & Shin, 2019). In addition, Barasa et al. (2017) presented a positive effect of political stability on the relationship between R&D and firm innovation. Nevertheless, the impact of stability of institutions in emerging economies requires further investigation (Dieleman & Boddewyn, 2012; Barasa et al., 2017).

As a result, there is still a gap within the existing literature for explaining the effect of the above-mentioned drivers on firm innovation and whether this differs between a stable or unstable political environment.

1.3 Objective

The gap requires more information into the determinants and drivers of firm innovation. This is more important than ever in the eye of more positional advantages and better firm, industry and even country performances (Furman, Porter, & Stern, 2002). There is still a need for better insights on how, amongst others, women in top management impacts the firm's innovation (Belitski & Desai, 2019; Ritter-Hayashi et al., 2019) and amongst others this includes for this research R&D expenditure and political stability.

Although the available literature, there is a lack of a combination of determinants and their moderated effect. Therefore, the objective of this study is to test the following determinants: influence of women in top management and R&D expenditure on firm innovation and what the impact of a political stable country would be.

The existing literature is acknowledging the importance of research into the emerging economies and especially regarding firm innovation. To test the effects of women in top management and R&D expenditure on firm innovation in emerging economies and whether this differs with political stability, the following research question will be addressed:

What are the effects of women in top management and R&D expenditure on firm innovation in emerging economies, and is this relationship moderated by political stability?

1.4 Relevance

The real poverty in the world has being falling since 1990, and the increase in workforce and incomes make emerging economies interesting places for firm innovation. But countries vary in the level of resources they possess and deploy in emerging countries (Haar & Ernst, 2016).

The arrival of a new group of emerging economies grouped into BRICS (Brazil, Russia, India, China and South Africa) has caused a change in the international battlefield (Nieto, 2011). It is predicted that the BRIC (without South Africa) countries will be larger than the G6 countries (among others United States, Japan and France) by 2050 (Wilson & Purushothaman, 2003). Their success is due to their rapid transformation into important economic performers in the world (Bruton, Ahlstrom & Obloj, 2008). The importance of emerging economies has grown and ask for a more and deeper understanding. There is also a lack of information on the impact of institutional strengths and/or weaknesses on a firm's competitive advantage (Young, Tsai, Wang, Liu & Ahlstrom, 2014). The influence of women in the Board of Directors is important for firm survival and for a steady social system. This all results in economic growth and development (Sing & Belwal, 2007) where especially women improve a firms' innovation level (Ritter-Hayashi et al., 2019). Women entrepreneurs are more flexible in entrance, change and innovation (Tezer, 2001). The call for equality in management is growing where nowadays Norway is even legislating a 40% female board representation (Burke & Winnicombe, 2008). Despite that all, only little research is able to constitute and to justify the reasons behind (Srinidhi, Gul & Tsui, 2011) but it is important as women in the management have a positive impact on firm innovation (Abdullah et al., 2016).

In today's world economy, innovation for an increase of better economic advantages and higher economic results becomes more important (Furman, Porter, & Stern, 2002). A major part of the world's R&D is coming from emerging economies (World Investment Report, 2005) and many researchers have already studied the effect of R&D and innovation in emerging economies (Hitt, Hoskisson & Kim, 1997; Balkin, Markman & Gomez-Mejía, 2000; Hoskisson, Hitt, Johnson & Grossman, 2002; O'Brien, 2003; Barasa et al., 2017). Despite their interest, most innovation research is still focused on developed countries, and little is done on the factors that enable firms in emerging economies to improve their innovation performance (Wang & Kafouros, 2009). Although the importance of investments in R&D for firm innovation are addressed, more research is necessary as only possessing these resources is not enough to be able to effectively make use of it (Barasa et al., 2016).

To be able to make effective use of the possessing resources, firms also have to deal with the external environment. An effective legal environment results in better abilities to get access to finance, development and in the end also economic growth for the firm (Miroshnychenko, Bozzi & Barontini, 2019). The other side, a poor legal environment is sensitive for civil conflicts and a low firm revenue can come from a political unstable environment (Ghura & Mercereau, 2004). There are mixed results in the literature about the effect politics has on firm innovation and it varies on the level and type of the stability. Nevertheless, it is found that firm innovation is dependent on the stability of the external environment (Rivoli & Brewer, 1997).

The emerging economies are facing a high growth and that let more room for opportunities for women (Ukhova, 2015) but to makes this work, additional efforts of the external environment are needed, and this differs regarding their stability (Mielke & Brown, 2019). Besides the possibilities to use resources, the investments done in R&D are also dependent on the quality of the external environment. Poor institutions are less likely to let a firm benefit from its R&D investments as they cannot extract the desired added value because of bad protection rights (Barasa et al., 2017). Therefore, it interesting to see the influence of political stability on the relationship between women in top management and R&D expenditure on firm innovation.

1.5 Outline

The study is organized as follows. In the next chapter, the theoretical framework will be built where there will be dived into the existing literature available on firm innovation and its determinants. From the existing literature four different hypotheses will be formulated based on the conceptual model (section 2.5). Chapter 3 is the methodology of this research, where the process of this study will be discussed. In the last three chapters the empirical results will be presented, implications will be discussed, and conclusions will be drawn.

2 Theoretical framework

The following theoretical framework will come up with an overview of all relevant and available literature on the core concepts of this study. This is structured in a way that there is started with the extant literature into the core concept firm innovation in emerging economies, followed by the concepts women in top management, R&D expenditure and political stability. This will result in several hypotheses which will predict the nature of the concepts and their relationships. The chapter will be completed with a conceptual model (section 2.5) visualizing the concepts and their relationships.

2.1 Firm innovation in Emerging Economies

A fast-growing share of the current R&D expenditures is coming from emerging economies (World Investment Report, 2005). Firms operating in emerging economies are achieving positional advantages and better economic outcomes. These are necessary for firm innovation as there is a higher degree of privatization in scientific commons and laws for intellectual property (Wang & Kafouros, 2009,) but also the rise of internet and globalization plays a role (Haar & Ernst, 2016). Additionally, there is less literature existing on firm innovation in emerging economies with respect to developed economies (Boubakri, Cosset & Walid, 2008; Descubes et al., 2013; Kotabe, Jiang & Murray, 2017), where in developed economies for example firms are protected by strong patent laws (Wang & Kafouros, 2009). An important difference between firm innovation in emerging and developed economies is the resource constraints of the emerging economies and the abundance of resources in developed economies. The resource constraints, who therefore invests in R&D, is more conducive to firm innovation as novel approaches are needed to deal with the more challenging environment (Shankar & Narang, 2020).

Although firm innovation seems interesting, the question still rises what firm innovation exactly consists of (Wang & Kafouros, 2009) and in the extant literature the drivers of firm innovation are still debated (Crossan & Apayding, 2010). It is important to know what the determinants of innovation are at the level of the firm as it all happens there (Van Uden, Knoben & Vermeulen, 2016). Despite that, the literature is missing conclusiveness on how firms in emerging economies can best operate and enhance firm innovation (Wang & Kafouros, 2009).

The available literature on the definitions of firm innovation differs as many studies have only focused on new product or process introductions as the innovation aspect (Crossan & Apaydin 2010; McCann & Oxley, 2012). Only a definition related to R&D expenditure and patents is not enough (Gorodnicheckno, Svejnar & Terrel, 2010), and according to Bessant & Tidd (2009) firm innovation is any process that increases the value in the market.

In 1934 Joseph Schumpeter came with five different types of innovation as according to him innovation is seen as an important indicator for economic growth. The five definitions are: introduction of a new product or new product quality; a new production process; opening up of a new market; securing of a new source of raw materials or other inputs; and the creation and application of a new organizational structure in an industrial sector (Ritter-Hayashi et al., 2019). Besides Schumpeter's definition, Haar & Ernst (2016) came with four different innovation types: product, process, service and business model as it is more than just introducing new products to the market. It is a new design of business processes, building new markets to be able to meet and connect to currently unknown customer needs (Haar & Ernst, 2016). But Liu & Buck (2007) operationalize and define innovation as follows: 'new product sales to total sales'. Dosi (1988) and Dosi & Nelson (2010) conclude that innovation can be seen as a continuous learning process for firms by exploiting resources originating from R&D expenditures and the connection with the institutional environment.

To overcome all, the following, most widely accepted way to define innovation in emerging markets (Krammer & Jiménez, 2020), is used in this study and is according to the Oslo Manual (OECD, 2005); *"the implementation of a new or significantly improved product (good or service), or process, a new marketing method, or a new organizational method in business practices, workplace organization or external relations"* (para. 146).

Despite all the different definitions and types of innovation, it is clear, with a global perspective, that there is a link between firm innovation and firm growth (Coad, 2009; Audretsch, Coad & Segarra, 2014) as firms engage in a lot of innovation activities like R&D expenditure, acquiring knowledge, changing organizational practices and many more (Bianchi, Pellegrino & Tamagni, 2018). "Not to innovate is to die" (Freeman & Soete, 1997).

Looking at emerging economies specifically, most of the extant literature on innovation focuses on the firms' external environment like limitations in finance (Ayyagari, Demirgüç-Kunt & Maksimovic 2011; Gorodnichenko & Schnitzer 2013; Mateut 2018) and competition on the market (Aghion, Carlin, & Schaffer 2002; Carlin, Schaffer & Seabright 2004; Crowley & Jordan 2017). But there is a lack of insights towards the internal factors driving firm innovation in emerging economies (Capozza & Divella, 2019). According to Mateut (2018) innovation activities for emerging economies are best defined on the level of the firm to include all important elements relevant for those countries like new products, services, improvements and more. Besides, it is also important to take the top management of a firm into consideration for an explanation of firm innovation differences in emerging economies (Crowley & Bourke, 2018).

As already described in chapter 1 there is also a link between women in top management and firm innovation, and this will also be addressed in the following section (2.2). According to Ritter-Hayashi et al. (2019) firms can benefit from the participation of women in decision making but it is dependent on the level of gender equality a country is conducting. Where several studies have significantly found that diversity in top management results in a positive firm innovation because of more ideas and creativity, a better understanding of the market and effective ways of solving problems (Murray, 1989; Siciliano, 1996; Carter, Simkins & Simpson, 2003; Erhardt et al., 2003; Miller & Triana, 2009; Galia & Zenou, 2012), Torchia et al. (2011) expresses that little research is done on the implication of gender diversity for innovation in emerging economies.

Firm innovation depends on the either side on women's participation in top management (Galia & Zenou, 2012) and on the other side on firm-level resources (Barasa et al., 2017) but firm innovation needs to deal with environmental issues and other external factors without having control on those factors (Haar & Ernst, 2016) and this will be addressed in the following sections.

2.2 Women in Top Management

Several studies have expressed the increased significant attention of board diversity (Farrell & Hersch, 2004; Galia & Zenou, 2012; Upadhyay & Zeng, 2014; Saeed et al., 2016). As said, Torchia et al. (2011) expressed the little research done on the implication of gender diversity and also only a few studies focus on gender diversity related to firm innovation (Miller & Triana, 2009). But the advocates of board diversity imply that women in top management improve the quality of businesses as they bring in a lot of additional or new resources such as knowledge, external contacts, legitimacy and strategic advice (Saeed, et al., 2016). Also has

gender equality gained a high increase in interest in the world as it is now one of the 17 Sustainable Development Goals next to the empowerment of women and girls (United Nations, w.d.; Zhang & Zhang, 2021).

Despite the interest, most top management teams consist of an unequal gender distribution in most companies in the world (Jamali, Safieddine & Daouk, 2007; Yap et al., 2017). In 1996 only .6% of the Fortune 500 firms' inside director positions were held by women (Hillman, Cannella & Harris, 2002) but over the past the amount of top management seats claimed by women in Fortune 500 firms has improved. In 2008 it was 14.8%, which was an increase of 5.2% since 1995, only 22% in 2014 and when looking at emerging economies, it is even much lower (Williams & Dempsey, 2014). All over the world the last few years different governments are striking for policies, hard or soft, especially designed to increase the percentage of women in top management (Abdullah, Ismail & Nachmun, 2016; Chen, Leung & Evans, 2018). The reason for the increase of policies is the positive impact of women in top management and therefore also the firm's performance (Abdullah et al., 2016). It is related to their distinctive management style, excellence in relationship management and collaborative work, which is of great importance for the board's job that is characterized by group decisions (Dargnies, 2012).

The improvement of the number of women in top management has raised the question whether there are differences among males' and females' management characteristics (Mukhtar, 2002). The same as before with the available literature on firm innovation, most literature amongst board diversity and women in top management is from developed countries and little on emerging economies (Saeed et al., 2016). The extant literature is not conclusive on the direct effect of women ownership on firm innovation as one finds that female-owned firms underperform men-owned firms, others vice versa or no difference at all (Belitsk & Desai, 2019). But Mukhtar (2002) also state that despite all conflicting findings, there is a real difference between male and female management styles and its influence on the practices, as man go for a transactional management style and women for a relationship style.

The top management team of a firm is held responsible for the fact that the results of the performance are well monitored (Hillman, Cannella & Paetzold, 2000; Huse, 2007; Galia, Zenou & Ingham, 2015). A diverse team improves the effectiveness (Chen, Ni & Tong, 2016) and provides a firm with several innovation advantages (Galia et al., 2015). The top

management of a firm influences the firm's innovativeness (Elenkov & Manev, 2005) because of the calm climate they can create (Zuraik & Kelly, 2019). Especially when the top consists of leaders striving for a transformation, they inspire, enthuse and encourage their employees. This results in confidence in their leaders which helps the employees to lose selfish behaviour and work for the team interest which increases the innovation of the firm (Bass, 1990). Transformational leadership is proven to have a positive impact on firm innovation (Matzler, Schwarz, Deutinger & Harms, 2008; Samad, 2012; Khalili, 2016). As transformational leaders are conducive to firm innovation and previous research has proven this to be mostly exhibited by women (Jung, Chow & Wu, 2003; Jung, Wu, & Chow, 2008; Gumusluoglu & Ilsev, 2009; Zuraik & Kelly, 2019), women in top management could improve firm innovation. Although the most about transformational leadership is coming from literature on developed economies, Walumbwa & Lawler (2003) and Durmusoglu et al. (2018) show the significance of transformational leadership in emerging economies.

Nevertheless, studies conducted on gender diversity in top management show that the work of women is assessed and rated differently, and less than their male colleagues (Almor, Bazel-Shoha & Lee, 2019). Mistakes made by women are resented and remembered for longer and mistakes by men are often blamed on external circumstances (Derks, Ellemers, van Laar & de Groot, 2011a; 2011b). Additionally are male team members more often positively evaluated than women, who are more often negatively evaluated (Whitman & Grado, 2012). For that reason, women have to prove themselves continuously towards the firm and its employees which overall results in more difficulties for women to even reach the top management team (Williams & Dempsey, 2014). The agency theory declares that women in comparison to men are more risk averse (Palvia, Vähämaa & Vähämaa, 2014; Croson & Gneezy, 2009; Adams & Ferreira, 2009; Charnessa & Gneezy, 2012) and less aggressive in their strategies (Apesteguia, Azmat & Iriberri, 2012). The latter can be referred to the relational management style of women and their exhibition of transformational leadership. The difficulties for reaching the top can be compensated by their relational acting (Mukthar, 2002) and their transformational leadership (Williams & Dempsey, 2014).

Overall, there is an increase in interest in gender diversity, gender equality and women in top management all over the world, so also in emerging economies. Although most literature is focused on developed economies, is there only limited literature focussing on women in boards and are they less rewarded than their male counterparts; women are beneficial for firm

innovation. They are beneficial as women in the top management are adding additional resources, create a calm climate and inspire the group which all improves firm innovation, and therefore the following is hypothesized:

Hypothesis 1: Women in top management has a positive effect on the likelihood of firms in emerging economies to innovate.

2.3 R&D Expenditure

Extant literature shows that the R&D expenditure of a firm is a significant proxy for firm innovation (Hitt et al., 1997; Balkin et al., 2000; Hoskisson et al., 2002; O'Brien, 2003; Luo & Tung, 2007). Where internal R&D has a strong positive effect on the innovation process of a firm (Bianchi et al., 2018), emerging economies have limited resources to be able to achieve the innovation as a firm (Chacar & Vissa, 2005; Milana & Wu, 2012; Descubes et al., 2013). They also do not invest significantly in it (Fitjar & Rodriguez-Pose, 2013; Parrilli & Alcalde Heras, 2016) wherefore R&D expenditure is still relevant and important for firms in emerging economies. The most important decision for top managers to make is the decision whether to invest in R&D or not, and if so, how much (Barker & Mueller, 2002). The advantage of investing is that it can result in the development of new technologies, products and processes which are in place a driver of competitive advantage, firm growth and innovation (Scherer, 1984; Ettlie, 1998).

Only making use of R&D (investments) for firm innovation is according to Gorodnichenko, Svejnar & Terrell (2010) not enough as not all innovations are generated with R&D expenditures. R&D does not always directly lead to innovation, and it could be biased regarding the size of the firm. Although R&D expenditure is not always directly related to firm innovation, it is a relevant and important input towards firm innovation (Barker & Mueller, 2002). R&D gives the organization the possibilities to innovate at the firm level, market level or coming with new to the market products and services that are not known yet (Petrescu, 2012). Although an investment in R&D seems like a risky one (Shi, 2003), it is sustainable for the longer run and can only prove itself to be innovative after a couple of years (Almor et al., 2019). For example, successful R&D investments can result in different types of interventions which in their turn lead to innovation for the firm which is a success indicator for the organization in the longer run (Almor et al., 2019). Resources of a firm are used to generate new technologies. Firms can build up resources, competencies and skills by the use of R&D expenditures or training which can result in innovative firm behaviour and a competitive advantage (Barasa et al., 2017). R&D expenditure is proven to create more scientific knowledge (Friliches, 1979; Hall & Mairesse, 1995; Feinberg & Majumdar, 2001). It also increases the understanding towards external ideas and upcoming technologies (Cohen & Levinthal, 1989) which results in a better picture of the world on how to innovate and what is needed to be able to do so (Buckley & Ghauri, 2004; Kafouros, 2008a, 2008b).

As the expenditure on R&D can result in innovation and competitive advantages for the firm, it does not directly mean that firms who possess the required resources, are also innovative and create the necessary value to be competitive (Barasa et al., 2017). According to Wang & Kafouros (2008), R&D spending is seen as an important characteristic and determinant of firm innovation and it is highly valued for firms (Bravo & Reguera-Alvarado, 2017). R&D has according to Bianchi et al. (2018) a positive effect on firm growth and innovation wherefore R&D expenditure results in a high chance of finding significant opportunities in the market to meet (unknown) customer needs.

Therefore, the following is hypothesized:

Hypothesis 2: *R*&*D* expenditure has a positive effect on the likelihood of firms in emerging economies to innovate.

It is important to understand the quality of the country's institutions the firm is operating in as this affects the firm's innovation possibilities, and it is vital for a good and deep understanding of the process innovation is going through (Ekman, Gustavsen & Asheim, 2011; Laursen, Masciarelli & Prencipe, 2012).

2.4 The role of formal institutions

Some institutional environments are more successful than others, like for example in giving access to resources (Sirmon et al., 2007; Ndofor, Sirmon & He, 2015). The quality of the institutional environment consists on one side of how the government is selected, monitored and replaced, on the other side how it can create well-thought policies and finally also of the social and economic relationship between the inhabitants and the state (Kaufman, Kraay &

Mastruzzi, 2011). With all the above, the institutional environment can influence the way how firms are able to innovate (North, 1990; Krammer & Jiménez, 2020), and this environment can change per country and/or region (Barasa et al., 2017). Differences in countries can be related to corruption within one country. There are differences in for example crime, theft and disorder (Barasa et al., 2017).

Within the institutional environment there are formal rules, consisting of laws, procedures etc., all necessary for the market to operate, and informal constrains like culture, norms and values (North, 1990; Peng & Heath, 1996; Garud & Ahlstrom, 1997; Scott, 2014) to reduce uncertainty in doing business in that specific country the firm is operating in (Garud & Jain, 1996; Bruton & Alhstrom, 2003; Acemoglue & Robinson, 2012). When there are stronger institutions the effect the governance can have on the firms operating in that country is also stronger (Barasa et al., 2017). For example, the possibility for firms to extract value from resources is dependent on whether the firm's external environment is stable or not (Sirmon et al., 2007). The possible impact of the institutional environment could be a real challenge for firms (Acemoglue & Robinson, 2008) as weak institutions can even lead to unproductive firm behaviour (Greif, 2006) and firms have directly and indirectly to deal with higher risks and less possibilities to innovate (Ayyagari et al., 2011). The institutional environment is seen as the 'rule of the game' and therefore the firms and their employees operating in there are the players of the game who need to win (North, 1993; Peng & Heath, 1996). Nevertheless, in emerging economies there is less support as the institutions are not that stable (North, 1994; Peng, 2003).

Some studies towards the external environment's effect on firm innovation focus on emerging economies, but still most are focused on the developed economies (Krammer, 2017). The emerging economies are seen as less stable (Nelson, 1990; Peng, 2000; Xu, Huang & Gao, 2012) and probably less effective in relationship between two parties (North, 1994; Peng, 2003), where developed economies are seen as stronger (Wei & Varela, 2003; Saeed & Athrey, 2014). Weak institutional quality can be defined as political instability: the chance that the government of a country would collapse. As a result, political instability and economic growth of a firm are often seen as causal to each other (Alesina, Özler, Roubini & Swagel, 1996). Instability leads to lower growth and innovation opportunities for firms (Dupas & Robinson, 2012) as it increases uncertainty which refers back to lower opportunities (Alesina et al., 1996).

Countries with a high institutional quality mitigate uncertainty which goes hand in hand with innovations. There are stricter rules and regulations, and it makes innovation activities easier by mediating intellectual property rights (Oyelaran-Oyeyinka, 2004). Political stable countries offer firms confidence to be able to tap into risky innovations (Wang, Sutherland, Ning, Wang & Pang, 2018).

2.4.1 Women in top management and political stability

Political stability is also related to the equality and non-discrimination of the inhabitants on different concepts like race, age and gender, where gender is globally the most used aspect of equal opportunities. Non-discrimination on the concepts is also important for a healthy business climate but both equality and non-discrimination in emerging economies are far behind developed countries. For example on gender equality, the percentage of women in the top management is much lower in emerging economies compared to the developed economies (Baskin, 2006). As emerging economies are facing a high growth, also the opportunities for women in businesses grow (Ukhova, 2015). Nevertheless, the inequality between man and women is too high with a result that women cannot benefit from the opportunities at this moment, and therefore is gender equality more important than ever (Mielke & Brown, 2019).

Nevertheless, there is a significant positive effect of gender equality on firm growth and innovation. An increase in education for women leverages the talent pool and it increases the chance for women getting into top management. As a result, there are more and higher skilled employees where firms can take advantage of to innovate. The only restriction in that sense is that women also must be able to connect to the business markets and conduct paid, appreciated and appropriate work otherwise the received education would have no improving impact on the business market's innovativeness (Kabeer & Natali, 2013). An increase of women participating in the job market because of equality, will let their income raise which increases the chance of following education as they are better able to afford it. On the other side, with a stable political country which invests in gender equality and education, the possibilities of women in the business field would increase (Fatema, Li & Monirul, 2017).

Women often act in according to a relational management style (Mukthar, 2002) and are mostly related to transformational leadership (Williams & Dempsey, 2014). Transformational leaders create well-established working teams, helps to navigate them by creating a team effort and it reduces the stress within such a team which all improves the outcomes of the firm (Shadraconis, 2013). As being a team, the uncertainty that is present in doing business is being reduced (Oyelaran-Oyeyinka, 2004). Leaders acting upon the building blocks of transformational leadership are able to create the best and most innovative results in addition to their team creations (Mokhber, Khairuzzaman & Vakilbashi, 2017). The outcomes of the firm can be improved when there are high levels of trust, security and certainty, internal as well as external to the firm (Afsar & Masood, 2017). A political stable country reduces the uncertainties for firms in doing business (Oyelaran-Oyeyinka, 2004). As transformational leadership leads to high firm performances when acting in certainty within the team, this effect is enhanced by a political stable country which reduces uncertainty and risks even more (Ibid). Therefore, the following is hypothesized:

Hypothesis 3: The effect of women in top management on firm innovation in emerging economies is positively moderated by political stability in these economies.

2.4.2 R&D expenditure and political stability

Government policies in emerging countries are able to support local firms with subsidies for R&D expenditures in regions where there are high levels of competitiveness because of the presence of foreign firms (Wang & Kafouros, 2009). But, only possessing the necessary resources as a firm is also not enough to be able to innovate; it doesn't directly lead to value creation (Sirmon et al., 2007; Ndofor et al., 2015). The resources should be considered in a broader context where there is also looked into the external environment of the firm (Barney et al., 2001). Whether a firm can successfully use its investments in R&D for firm innovation depends therefore on the regions where the firm is operating in, as there are differences between the quality of these external environments, and additionally institutions are playing an important role in the effect of R&D expenditures on firm innovation (Barasa et al., 2017). Because, when rules about intellectual property rights in emerging economies would be satisfactory, it would be possible for local firms to extract the necessary value from the possessed resources and protect them with intellectual property rights wherefor they can innovate (Zhao, 2006).

The extant literature has already proven that political connections of a firm can have either positive or negative results on the performance of a firm. It can be negatively related as there is a higher risk of overinvesting because of easy access to finance and it can be positively related in terms of sales and lower interest rates (Proença, Augusto & Murteira, 2020) but also

in a way that administration and bureaucratic processes can be speed up (Dikova, Jaklic, Burger & Kuncic, 2016). Additionally, the theory of resource dependency adds that it believes that strong political connections have negative results on a firm's performance because of a too strong reliance on the government (Wong & Hooy, 2018). Although there are contradictory results, most literature sees political connections as negative (Harymawan & Nowland, 2016). The same authors claim that a political stable country results in a lower need for political connections. The advantages a firm receives by political connections decreases as the effectiveness of the country increases as well as it becomes politically more stable (Harymawan & Nowland, 2016).

There can be spoken of a political stable country when corruption is low, there is a strong rule of law and the regulatory quality within the region is high (Barasa et al., 2017). A political stable country makes it easier for a firm to be able to extract value from the R&D investments made to create profit from innovation (Zhu, Xia & Makino, 2015) as it for example, takes less time to get approvals or declines from the institutions needed for the innovation (Austin, 2002). Therefore, the following is hypothesized:

Hypothesis 4: The effect of R&D expenditure on firm innovation in emerging economies is positively moderated by the political stability in these economies.

2.5 Conceptual model

Based on the hypotheses formulated above in the theoretical framework, figure 1 comprises the conceptual model of this study. It shows the core concepts and their relationships.



Figure 1: Conceptual model

3 Methodology

This chapter consists of the methodology of this research where will be elaborated on the used data. Section 3.1 will start with an explanation of the data collection and selection, complemented by the second section, the variables and their measurement. Section 3.3 will discuss the analytical tool that will be adopted, and finally, in section 3.4 the research ethics related to this study will be discussed.

3.1 Data

To be able to test the hypotheses from the conceptual model (figure 1) given earlier in section 2.5, data from the World Bank Enterprise Survey (hereafter called WBES) is used, and there is no additional data collected.

The Enterprise Surveys (hereafter called ES) are major cross-sectional firm level surveys using economic data on 169,000 firms spread over 146 countries. The Enterprise Surveys, hereafter mentioned as ES, are conducted by the World Bank Group and its partners in different geographic regions and cover all sizes of companies. The mode of data collection is a wide array of qualitative and quantitative information by the use of face-to-face interviews. All surveys are conducted with a representative sample of all firms, related to size, industry and sector since 2006 onward, by following the global sampling methodology (World Bank Group, 2021).

The focus of the ES is on different factors that shape the business environment; amongst others trade, infrastructure, taxes and business licensing, corruption, innovations, labour and more, all related to doing business. There are standard survey instruments used to be able to collect data from the firm on the business environment from top managers and business owners. The collected data connects a country's business environment characteristics with the productivity of the firm and its performance wherefore it is applicable to as well policymakers as researchers (World Bank Group, 2021).

The used indicators in the ES are clustered in different subgroups related to different firm characteristics (World Bank Group, 2021). To be able to include the gender of the top management into this study, it is important to only use the latest surveys which use the global methodology, as otherwise the concept is not included in the level of stratification (World Bank Group, 2017).

In this study the most recent data will therefore be used as this provides the most recent available dataset in which the dependent variable is measured. The focus of this research is on the emerging economy and therefore includes all emerging countries.

Emerging economies are chosen because of their growth in the global area and their high economic growth (Fatema, Li & Monirul, 2017). Besides, it is important to classify emerging countries to have an overview of the countries that are applicable in this research towards firm innovation in emerging economies. Hoskinson, Eden, Ming Lau & Wright (2000) classify emerging economies as fast-growing companies with a low income where the primary engine of growth is related to the economic liberalization, but according to Zhang & Zhang (2021) there cannot be spoken of one precise definition of emerging economies. They wish to refer to a country classified by a low to middle annual income per capita, low industrialization level and a less developed capital market.

The Morgan Stanley Capital International, hereafter called MSCI, is an American, international finance cooperation which designs and maintains different indexes for already 50 years. On the 23rd of June 2020, MSCI has classified and set up an overview of 27 emerging countries across three different regions in the world (MSCI, 2021) (see Table 1). On September 24, 2020, FTSE Russell also released a country classification, which defines 23 emerging countries (FTSE, 2020). FTSE is a provider of analytics, benchmarking and data solutions for investors by giving a precise market view. Within their index, FTSE distinguished between Developed, Advanced Emerging, Secondary Emerging and Frontier countries but only the Advanced- and Secondary emerging countries are relevant for this study.

The outcome of the FTSE index is almost the same as the of MSCI, only FTSE excluded four countries: Argentina, Korea, Peru and Poland. Argentina and Peru are under consideration for a possible change (FTSE, 2020) and the choice for excluding Korea and Poland in the FTSE index or the inclusion into the MSCI index is unclear. To cover an as broad and conclusive sample as possible, the 27 countries coming from the MSCI will be used in this research (see Table 1 for an overview).

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Additionally, the size of the firm is not taken into consideration in the classification of the data in such a way that there is not made a distinction between, small, medium and/or large firms as the research is not specifically related to either Small-Medium Enterprises (SMEs) or Multinational Enterprises (MNEs). The size of the firm will in this research amongst others be used as a control variable which will be elaborated in section 3.2.3.

South America	Europe, Middle East & Africa	Asia
Argentina	Czech Republic	China
Brazil	Egypt	India
Chile	Greece	Indonesia
Colombia	Hungary	Korea
Mexico	Kuwait	Malaysia
Peru	Poland	Pakistan
	Qatar	Philippines
	Russia	Taiwan
	Saudi Arabia	Thailand
	South Africa	
	Turkey	
	United Arab Emirates	

Table 1: Classification of Emerging Countries (MSCI, 2020)

3.2 Variables

This section consists of an elaboration on the variables included in this study, how they are being measured and their analytical technique. The section will start with the dependent variable firm innovation, followed by the two independent variables and the moderator variable and finally, it will be completed with an explanation about the control variables.

3.2.1 Dependent variable

In section 2.1 the dependent variable firm innovation was defined based on the most widely accepted definition from the Oslo Manual *"the implementation of a new or significantly improved product (good or service), or process, a new marketing method, or a new*

organizational method in business practices, workplace organization or external relations" (OECD, 2005: para. 146).

To be able to measure the level of firm innovation, the WBES included two survey questions related to innovation which will be used in this research. They are h1 '*During the last three years, has this establishment introduced new or significantly improved products or services?*' (World Bank Group, 2017 p.115) and h5 '*During the last three years, has this establishment introduced any new or significantly improved process?*' (World Bank Group, 2017 p.117).

In the second question also 'methods of manufacturing product or offering services; logistics, delivery, or distribution methods for inputs, products or services; or supporting activities for processes' (World Bank Group, 2017 p.117) were included wherefore the dependent variable firm innovation based on the Oslo Manual definition will be fully captured with question h1 and h5. Both questions have three answering options: yes, no and don't know. 'Yes' is indicated with a 1, 'No' with a 2 and when it is not clear for the respondent, -9 is the sign of 'Don't know'.

To examine if the two questions reflect firm innovation well as a single variable, a reliability analysis will be conducted. If the analysis allows a composite measure by the use of summated scores will be created for the two items to capture the dependent variable firm innovation. Summated scores are an appropriate technique as it reduces the data, represents multiple aspects in one variable and it reduces measurement error (Hair et al., 2018).

According to Hair et al. (2018) it is also important to look at previous research studies to operationalize constructs. Based on theory the items should be a good reflection for firm innovation. Specifically, the two items should reflect firm innovation well as it all encompasses the most widely accepted firm innovation definition of the Oslo Manual (OECD, 2005), described above and in section 2.1. Finally, in the Oslo Manual it is recommended to make use of a multi-year approach to overcome any underdetermination (Ibid). Underdetermination is related to the fact that concepts can vary across time periods (Turnbull, 2017). That is incorporated in this research. The most recent data for each country is used and this encompasses multiple years, see section 4.1 for the specific years.

3.2.2 Independent variables

To measure the dependent variable, several independent variables are needed to explain those changes in the dependent variable firm innovation. The independent variables are thought to be the cause of the dependent variable (Field, 2018) and in this study they consist of women in top management, R&D expenditure and the moderator political stability which all will be covered in the following sections.

3.2.2.1 Women in top management

Gender related questions in the WBES are only possible to answer with female or male (World Bank Group, 2017). To be able to measure the degree of women in top management the WBES has come up with two questions, b4: '*Amongst the owners of the firm, are there any females?*' (World Bank Group, 2017 p.60) and b7a: '*Is the top manager female?*' (World Bank Group, 2017 p.63) both with three answering options: yes, no and don't know. 'Yes' is indicated with a 1 and 'No' with a 2. When it is not clear for the respondent, -9 is the sign of 'Don't know'.

To examine if the two above questions reflect women in top management well as a single variable, a factor analysis is used followed by a reliability analysis. The factor analysis is done to reduce data based on underlying dimensions (Hair et al., 2018). In the same way as for the dependent variable, a composite measure by the use of summated scores will be created after allowance of the analysis. But also important is looking at the existing theory (Hair et al., 2018). Several previous studies indicate that the use of items which ask for any females amongst the owners, or specifically whether the top manager is female, are suitable to measure the concept women in top management (Krishnan & Park, 2005; Dezso & Ross, 2012; Dezso, Ross & Uribe, 2016). Although, only the presence of a women within the top management can limit the understanding of their impact on firm innovation. It can encompass much more like their characteristics, way of dealing with problems or the way employees are being treated (Dezso et al., 2016). Nevertheless, this is outside the scope of this study.

3.2.2.2 R&D expenditure

R&D expenditure is the second driver of firm innovation in this research as it is proven that R&D expenditure an input is for firm innovation (Kumar & Basu, 2008). To measure the concept, the following WBES question, h8: '*During last fiscal year, did this establishment*

spend on formal research and development activities, either in-house or contracted with other companies, excluding market research surveys?' will be used (World Bank Group, 2017 p.118). The question has three answering options: yes, no and don't know. 'Yes' is indicated with a 1 and 'No' with a 2. When the respondent doesn't know the right answer, -9 'Don't know' is also an option.

As the question, h8, directly asks whether a firm has invested in R&D in the last fiscal year or not, the question is accepted and seen as fully capturing the independent variable R&D expenditure. Besides, existing literature on R&D expenditure also uses the same question to capture R&D activities (Chudnovsky, Lopez & Pupato, 2006; Chundakkadan & Sasidharan, 2019). Also for this variable the limitation of underdetermination is present. As emerging economies are facing rapid growth (Ukhova, 2015) the R&D expenditure is expected to be determined differently across the years (Choi & Yi, 2017; Haseeb, Kot, Huaain & Jermsittiparsert, 2019). To overcome the limitation in this study there is chosen for recent multi-year data as expressed in section 3.2.1

3.2.2.3 Moderator variable: Political stability

According to Field (2018) is a moderator is a variable that affects a relationship between two other variables in the model; the direction or the strength of the direct relationship between variable A and B can be altered by the introduction of the moderator variable. In this research variable A is either 'women in top management' or 'R&D expenditure', variable B is in here always the dependent variable 'firm innovation'. This study examines whether the direct relationship between women in top management or R&D expenditure and firm innovation is affected by political stability.

Political stability in this research is measured by the use of the following two questions from the WBES: j30e; *How Much of an Obstacle: Political Instability* (World Bank Group, 2017 p.24) and i30; *How Much of an Obstacle: Crime, Theft and Disorder?* (World Bank Group, 2017 p.51). Both questions are conducted on a five-point scale: No obstacle (0), Minor obstacle (1), Moderate obstacle (2), Major obstacle (3) and Very Severe obstacle (4).

Also for these two items it is necessary to perform a factor analysis to test whether they reflect political stability well as a single variable. After the analysis the factors can be used for calculating a summated score. The summated score can then be used to capture the moderator variable political stability. As the items are referring towards instability, and the variable is based on stability it will be reverse coded. As the same with the dependent and independent variables, it is important to look at previous research studies as well to be sure the items are a well reflection of the construct (Hair et al., 2018). Several studies point out that political stability is often related with crime, theft and disorder (Barasa et al., 2017; Kresic, Milatovic & Sanfey, 2017; Talukdar, 2018) wherefor the two items should reflect political stability well as a single variable.

The problem that could occur with such an operationalization is the lack of universality. This means that operationalizations for constructs can be context-specific and understood in different ways (Wakefield, 1993; Nielsen, Eden & Verbeke, 2019). For political stability this means it can be operationalized in different ways, but the measures may not always reflect the exact same concept then. In this study it is tried to overcome by making use of operationalizations based on previous research studies.

3.2.3 Control variables

In research are control variables used to overcome and eliminate possible biases in one of the findings and also to ensure the reliability and validity of a research (Field, 2018). This research controls for firm size, firm age, managerial experience, industry and country. Firm size is an important concept in determining innovation (Cohen, 1995) and in previous research it is indicated that there is a positive relationship between firm size and the innovation level of the firm (Ostergaard, Timmermans & Kristinsson, 2011; Díaz-García, González-Moreno & Sáez-Martínez, 2013 Ritter-Hayashi et al., 2019). To also overcome and eliminate possible biases in the findings belonging to women in top management, it is important to control for firm size; as the differences in management related to gender will diminish or even disappear (Mukhtar, 2002). Additionally, in most cases companies with a bigger firm size have more and better access to resources (Shefer & Frenkel, 2005; Knott & Vieregger, 2020). Within the WBES the following classification (Table 2) is related to firm size, based on the number of employees (World Bank Group, 2017).

Size	Employees
Small	5-19
Medium	20-99
Large	100+

Table 2: Classification of Firm Size

The subsequent control variables for this research are firm age and managerial experience. In previous research firm age has significantly proven to be related to firm innovation; older firms are less likely to innovate compared to younger firms (Saeed, et al., 2016; Barasa et al, 2017; Belitski & Desai, 2019). Managerial experience has according to previous literature a positive relationship with firm innovation; firms with experienced managers benefit more from firm innovation (Ayyagari et al., 2011; Barasa et al., 2017). Additionally, managerial experience leads to novelty related innovations (Bradley, McMullen, Artz & Simiyu, 2012) conducive to firm innovation (Shankar & Narang, 2020).

Finally, also the variables industry and country are in this study included as control variables as innovation can be influenced by both (Barasa et al., 2017). Three different industries are incorporated: manufacturing, retail and others. This study includes dummies for those three industries and also dummies for the countries included in the sample.

3.3 Analytical technique

To test the formulated hypotheses, there will be made use of logistic regression. According to Hair et al. (2018), logistic regression is a specialized form of regression, similar to the variate in multiple regression which is a technique that can be used to test and analyse the relation between one dependent variable and a set of independent variables. Logistic regression predicts and explains a binary categorical variable rather than a metric-dependent measure. Logistic regression is suitable for this research as there are two or more independent variables in this study and the dependent variable is a binary categorical variable.

The logistic regression model with several predictors can be presented as follows (Field, 2018):

 $P(Y) = \frac{1}{1 + e^{-(b_0 + b_1 X_{1i} + b_2 X_{2i} + \dots + b_n X_{ni})}}$

Here Y represents the dependent variable firm innovation, the b₀ represents the intercept, the X's are the two different independent variables; women in top management and R&D expenditure, the moderator; political stability and also the several control variables; firm size, firm age, managerial experience, industry and country. The 'e' stands for the error term that is related to the equation.

When the mentioned variables are included, the equation will look like the following:

 $Firm\ innovation(Y) = \frac{1}{1 + e^{-(b_0 + b_1 WOMEN_i + b_2 RD_i + b_3 POLITICAL_i + b_4 SIZE_i + b_5 AGE_i + b_6 EXP_i + b_7 IND_i + b_8 COUNTRY_i)}$

An important assumption for the use of a logistic regression is the measurement level (Hair et al., 2018). All independent variables must be metric or non-metrically scaled, and the dependent variable must be a dichotomous (binary) variable. According to Field (2018), dichotomous variables are both categorical and metrically skilled. As can be seen in table 3: *measurement level of the variables*, the above assumption is met for both the independent and the dependent variables that will be used in this research.

The other assumptions that need to be met are: 1) a sample size over 400, 2) independence of the observations, 3) among the independent variables little or no multicollinearity and 4) linearity of the independent variable and log odds (Hair et al., 2018). The assessment whether the assumptions are met will be further elaborated in chapter four.

Variable	Measurement level
Firm innovation	Nominal Dichotomous/Binary
Women in top management	Nominal Dichotomous
<i>R&D</i> expenditure	Nominal Dichotomous
Political stability	Ordinal

Table 3: Measurement level of the variables

3.4 Ethics

This research does not draw on primary data as only data derived from the WBES is conducted. That means that all data used in this research is already collected prior to this study. The World Bank Group is globally an acknowledged organization wherefor at this point there are no expected issues regarding ethics with their data. Their data is publicly available, and this is done by a clear process. Additionally, by using the data people have to agree with the policy 'Access to Information' (World Bank Group, 2021).

The following principles of integrity are according to the Netherlands Code of Conduct for Research Integrity (2018): honesty, scrupulousness, transparency, independence and responsibility. In this research there will be taken responsibility for all five principles. Regarding honesty; the research process will be reported accurately and there will be honesty about uncertainty and the sources used. The methods used are scientific and carried out with the best possible care wherefore the principle of scrupulousness is also met. For transparency to be met their will be clarity where the data is coming from and based upon, but also how results were achieved. Coming back to the methods used, they are guided by scientific considerations according to the principle of independence and also impartiality about the research and its finding is related to that. Finally, responsibility will be taken by the researcher that the study is scientifically and/or societally relevant.

This research will have its own clean dataset with data retrieved from the WBES using the relevant variables. This needs to be stored safely and made accessible to those who may want to check the analysis.

Based on the above, there can be concluded that the data and findings in this research will be used in an ethical and responsible way.

<u>4 Results</u>

This chapter will dive into the analyses needed for this study. In section 4.1 the sample description will be discussed. Section 4.2 will discuss the descriptive statistics for this research including a missing value analysis, factor analysis and a reliability analysis. The descriptive statistics are followed by section 4.3 where the assumptions belonging to logistic regression will be addressed. In section 4.4 the results of the logistic regression will be discussed whereafter the formulated hypotheses are accepted or rejected. The appendices 1 to 5 provide the detailed analyses.

4.1 Sample description

To be able to conduct a logistic regression for this study, the data should be examined in more detail. In section 3.1, table 1, 27 emerging countries were defined to use in this research. From those 27 countries, there were 8 which provided the needed data based on a recent multi-year approach defined in section 3.2. Table 4 shows the full sample, with each country and its number of firms belonging to. The sample results in 10,434 firms. The majority of firms is coming from Egypt with a percentage of 29.5. The least represented country in this sample is Czech Republic with a percentage of 4.8. Only countries with data ranging from 2018 to 2020 were included in this sample as emerging economies face rapid transformations (Bruton et al., 2008). Therefore, some countries defined earlier were excluded based on the year of data creation. All countries coming from South America, ranging from 2009 to 2017, and Asia, ranging from 2005 to 2016 were excluded. This consists of amongst others Mexico (2010), India (2014) and Korea (2005). For Kuwait, Qatar, United Arab Emirates and Taiwan no dataset was available and therefore also not included.

Number of firms	Percentage		
502	4.8		
3075	29.5		
600	5.8		
805	7.7		
1369	13.1		
1323	12.7		
1097	10.5		
1663	15.9		
10,434	100		
	502 3075 600 805 1369 1323 1097 1663 10,434		

Table 4: Sample

4.2 Descriptive statistics

Before the assumptions for logistic regression can be tested, there should be looked at the descriptive statistics. Within this section the different (composite) measures for this study will be discussed. In section 3.2 the following items were chosen to use in the analysis. h1 and h5 for the dependent variable, b4 and b7a for the independent variable women in top management, h8 for R&D expenditure and j30e and i30 for the moderator political stability. Section 3.2.3 presented the five control variables: firm size, firm age, managerial experience, industry and country. For the latter two were dummies created to use in the analysis.

		Firm	Women in top	R&D	Political	Country	Firm	Sector	Firm	Managerial
		innovation	management		stability		size		age	experience
Ν	Valid	10313	10337	2458	10434	10434	10434	10434	10320	10173
	Missing	121	97	7976	0	0	0	0	114	261
Mean		.1523	.2841	1.59	1.2333	71.13	1.73	1.66	1998.12	21.03
Media	an	.00	.00	2.00	1.00	59.00	2.00	1.00	2001.00	20.00
Mode		.00	.00	2	.00	92	1	1	2000	20
Std. E	Deviation	.35936	.45102	.492	1.07421	19.481	.796	.877	15.918	11.378
Skew	ness	1.935	.957	368	.511	.494	.521	.715	-2.859	.554
Kurto	osis	1.746	-1.083	-1.866	648	-1.085	-1.238	-1.318	16.618	089
Minin	num	.00	.00	.00	.00	47	.00	.00	1800	1
Maxi	mum	1.00	1.00	1	4	112	2	2	2020	70

Descriptives

Table 5: Descriptive statistics a

Although the number of missing's are visible in the table above, a missing value analysis is conducted, *see table 6: Missing value analysis*, to check if there are concerns regarding missing's in the dataset as this often happens (Field, 2018). Items with up to 10% missing are not a real concern and is acceptable (Hair et al., 2018). In this case R&D (h8) is having extreme high missing values and is therefore not acceptable. To be able to use this variable within the analysis, imputation is needed. There are single imputation methods like mean substitution but also a multiple imputation method can be used (Hair et al., 2018). For this study, to be able to use item h8, there is chose to use multiple imputation. This method is preferred over mean substitution as that has the disadvantage and weakness of underestimating the uncertainty with imputation (Baguley, 2012). Multiple imputation leads with pooled data to less biased and more precise estimates of the dataset, as it used a simulation to replace missing data (Ibid).

	Univariate statist	ics	
Variable	N	Mis	sing
		Count	Percent
Firm innovation	10313	121	1.2
Women in top management	10337	97	.9
R&D expenditure	2482	7976	76.4
Political stability	10334	100	1.0
Country (a1)	10434	0	0
Firm size (a6a)	10434	0	0
Industry (a0)	10434	0	0
Firm age (b5)	10320	114	1.1
Managerial experience (b7)	10173	261	2.5

Table 6: Missing value analysis

After the missing value analysis and the imputation, it is important to check the items again. In table 7: Descriptive statistics b the overview of the variables with its mean and missing's are presented. The pooled data will not give an overview of all statistics, but the original data and all 10 imputations doesn't show any problem related to skewness and/or kurtosis for all variables except firm age as all other variables stay within the threshold of +/- 3 (Field, 2018). An overview of the 10 imputations for each variable, including the statistics can be found in appendix 1.1: *Imputation statistics*. Firm age has in the original dataset and in each imputation a high kurtosis, ranging from 16.505 to 16.618. To solve the problem three different transformations should be conducted: square root, logarithm and inverse to test if there is any improvement (Field, 2018). As there is no improvement, see appendix 1.2: *Kurtosis check*, the original firm age item will be used in the analysis.

		Firm	Women in top	R&D	Political	Country	Firm	Sector	Firm	Managerial
		innovation	management		stability		size		age	experience
Ν	Valid	10434	10434	10434	10434	10434	10434	10434	10434	10434
	Missing	0	0	0	0	0	0	0	0	0
Mean		.1525	.2841	1.60	1.2338	1.66	1.73	71.13	1998.12	21.03

Table 7: Descriptive statistics b

The above descriptives table already reveals the solving of all missing's. Although, to be sure, a missing value analysis is conducted again and can be found in appendix 1.3: *Missing value Analysis*.

As the descriptive statistics were checked and all items are adjusted if needed, the next procedure is a factor analysis. Afterwards, a reliability analysis will be conducted. Those tests are done to examine if the questionnaire items reflect the single variables well. At first the factor analysis has been conducted and the output can be found in appendix 2: *Factor analysis*. To be able to create composite measures within this study, a principal component analysis (PCA) is used. The goal of PCA is to reduce data based on underlying structures (Field, 2018).

The default rotation in PCA is Oblimin. To see if the analysis can be continued, at least one of the correlations from the Component Correlation Matrix should reach a value of .30 or higher (Field, 2018). In appendix 2.1: *Factor Correlation Matrix – Oblimin,* it appears none of the components has reached the threshold, therefore the analysis has to be redone with the Varimax rotation method.

Second, for the analysis can be started the related values of the KMO and Bartlett's Test and the communalities should be checked. The output can be found in appendix 2.2: *Varimax output*. The Kaiser-Meyer-Olkin (KMO) verifies the sampling adequacy for the analysis and has a threshold level of >.50. Bartlett's Test of Sphericity checks the significance and has a threshold of <.05 (Field, 2018; Hair et al., 2018). In the analysis Bartlett's test is significant at .000 and KMO is above .50. This indicates that there are sufficient correlations among the variables (Hair et al., 2018). Finally, each of the communalities, after extraction, should meet the threshold of >.20 (Field, 2018). As all assumptions for a PCA are met, the analysis can be continued, and the output can again be found in appendix 2.2: *Varimax output*.

As expected, the first two items: b4 and b7a load on the first factor 'women in top management'. The second factor is 'political stability' and only has loadings for the related items i30 and j30e. The third factor has two loadings, h8 and j30e. As the two loadings of item j30e are not closer within a range of .20, no cross loading can be determined (Hair et al., 2018). As the loading for j30e on the second factor is higher, the third factor 'R&D expenditure' only consists of item h8.

As the factor analysis is conducted, the following is a reliability test. Dichotomous items are measured based on the Kuder-Richardson 20 Test (KR-20) and items based on a Likert scale are measured based on Cronbach's alpha (Field, 2018; Hair et al., 2018). For the variables 'women in top management' and 'firm innovation' this means the reliability test will be based on the KR-20 test within this study and for 'political stability' Cronbach's alpha is used. Cronbach's alpha has a threshold level of .70 and the KR-20 Test has a threshold level of .75 (Field, 2018). Additionally, both tests interpretations are based on the Cronbach's Alpha column and the output can be found appendix 3: Reliability analysis,

For women in top management (.580) and political stability (.480) it means they have not met the required threshold level of .70. Additionally, the items for the dependent variable firm innovation (.511) also did not meet the required level. Nevertheless, as theory presents the composite measures, the factor analysis substantiates it and the reliability findings are not that far from the threshold, the composite measures will be used for the following analyses.

4.3 Assumptions

Logistic regression has a number of assumptions. Before conducting the analysis, the following assumptions should be met (Field, 2018):

- * All independent variables must be metric or non-metrically scaled
- * The dependent variable must be a dichotomous (binary) variable
- * Sample size over 400
- * Independence of the observations
- * Little or no multicollinearity among the independent variables
- * Linearity of the independent variables and the log odds

4.3.1 Measurement levels

A logistic regression analysis can be used when the independent variables are metrically or non-metrically scaled and the dependent variable must be dichotomous. Section 3.3 already explained that this assumption is met as can be seen in table 3: *measurement level of the variables*.

4.3.2 Sample size

Before being able to perform a logistic regression, the rule of thumb is to use a sample size that exceeds a N-value of 400 (Hair et al., 2018). With a large sample size, the statistical power increases where any difference can be seen as statistically significant. Additionally, for logistic regression it is needed to support the logistic model adequately and if the sample size exceeds the value of 400 it can achieve the best results (Hair et al., 2018). In this study 8 countries with in total 10,434 firm were included in the sample wherefor the third assumption is met.

4.3.3 Independence of the observations

All participants in a sample should be counted only once. If not, and participants appear multiple times in a sample the results are skewed and not representative. When this assumption is met, it makes sure that the variance of each participant affects an analysis only once (Hair et al., 2018; Field, 2018). It is not possible to test this assumption with a statistical test but as each participant in this study, each firm, is included only once, this assumption is met.

4.3.4 Multicollinearity

There is multicollinearity if there exists a strong correlation between two or more predictors in a model (Field, 2018) and whether a variable in the analysis can be explained by other variables (Hair et al., 2018). To test this assumption in SPSS, the tolerance and VIF values in the correlation table are checked. The critical value is a VIF value <10 or a threshold value >.10 for the tolerance statistic (Hair et al., 2018). In appendix 4.1: *multicollinearity test*, the ranges for all 10 imputations for both the VIF value and the tolerance statistic are included. All variables in the model have met the threshold level for both test statistics. The tolerance statistic ranges from .931 to .995 and the VIF value from 1.005 to 1.205. Therefore, there can be concluded that there are no signs of multicollinearity in this model.

By the use of Pearson's correlation there is a second check on multicollinearity. Correlations between two items with a value above .80 indicates multicollinearity (Field, 2018). Table 7 provides an overview of all items and their correlation. As none of the values exceed .80 it substantiated that there is no multicollinearity in this study.
Correlations									
Variable	1	2	3	4	5	6	7	8	9
1. Firm innovation	1								
2. Women top management	.103	1							
3. R&D expenditure	172	025	1						
4. Political stability	020	074	224	1					
5. Country	.006	084	108	.126	1				
6. Firm size	.087	.025	046	020	130	1			
7. Industry	086	.012	.062	.014	008	150	1		
8. Firm age	036	033	013	.024	050	158	.101	1	
9. Managerial experience	.019	.677	.018	077	172	025	.051	.013	1

Table 7: Correlations

4.3.5 Linearity of the independent variables and the log odds

This assumption is tested with the use of the Box-Tidwell test. The test looks at linearity of the independent variables to the outcome and is especially checked for the continuous independent variables. If the interaction is not significant, this assumption is met (Hair et al., 2018). Appendix 4.2: *Box-Tidwell test,* shows the results of the analysis. As the log interactions are not significant (Exp (B) .966 & sign .641), the assumption of linearity is met.

4.4 Logistic regression

The logistic regression model is conducted and should be interpreted in a stepwise hierarchical manner (Hair et al., 2018). The outcomes should be interpreted from the exponentiated logistic coefficient; the odds ratio, as the b-coefficient, presented in log-odds units, only measures a change in the log of the odds and not the probabilities directly (Hair et al., 2018). In table 7: *Logistic regression analysis firm innovation*, the outcomes of the analyses are presented. Significant results are marked with either one asterisk (p<.05) or two asterisks (<.001) based on a two-sided model.

Model 1 includes the control variables firm size, industry dummies, firm age, managerial experience and the country dummies. The second model includes the control variables and the independent variables. The independent variables are women in top management and R&D expenditure. In model 3 the moderator item political stability is included besides the

independent and control variables. The final model, model 4, includes the 2 interaction terms created between the independent and moderator variables. In the analysis the following variables are used as control variables based on the highest N-value; Size_Small, Ind Manufacturing and dEgypt.

Before the model and the analysis can be interpreted an overall goodness-of-fit test must be conducted. This can be done either based on statistical measures with the Chi-square test for the change in the -2 Log likelihood (-2 LL) test or on practical measures with the Nagelkerke's \mathbb{R}^2 measures (Hair et al., 2018). Moving from one model to the other, a smaller value of the -2LL indicates a better model fit. The Nagelkerke's \mathbb{R}^2 value ranges from 0 to 1 and must be interpreted like *n* proportion explained variance with the following thresholds: acceptable fit $\mathbb{R}^2 > .2$, for a good fit $\mathbb{R}^2 > .4$ and a very good fit with a $\mathbb{R}^2 > .5$ (Hair et al., 2018). Additionally, the fit test also includes the Hosmer & Lemeshow Test which is based on the -2LL which concludes what the model can explain compared to what was possible to explain in the first place. Small p-values for the Hosmer & Lemeshow Test indicate a poor model fit (Field, 2018). Finally, the Omnibus Test of Model Coefficients also provides a significance test of the model. The Chi-square for 'block' should be interpreted as the improvement of adding (an) additional item(s) and tests its significance (Field, 2018).

The outcomes of the Overall Model Fit can be found in table 7 as well, at the bottom. Starting with the *-2LL* test, as going through the models result in lower values it means that there is a better model fit where the difference between models 3 and 4 is the lowest. The Nagelkerke's R^2 value also improves by each model which indicated a higher proportion of the explained variance. For the Hosmer & Lemeshow test model 1 is significant and all others have high p-values, ranging from .434 to .527, which indicates a good model fit (Field, 2018). Finally, all OTMC tests are significant, and the block outcomes are positive wherefore the included variables are a better fit than a model without them. Despite the model 1 result of the Hosmer & Lemeshow test all tests are significant. Therefore, can overall be concluded that there is a good model fit.

As the analysis is based on the odds ratio, the numbers between brackets are the exponentiated logistic coefficient. They should be interpreted as a percentage after a value of 1 is extracted from the coefficient (Field, 2018).

The analysis starts with model 1 where the control variables are included. The value of the R² is .202 which means that the control variables explain 20.2% of the variance in firm innovation. Except for firm age all control variables are significant. Looking at the odds ratio with their belonging significance the following can be concluded. Medium (1.239) and large (1.538) firms are introducing more firm innovation than small firms. For medium firms this means 23.9% more than small firms and large firms even more; 53.8%.

Firms operating in the retail (.669) and other (.664) sectors introduce less firm innovation than firms operating in the manufacturing sector. 33,1% less for the retail sector and 33.6% less in the other sectors. As the manager has more experience (1.018), 18% more firm innovation will be introduced. Finally, more firm innovations are being introduced by firms in all countries compared to Egypt. Czech Republic (22.358), Greece (9.282), Hungary (6.262), Poland (5.808), Russia (5.197), Turkey (1.535) and South Africa (2.250).

In the second model the independent variables are included. This results in a R^2 value of .230. Therefore, the independent variables explain 23% of the variance in the dependent variable. In chapter 2 the directions for both hypotheses 1 and 2, are set as positive. If a hypothesis is one sided, the two-sided significance level can be divided by two (Hair et al., 2018). This means that the significance level for women in top management (.079) can be divided and results in a significance level of .040. For R&D (<.001) the value remains the same but could by higher values also be divided. Based on these outcomes are both items, women in top management and R&D expenditure significant based on the following odds ratios; 1.152 (women in top management) and .446 (R&D). Again, looking at the odds ratio and the significance, it seems that firms with women in boards introduce 15.2% more firm innovations. Firms investing in R&D are introducing 55.4% less innovations.

The moderator variable is included in the third model and with a R^2 value of .232 the predictive capacity of the model slightly increased to 23.2%. The variable is significant based on a p-value of <.05 with a odds ratio of 1.064. This means that political stability improves firm innovation with 6.4%. As the direct effect of political stability on firm innovation is not incorporated in this study, the following model is of more interest.

Model 4 consists of all previous items including the two interaction terms. The predictive capacity is improved up to 24.3% based on a R² value of .243. As there are expected directions for the moderation effect, the significance level out of the analysis can be divided. Only one of the two is significant; R&D with political (.887). Women in top management with political (.093) is not significant and can therefore not be interpreted. The significant effect of R&D with political means that more R&D expenditure leads to less firm innovation when the country is politically stable. This means that political stability in an emerging country strengthens the negative impact of R&D expenditure on firm innovation.

Firm Innovation	Model	1	Mode	el 2	Model 3		Model 4		
	Exp(F	3)	Exp(B)	Exj	p(B)	Exp	(B)	
a6a_Medium	1.239)*	1.21	.3*	1.2	208*	1.2	208*	
a6a_large	1.538	1.538**		1.478**		·60**	1.4	1.450**	
a0_retail	.669*	*	.72	4*	.7	.730*		.732*	
a0_Other	.664*	*	.688	}**	.696**		.69	.697**	
B5_FirmAge	.999	.999		.999		999	.9	.999	
B7_Experience	1.018**		1.020**		1.019**		1.019**		
Czech	22.35	22.358*		21.667*		20.711*		20.595*	
Greece	9.282	9.282*		7.963*		444*	8.333*		
Hungary	6.268	6.268*		6.214*		5.708*		5.796*	
Poland	5.808)*)	5.786*		5.7	5.772*		5.768*	
Russia	5.197	7*	5.32	23*	5.0	5.079*		5.062*	
Turkey	1.535	1.535*		1.589**		1.618**		1.609**	
ZAF	2.250	**	2.26	2**	2.207**		2.220**		
Women in Top Management R&D expenditure			1.15	52* 5**	1. .4	144* 33**	.31	023 0**	
Political stability					1.0	064*	.78	87**	
WomenTop*Political							.9	930	
P&D*Political							8	87*	
Red Tonneal							.0	07	
Constant	.112	<i>Sig.</i> .648	.964	<i>Sig.</i> .941	1.089	Sig. .986	1.604	<i>Sig.</i> .924	
-2LL	5882.381		5736.650		5726,167		5716.416		
Nagelkerke R ²	.202		.230		.232		.243		
H&L Chi-square	23.707	.004	7.377	.527	7.652	.499	8.606	.434	
OMTC Block	978.570	<.001	145.734	<.001	10.490	.004	9.751	.012	
OMTC Model	978.570	<.001	1131.494	<.001	1141.984	<.001	1043.281	<.001	

Significance: ** <.001 * <.05 Table 7: Logistic regression analysis firm innovation

The results, shown in table 7 can be used to assess the formulated hypotheses in chapter two. The acceptation/rejection choice of the hypotheses is based on the odds ratio and its significance coming from the logistic regression. As can be seen in table 8: *Hypothesis testing firm innovation*, only hypothesis 1 can be accepted.

Despite a positive significance level, hypothesis 2 cannot be accepted as the direction is not in line with the expectations (Hair et al., 2018). It was expected that R&D expenditure would have a positive effect on firm innovation, but the opposite is coming out of the analysis. The third hypothesis is rejected based on the significance level (.059). The final hypothesis can also not be accepted based on the same reason as for hypothesis 2. Despite the significant effect, the direction is opposite from its expectation. Therefore, only hypothesis 1 can be accepted based on the significance level and the expected direction.

Hypotheses	Odds ratio	%	Sig.	Accepted v / Rejected x
H1 (+) Women in top management	1.152	15.2	.004	V
H2 (+) R&D expenditure	.446	-55.4	<.001	Х
H3 (+) Political * Women	.930	-7	.059	Х
H4 (+) Political * R&D	.887	-11.3	.007	Х

Table 8: Hypothesis testing firm innovation

5 Discussion

In this chapter the results from chapter 4 will be discussed and linked to the existing literature. Despite most of the effects were significant, only hypothesis 1 could be supported. In the first two sections the results of the main effects, hypothesis 1 and 2, will be discussed. Section 5.3 and 5.4 will discuss the interaction effects and the control variables.

5.1 Main effect women in top management

Hypothesis 1 posited that women in top management would have a positive effect on the likelihood of firms in emerging economies to innovate. Based on the results in the previous chapter, the first hypothesis is accepted. The moment women in top management are present, the higher the likelihood that firms in emerging economies are engaging in firm innovation. The reason behind could be the additional new resources women bring in like knowledge, contact and strategic advice (Saeed et al., 2016). Or it could be based on the fact that women are seen to be excellent in relationship management (Dargnies, 2012) wherefore they act upon a relational management style (Mukthar, 2002). Additionally, women in top management means diversity within the board as not only man are present. This diversity improves effectiveness (Chen et al., 2016) and adds innovation advantages (Galia et al., 2015). All the characteristics of women come together when looking at transformational leadership. Women tend to act upon those principles which include striving for a transformation and inspiring and enthuse single people in a team which increases the innovation of the firm (Bass, 1990).

Already a lot of countries are investing in policies to attract and obtain (more) women into management positions (Abdullah et al., 2016; Chen et al., 2018). One emerging country is China, where some local governments motivate women entrepreneurs to participate and earn (more) money (Zhu, Kara & Zhu, 2019). Innovation importance in emerging economies is growing (Wang & Kafouros, 2009) and more promotion of it by governments should encourage more participation of women into the market. It also promotes more innovation activities and supports and fosters female owners to participate in innovation activities (Na & Shin, 2019).

5.2 Main effect *R&D* expenditure

The second hypothesis expressed that R&D expenditure has a positive effect on the likelihood of firms in emerging economies to innovate. Although the effect is significant, the hypothesis was not supported as it appeared to have an adverse effect against the expected. With the outcome in chapter 4 it should be interpreted in a way that firms in emerging economies who invest in R&D are less likely to innovate. This outcome seems surprising as investing in R&D should give firms the opportunity to create a competitive advantage on the market, to grow and even to innovate (Scherer, 1984; Ettlie, 1998). Also, several studies have already found that R&D expenditure is a significant proxy for firm innovation (e.g., Luo & Tung, 2007).

Nevertheless, this result can be seen as not fully surprising based on the existing literature. Although most literature found positive effects, there were researchers who did not agree with those findings directly. R&D expenditure on itself is according to Barasa et al. (2017) not solid ground for firm innovation directly. R&D expenditure is according to Huang, Lin, Wu & Yu (2015) not directly related to innovation for a firm as it can also be invested in research equipment, recruitment of highly skilled employees or patent licensing fees. Those expenditures may divert resources from skills needed to innovate. R&D expenditure means to create competitive advantage based on new product, markets, services etcetera and those innovations are hard to create for firms in those economies as they do not possess the required resources (Descubes et al., 2013). Additionally, firms operating in the emerging economies are more likely to engage in imitation and adaptation rather than creating something novel (Gorodnichenko et al., 2013), wherefore they currently do not engage in R&D expenditures directly related to firm innovation (e.g., Parrilli & Alcalde Heras, 2016).

It is finally noteworthy that R&D expenditure can build resources, competencies and skills (Barasa et al., 2017). Either way, hypothesis 2 cannot be supported as the results contrasts with recent literature supporting the hypothesis, which says that R&D is directly an important characteristic and determinant for firm innovation (Bravo & Reguera-Alvarado, 2017). Now the question is: how can R&D expenditure directly be of positive importance for firm innovation? Unfortunately, searching for the answer is outside the scope of this research but it offers an interesting direction for further research which will be address in the next chapter.

5.3 Interaction effects *political stability*

Hypotheses 3 and 4 are based on the moderating effect of political stability. Hypothesis 3 posited that the effect of women in top management on firm innovation in emerging economies is positively moderated by political stability in those economies. First the results of this hypothesis will be addressed, whereafter the fourth will follow. The significance level could be divided as this was a single directed hypothesis. Nevertheless, this effect is still slightly not significant wherefore the hypothesis is not supported. This means that the relationship between women in top management and firm innovation does not differ for political stable or unstable countries. It is finally noteworthy that the significant direct effect of women in top management on firm innovation also disappears after adding the interaction effects into the model.

The second moderation effect of political stability is addressed in hypothesis 4. Hypothesis 4 stated that the effect of R&D expenditure on firm innovation in emerging economies is positively moderated by the political stability in those economies. First it is worth nothing that the hypothesis for the direct effect of R&D expenditure on firm innovation is significant but not supported due to a deviating direction. It seems that R&D expenditure has a negative effect on the likelihood of firms in emerging economies to innovate. The fourth hypothesis still focusses on the positive effect, and whether this effect changes in a political stable or unstable environment. Although the fourth hypothesis is significant, also this hypothesis cannot be accepted based on the expected direction.

That hypothesis 4 cannot be accepted is a bit surprising. As Shankar & Narang (2020) already described have emerging economies to deal with resource constraints wherefore investing in R&D is crucial, and conducive to firm innovation. Stable countries should make it easier for firms to extract value from those R&D investments (Zhao, 2006; Zhu et al., 2015). Besides contradictions in the literature regarding the effectiveness of political connections, most studies prove the negative side which promotes political stability (Harymawan & Nowland, 2016). Corruption is also an interesting aspect when looking at political stability; low corruption in a country can be related to political stability (Barasa et al., 2017). It seems that in a situation of political stability there less room is for diversion of funds to ineffective sources of firm innovation. Firms operating in a political stable country with strong anti-corruption campaigns, are more likely to invest in R&D activities promoting firm innovation (Weiyu & Xixiong, 2019).

One of the possible reasons for the opposite direction is the fact that in a stable country the quest for novel approaches is lower as the need for survival is also lower. Stable political countries are more likely to guarantee when something goes wrong (Shankar & Narang, 2020). Additionally, if authorizations after a novel innovation can be requested, corruption can contribute by connecting firms with the government (Zhou, Wei, Jang & Chang, 2019). Instability in politics leaves more room for corruption. Besides the fact that it is a result of instability, corruption can also be a major cause towards the political instability of a country (Ibid). Nevertheless, going into this in more detail is beyond the scope of this study but also offers direction for future research which will be addressed in the following chapter.

The fact that it is only a bit of a surprise is related to the earlier findings. Although the fourth hypothesis is rejected, the result is in line with previous findings. The effect is in line with the direct effect composed in hypothesis 2. Both results are significant but present a deviated direction from the expected as they are both negative.

5.4 Control variables

Firm size (e.g., Cohen, 1995; Ostergaard et al., 2011; Ritter-Hayashi et al., 2019; Knott & Vieregger, 2020), managerial experience (e.g., Ayyagari et al., 2011; Bradley et al., 2012; Shankar & Narang, 2020), industry and country (Barasa et al., 2017) influence firm innovation as expected. Only the age of the firm is surprising as it has been excluded from an effect on firm innovation. Going through the four models of the logistic regression analysis, the significant effects of the control variables hold by adding the independent variables, moderator variables and the interaction effects. This result confirms the existing literature only partly because of the insignificant effect of firm age. In previous research firm age has been significantly proven to influence firm innovation (Saeed et al., 2016; Barasa et al., 2017; Bellitski & Desai, 2019). This research contributes to the extant literature by the confirmation of the fact that firm size, managerial experience, the industry and the country where a firm is active in determine firm innovation in emerging economies.

6 Conclusion

This final chapter of the research starts with a conclusion. Thereafter the theoretical and managerial implications of this study will be discussed. Finally, the limitations of this research will be critically addressed and the different avenues for future research will be presented.

6.1 Conclusion

The aim of this study was to deep dive into the determinants of firm innovation in emerging economies as extant literature is mostly focused on developed economies (Wang & Kafouros, 2009; Saeed et al., 2016). Despite the increased attention for board diversity (Farrell & Hersch, 2004) and the significant findings that women improve the quality of businesses, (Saeed et al., 2016) little research is done on its implications (Torchia et al., 2011). Studies towards R&D expenditure express it to be a significant proxy for firm innovation (e.g., Hitt et al., 1997; O'Brien, 2003; Luo & Tung, 2007), only the profit that can be obtained remains questionable (Gorodnichenko et al., 2010; Barasa et al., 2017). Research into the emerging economies is acknowledged but despite the available literature there is a lack of a combination of women in top management and R&D expenditure with political stability. To address this, the following research question was formulated: *What are the effects of women in top management and R&D expenditure in emerging economies, and is this relationship moderated by political stability?*

The direct effects of women in top management and R&D expenditure were in this study firstly examined. The direct effects were followed by the examination of political stability on the relationship between women in top management and R&D expenditure with firm innovation. This study found that women in top management is positively related to firm innovation. Subsequently this research found that R&D expenditure is negatively related to firm innovation. By testing whether the effects hold and/or change by adding political stability in the model, this research found only one relationship being influenced. That is the relationship between R&D expenditure and firm innovation which is negatively moderated by a political stable country. Additionally, there is no moderation effect present on the relationship between women in top management and firm innovation.

6.2 Theoretical implications

This study has several theoretical implications for the drivers of firm innovation in emerging economies. The drivers for this study, women in top management and R&D expenditure which are related to political stability reveal several implications. Overall, it seems that all drivers have a direct significant effect on firm innovation. This adds to the existing literature by substantiating the drivers as important proxies for firm innovation (e.g., O'Brien, 2003; Miller & Triana, 2009; Krammer & Jiménez, 2020).

The results towards the effect of women in top management confirm existing findings of Mukthar (2002) Galia et al. (2015) and Saeed et al. (2016). As a result, the addition of women, either as the owner or as being a female in the top management team is important and good to have for firms operating in the emerging economies as it improves firm innovation. Secondly, R&D expenditure is in the current literature already proven to be a good proxy for improving firm innovation (e.g., Hitt et al., 1997; Hoskisson et al., 2002; Luo & Tung, 2007). This study does not add to that existing literature as R&D expenditure is here found to be negatively related to firm innovation. Additionally, this adds to the other side of the contradictory R&D literature. R&D expenditure not always directly leads to firm innovation, as it could also be related to an investment to be able to innovate in the future (Huang et al., 2015) and that seems to be the result of this study as well.

Looking at the effect of political stability, it seems not to have any effect on the relationship between women in top management and firm innovation as the effect was found nonsignificant. Although the opportunities of women in emerging economies are growing (Ukhova, 2015), there is still a lack of gender equality in those economies (Mielke & Brown, 2019) and it seems that stability within politics cannot address this problem. The effect of political stability on the relationship between R&D expenditure and firm innovation is in the opposite direction of what is expected based on the literature. As a result, the relationship of R&D expenditure with firm innovation is negatively moderated by political stability. Although this is contradictory to the expected, it is in line with the direct effect of R&D expenditure on firm innovation. Nevertheless, the findings add to the existing contradictory R&D expenditure literature where according to Huang et al. (2015) investments in R&D not always directly lead to firm innovation.

6.3 Managerial implications

After the theoretical implications, this research has also some managerial implications. The findings of this study may be relevant to both managers and policymakers. With this study managers and policy makers have gained additional insights in the drivers of firm innovation in emerging economies.

First, it appears that a gender diverse composition of the management team contributes to the degree of firm innovation. As a result, this means businesses should address the importance of women being present in the top management of a firm. Additionally, the findings of this research indicate that the more firms spend on R&D, the less likely a firm seems to innovate. It seems that investments in R&D not always directly lead to firm innovation, as expenditures, for example in equipment or employees, are also necessary for the future to be able to innovate as a firm. However, managers may not be aware of this fact; managers should be aware of the additional elements necessary to make R&D positively related to firm innovation. As this is outside the scope of this research, it will be addressed in the last section of this paragraph.

For managers and policy makers, it is important to be aware of the effects of a political stable country. In this study there is proven that a political stable country has no influence on the relationship between women in top management and firm innovation. For managers and policy makers it is, as said, important to address the importance of women in top management and they can act without taking political stability into consideration. For R&D expenditure this seems different. The effect R&D has on firm innovation is overall negative, and the influence of political stability is weakening this even more. Since the additional elements necessary for R&D expenditure to be positive related to firm innovation is not known yet, managers should be cautious with their expenditure on R&D directed to improve firm innovation.

6.4 Limitations of conducted research

As always, this study also has some limitations which may also offers avenues for future research. At first looking at the sample. The country classification for this study was based on the 27 emerging countries defined by the FTSE (2020) and the MSCI (2021). The data used for this study was received from the WBES. Nevertheless, as the sample, because of rapid

transformation within the economies (Bruton et al., 2008), could only consists of countries ranging from 2018 to 2020, only 8 countries were left. This means removal of 19 countries which makes it the first limitation. All countries coming from South America and Africa are not up to date and therefore removed, where Kuwait, Qatar, United Arab Emirates and Taiwan does not have any dataset at all. The second limitation is based on the sample as well. Although the existing literature about the drivers of firm innovation in emerging economies is extended, the differences within countries is still questionable. According to Kogut & Sing (1988) there are differences within one country, also called intra-country variation. This means that taking a country as a whole can come up with biased results.

Continuing with the independent variables. As Dezso et al. (2016) described, the impact of women in top management on firm innovation can encompass more, like their characteristics. As the WBES does not include items related to the characteristics of women in top management this is seen as a limitation for this research. The last limitation based on the sample is coming from the independent variable R&D expenditure. The variable was based on a single WBES item which has a lot of missing. Adding the only possible related item, h9; *''How Much Spent On R&D, Either In-House or External?''*, did not improve the measure as that had even as much missing data. To be able to use the R&D expenditure variable the missing data is imputed based on multiple imputation. As the variable had a missing of 70%, the outcome of the results can be biased because there is made use of replaced data based on the 30% valid answers. Therefore, it has high validity issues which can be seen as a limitation.

In this study, the dependent variable firm innovation encompasses all important elements described within the Oslo Manual (OECD, 2005). Nevertheless, the drivers of firm innovation can have different effects on several number of innovative activities. For example, Na & Shin (2019) have found that women in top management and a composite measure for firm innovation are positively related, but however, this does not hold when examining solely process innovation. Consequently, the theory supporting the hypotheses 2 and 4 was not confirmed. In section 5.3 alternative explanations for the wrong direction of the hypotheses were given but ranges outside the scope of this research. The fact that the results therefore cannot be fully explained forms a limitation to this research.

A final limitation is the fact that political stability is only taken as a moderator within this study. The results reveal that political stability has a direct positive effect on firm innovation. As this relationship ranges outside the scope of this research it is not included and can therefore be seen as a limitation. Nonetheless, the results do provide directions for future research which will be addressed in the following and last section.

6.5 Directions for future research

Following up from the limitations, there are several avenues for future research. Looking at the sample, for future research it is interesting to include (all) emerging countries from South America and Africa. The possibility exists that they could differ in their result as the countries included in this research also showed different results. Additionally, the results would be better generalizable for emerging economies as a whole. Besides the interest in differences among countries also the within difference might be important as intra-country variations exist.

Focusing on firm innovation, future research could replicate this study and separate the different types of innovation as it might be interesting to test the outcomes for the different types of firm innovation.

The drivers used in this study could also be topic for future research. Although women in top management is proven to be positive related to firm innovation, it might be an idea to deep dive into the leadership style of women in top management. Future research may investigate which leadership style increases the likelihood for firms in emerging economies to innovate. It seems interesting to see how their participation can be supported by managers as well as by different policies. Maybe supporting gender diversity implies the basis for other diversity within the firm, which is another direction for future research. Continuing with the independent variable R&D expenditure. Existing literature already found that R&D expenditure does not always directly lead to firm innovation, as it may divert resources from skills needed to innovate. Nevertheless, the scope of this study did not delve deeper into the meaning behind it and also not into how R&D expenditure specifically can be of positive importance for firm innovation, raising potential topics for future research.

Finally the moderator of this study, political stability. Extant literature has shown that there is a direct relationship between political stability and firm innovation (Polacheck & Sevastianova, 2012), which this study confirms. Nevertheless, they are, even as North (1990) and Barasa et al. (2017), asking for a deeper understanding of that relationship. Moreover, as Zhou et al. (2019) said, corruption can in addition to being a consequence also be a cause of political stability, which might be interesting for future research. Lastly, political stability can in future research be extended by the use of the different voids of Khanna & Palepu (2010) as they offer a roadmap for dealing with the types of institutional voids in emerging economies.

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