

Perspectives on micro-organisation innovation in emerging markets

A quantitative study on the drivers of firm innovation



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Abstract: This research used logistic regression analyses to examine firm innovation in emerging market micro-organisations. Both the relationship between firm innovation and firm performance as well as three possible drivers of firm innovation were studied. The drivers were prior industry knowledge, indebtedness and women in top management. The research made use of data from the World Bank Enterprise Survey. This lead to a sample of 762 micro-organisations divided over 8 different countries. First firm innovation was not found to have a significant impact on firm performance. A manager's prior industry knowledge and gender were both confirmed to have a positive effect on firm innovation. While indebtedness unexpectedly also proved to have a positive effect on firm innovation.

Keywords: Micro-organisations, emerging markets, firm performance, firm innovation, industry experience, indebtedness, women in top management

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1. INTRODUCTION

In emerging markets innovation is essential for all firms to increase their performance (Dabla-Norris et al., 2010). Innovation has long been seen as a crucial factor in firm growth (Schumpeter, 1934). This important role for innovation leads companies to have an interest in both improving their innovating capabilities and getting the most out of their current innovation options. Firms need to handle external factors, as this seems to impact the success of firm endeavours in innovating. However the ways in which a firm can deal with external factors differs from firm to firm. Firm specific characteristics cause them to attain different results. Micro-organisations face extra challenges, by having less resources and being generally less experienced than larger organisations (Laforet & Tann, 2006). This study will focus on those firms that can be labelled as a micro-organisation. The relatively large influence a manager can have within such a micro-organisation leads to an increased interest in characteristics of these managers which could positively influence firm innovation in these micro-organisations (Hausman, 2005).

1.1 Problem statement

Research regarding innovation in emerging markets has often looked at changes in institutions or infrastructure (Powell, 2008). Due to uncertainty and market imperfections, emerging markets can have other factors be determinants of firm innovation compared to developed markets (Saka-Helmhout et al., 2020). It is often argued how poor institutions in emerging markets cause increased transaction costs, which in turn have a dampening effect on innovation practices (Doh et al., 2017). Innovation does not only stem from the availability of resources. Entrepreneurs assess the risks of pursuing innovations. In this research the causes for different innovation decisions will be looked at. The emphasis will be on the influence of industry experience, gender and indebtedness on the choice of entrepreneurs to pursue innovations. This thesis will examine three possible causes for this lack of innovations in order to further the understanding of innovation decisions made by micro-organisations in emerging countries.

1.2 Objective and research question

This research will try to replicate some of the findings from Bradley et al. (2012) in order to further validate their findings. Because this focusses on emerging countries, whereas the original study took place in Nairobi, in a developing country, a successful replication would prove that the results can be generalized to a larger population. However this will not be a full replication, since there is also a need for further development of the knowledge surrounding

this topic. By following their suggestion to delve deeper into the specific characteristics which deter EM entrepreneurs from pursuing innovations (Bradley et al., 2012). This results in the following research question:

For emerging market micro-organisations, what is the effect of firm innovation on firm performance and is firm innovation driven by prior industry knowledge, indebtedness and women in top management?

1.3 Relevance

Micro-organisations are relatively underrepresented in the literature compared to larger firms and theories about the relationship between micro-organisations and innovation are underdeveloped (Jones et al., 2014). Especially when considering how for example in the EU micro-organisations make up about 90% of all firms (Perez-Cabanero et al., 2012). One of the reasons developing the theory on this subject is difficult, is the fact that they have often been excluded from innovation surveys (Jones et al., 2014).

The objective of this thesis is to further develop the theory on this subject by providing a better understanding about what characteristics cause micro-organisations in emerging markets to pursue innovations. Our current theories have mostly been derived from research in developed economies. This research seeks to fill the gap that consists in knowledge about whether these existing theories about larger organisations and developed economies are also applicable in emerging market micro-organisations. By gaining a better understanding of what causes innovation in these firms, future policies can be adapted to stimulate innovation in emerging economies. Since it will be clearer which circumstances drive innovation in these environments.

1.4 Outline

The thesis will first discuss the current theoretical ideas surrounding the relationship between innovation and firm performance in emerging market micro-organisations and some possible drivers of innovation in emerging market micro-organisations. Prior industry knowledge, indebtedness and women in top management will all be discussed as possible drivers. The known relationships in larger firms and developed economies will be used to hypothesize possible relationships between these variables in emerging market micro-organisations. This will lead to the formation of several hypotheses. Then the method in which these hypotheses will be tested will be discussed, to then follow with the actual application of this method and discussion of the results. After this analysis there should be some conclusions to be drawn from this research, while also discussing its limitations and opportunities for further research.

2. THEORETICAL BACKGROUND

2.1 Emerging markets

In the world different types of markets can be distinguished. Emerging markets are low-income countries experiencing a rapid growth due to recent liberalisations, while still having weak formal institutions (Khanna & Palepu, 2010). This rapid growth distinguishes them from developing markets. By 2025 these emerging markets are expected to make up half of the global consumption (McKinsey & Company, 2012). Showcasing how they have become increasingly important and offer great business opportunities to firms (Khanna & Palepu, 2010). This has led to an increase in attention for these emerging countries.

2.2 Micro-organisations

Micro-organisations are faced with different challenges than larger scale firms due to their limited resources and capabilities (Laforet & Tann, 2006). They are characterized by their size and are heavily influenced by the individuals that work there (Olivari, 2016).

What constitutes a micro-organisation is not universally defined (Kelliher & Reinl, 2009). One possible measurement is the amount of employees a firm has, where it is common for firms with <10 employees to be labelled as micro-organisations (Kelliher & Reinl, 2009; Ipinaiye et al., 2017; Duarte Alonso et al., 2018). However there are studies which use even lower cut-off points (Bögenhold & Fachinger, 2007; Cebula, 2010). The World Bank conducts special surveys focussing on micro-organisations in which they only interview firms with 5 employees or less. Since the World Bank data will be used in this research, their definition will be used resulting in micro-organisations being defined as firms with 5 employees or less. This operationalisation also aims to focus this research more on entrepreneurial micro-organisations with few employees.

2.3 Firm innovation in emerging markets

Firms need to have some sort of competitive advantage over their competitors in order to beat them and maximize their own performance (Barney, 1991). In other words they need to have some sort of distinguishment which sets them apart from their competitors, a competitive advantage. Firms can create their own competitive advantage through innovation. It is seen as a key factor for sustainable growth and creating a competitive advantage (Barasa et al., 2017).

But what exactly is innovation? For a definition we can look at the OECD (2005) definition. They define innovation as: *‘An innovation is 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). This definition goes beyond the invention of a new idea, but calls for the idea to be implemented in business practices. An actual application of the innovation is necessary for the innovation to be called an innovation. This sets a standard of usefulness. Since 'innovations' which cannot be implemented and are therefore useless to the company, will not be labelled as innovations. This definition also captures both the service and product industry. This means less R&D intensive industries can also have innovations.

Solely imitating other business offers diminishing returns to entrepreneurs (Bateman and Chang, 2008; Davis, 2006; Olson, 1996). For new ventures, the uncertainty and risks of innovation can demotivate them from innovating (Debrulle et al., 2020). For entrepreneurs using loans, the extra risk of being unable to repay the loan can deter them from going the innovative route (Bruton et al., 2011). If these entrepreneurs choose to pursue innovations, they are more likely to choose incremental innovation over radical innovation. This choice results in an increase in firm performance for these entrepreneurs, since they only have to convince customers their product is better than competitors' products to prove the value of a new product (Bradley et al., 2012).

Many sources state the importance of innovation especially for small organisations. Innovative SMEs often perform better than less innovative competitors (Rosenbusch et al., 2011). Creating new products and services allows these small organisations to compete with larger competitors with more resources and economies of scale advantages (Miller, 1983; Lumpkin & Dess, 1996). They create new markets for themselves or distinguish their products from competitors making them more attractive for customers. This leads to innovation positively influencing firm performance (Löf & Heshmati, 2006). SMEs face an extra obstacle compared to MNEs in the cost of innovation due to their lack of resources. Since the costs are often determined by external factors (Barney, 1991). However by optimally using their resources, small organisations can overcome difficulties caused by their lack of resources. This results in them successfully innovating despite these challenges (Vossen, 1998).

Innovation gives these firms the opportunity to introduce new products, processes or organizational methods which can alter the status-quo in a given market (Cainelli et al., 2006). Coming up with new processes or products can lead to new markets or better fulfilment of customer demands (Day, 1994; Marzi et al., 2017). Resulting in an increase in market-share over non-innovating firms (Cainelli et al., 2006). As research has shown that without

innovation, firms tend to resort to cost containment measures which lead to a downward spiral of layoffs and decreasing performance (Hausman & Johnston, 2010). Innovation is thus an important firm performance enhancing factor for micro-organisations in emerging markets. This results in the first hypothesis to be tested.

Hypothesis 1: *In emerging market micro-organisations, incremental firm innovation has a positive relationship with firm performance.*

2.4 Industry experience and innovation

When looking at determinants to make innovation decisions, we need to emphasize the role of the individuals working within a firm. They are the ones deciding which opportunities to pursue or pass up on (Shane, 2003). Bayarçelik et al. (2014) showed the significant influence such a manager can have on the innovation endeavours of SMEs. In smaller firms a single manager or entrepreneur has the most influence over the organization (Olivari, 2016). The innovative capabilities of a firm are heavily influenced by the manager themselves, because this small firm manager has a lot of decision-making power (Dyer & Handler, 1994; Verhees & Meulenbergh, 2004). They are involved with all activities and decision-making in these small firms (Hausman, 2005). An example of the extent of this influence is the influence a manager/founder has on the innovation decisions a new business makes, where even decisions made before the foundation of the business can be of significant influence on the innovation endeavours (Wasserman 2012).

Aside from a manager's individual characteristics such as for example education, their prior knowledge of the industry can help them find new innovations more easily than their less experienced competitors. Experienced managers are more effective when gathering information (Cooper et al., 1995). In developed markets having more experience in a given sector brings knowledge to a firm which enables it to innovate (Rao and Drazin 2002; Almeida et al. 2003). Furthermore their prior knowledge should increase their confidence to pursue opportunities (Begley and Tan, 2001). It allows entrepreneurs to explore more new combinations (Bradley et al., 2012). Assuming this same relationship upholds in micro-organisations in emerging markets, where the entrepreneur has a lot of influence, leads to the second hypothesis.

Hypothesis 2: *In emerging market micro-organisations, prior industry knowledge of entrepreneurs has a positive relationship with firm innovation.*

2.5 Indebtedness and innovation

Firms investing more money in knowledge, innovate more and have higher labor productivity than other firms (Crespi & Zuniga, 2012). This shows the benefits of investing in innovation endeavours. Investment in R&D is seen as the greatest internal driver of firm innovation. A firm's expenses are related to its innovation capabilities through the amassing of competencies and skills which benefit innovative practices (Barasa et al., 2017). Everything else being equal, more research expenses should thus lead to more innovation. But what if you are restrained by the availability of resources? Small entrepreneurs in emerging markets often face financial challenges. They have to take out loans to start their business, immediately giving their business a debt. Getting a loan can be difficult because of the information asymmetry and uncertainty (Shane, 2003). The weak institutions in emerging economies increase this difficulty (Powell, 2008). The entrepreneurs can turn to microcredit loans which do not ask for physical collateral and are more achievable for them. This lack of collateral does make it a high risk loan for the entrepreneur. They have no equity against which they can borrow more money. Their firm performance is their primary and often sole concern (Bradley et al., 2012). Depending on the motivation, entrepreneurs might choose to spend all their resources on production in order to maximize their (short-term) earnings. Which renders them completely unable to innovate (Debrulle et al., 2020). As earlier discussed, micro-organisations face a greater challenge of resource scarcity compared to larger firms (Laforet & Tann, 2006). This leads to these micro-organisations showing the aforementioned behaviour in which they focus on short-term goals instead of investing in long-term oriented innovation (Kelliher & Reinl, 2009). When these micro-organisations face a higher pressure to earn as much as possible because of having a debt, the entrepreneur will be less likely to invest resources in innovation, thus leading to less innovation. This substantiates the third hypothesis.

Hypothesis 3: *In emerging market micro-organisations, indebtedness will have a negative relationship with firm innovation.*

2.6 Female top management and innovation

Diversity of the top management is becoming a more prominent topic in research (Galia & Zenou, 2012; Saeed et al., 2016) with a central idea being that the presence of women in top management has a beneficial effect on the firm (Saeed et al., 2016). This is caused by the resources, such as knowledge and strategic ideas, these women bring to the firm. Most studies regarding the influence of women in top management on innovation look at developed markets (Joecks et al., 2013; Galia et al., 2015; Ruiz-Jiménez & del Mar Fuentes-Fuentes, 2015). There

have been studies which found a positive relationship between women in top management and firm innovation in developing economies as well (Ritter-Hayashi et al., 2019). However this general lack of research regarding the effects female managers on firm innovation in emerging markets, leaves a gap for this study to examine whether this same relationship can be witnessed in emerging markets. In emerging markets the amount of women in top management positions is still very low. For example according to Stefanovic et al. (2014) only 8.97% of the top executive positions in the private equity sector in emerging markets were filled by women at the time. This underrepresentation might be caused by lower economic opportunities for women in emerging markets (Economist Intelligence Unit, 2012). But this does not make it less relevant to investigate whether those firms that do have women in their top management innovate more or less than other firms.

Previous research has found a positive relationships between women in top management positions and innovation (Na & Shin, 2019). This relationship could be caused by their management style. Men often choose a transactional style while women opt for a more transformational style of management (Mukhtar, 2002; Eagly & Carli, 2003). Transformational managers inspire and stimulate others in the organization (Bass, 1990). They increase employees' self-efficacy and build emotional relationships with them, both factors that stimulate employee creativity (Gumusluoglu & Ilsev, 2009). More creative solutions are tested, due to employees being encouraged to think outside the box and challenge assumptions (Bass et al., 2003). Aside from this direct influence on the employees, there is also the strategic influence of the top manager. Transformational managers tend to have a more future-oriented approach which embraces the importance of innovation (Eagly & Carli, 2003). They will opt for more change- and growth-oriented strategies benefitting innovation (Jung et al. 2003). Hence this transformational style improves innovation in firms as has been proven in developed economies (Samad, 2012; Khalili, 2016). Having previously emphasized the significant influence a top manager can have in a small organisation (Bayarçelik et al., 2014). It can be hypothesized that the gender of a top manager can have a significant influence on the innovation endeavours of a micro-organisation. Due to the positive effects of having women in top management seen in developed economies, this effect is deemed to be positive in emerging markets as well. Resulting in the following hypothesis.

Hypothesis 4: *In emerging market micro-organisations, having women in top management has a positive effect on firm innovation.*

2.7 Theoretical model

Based on the theoretical framework the following model has been constructed to reflect the formulated hypotheses. It shows the expected relationships and their polarities.

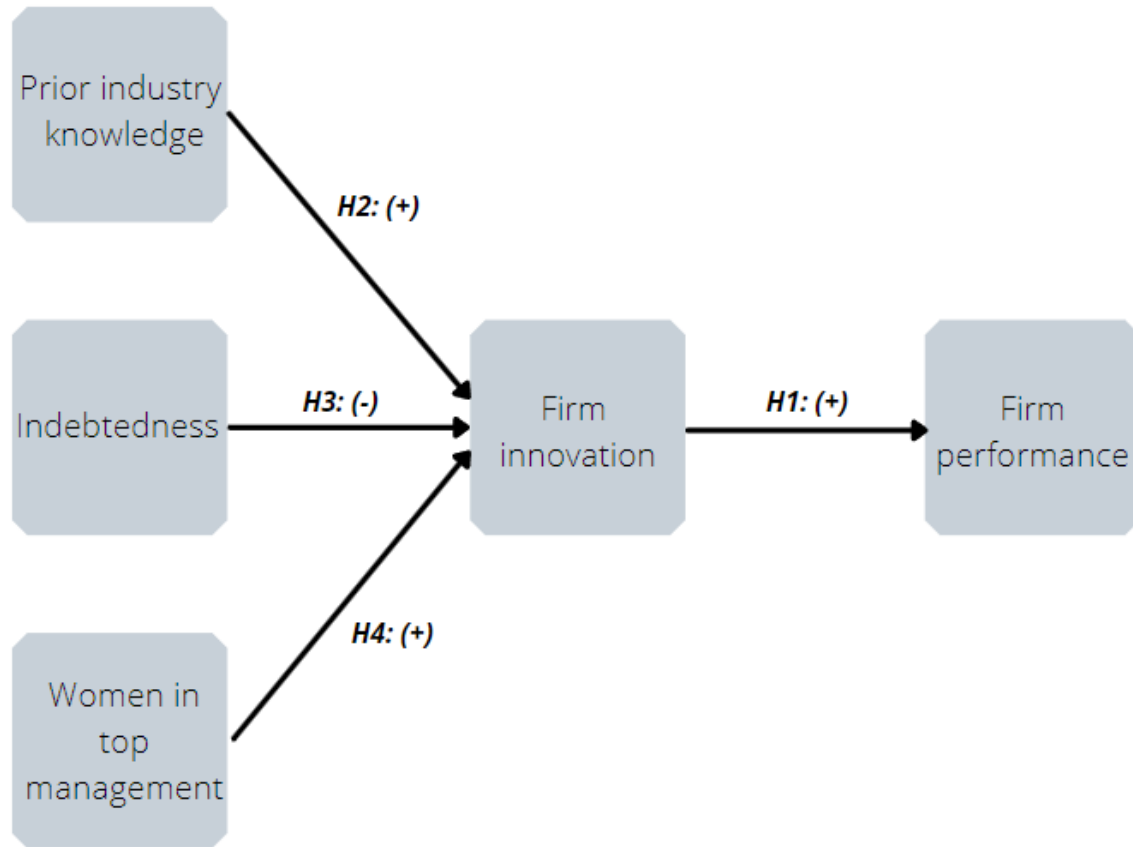


Figure 1: Theoretical model

3. METHODOLOGY

3.1 Sample/sources and measures

To test the hypotheses formulated in chapter 2, firm-level data collected by the World Bank will be used. The data is part of the World Bank's Enterprise Survey programme. This is a large scale survey programme containing data on 174,000 firms in different geographic locations (approximately 151 countries) and industry sectors (World Bank Group, 2022). Both qualitative and quantitative data was collected by conducting face to face interviews with firm managers and owners. Since this research is focussed on characteristics of entrepreneurs driving firm innovation, only the micro-organisations in the *enterprise surveys* (ES) will be used. As discussed in chapter 2 the decision has been made to define micro-organisations as firms with 5 employees or less. This deviation from the more common definition of less than 10 employees has been seen in other research (Bögenhold & Fachinger, 2007; Cebula, 2010). Since the World Bank makes a distinction in surveys based on the threshold of 5 employees, this threshold has been chosen for this research. Thus only the data from firms with 5 employees or less will be used, refining the data to a more small-scale entrepreneurial set of firms. The survey data is representative for all firms in the non-agricultural private sector of a country (World Bank Group, 2017). According to the MSCI index the 25 countries in table 1 are all deemed to be emerging (MSCI, 2022).

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

Table 1. Emerging markets

Data from these countries will thus be used in this analysis. Due to the nature of rapid change which characterizes emerging countries and recent changes in the content of the World Bank surveys, only data from 2017 and later will be used. How this influences the sample will be discussed in section 4.1.

3.2 Variables

The ES uses indicators to show how firms responded to questions regarding for example firm innovation or characteristics of their top management. These indicators are used to quantify the variables, making an analysis possible.

3.2.1 Dependent variable 1: Firm performance

The first dependent variable is firm performance. This can be measured by using indicator [perf1] from the ES. This indicator asks firms about their growth in total annual sales by comparing their sales in the last fiscal year to the sales of three fiscal years ago (World Bank Group, 2017). This results in either an increase, decrease or the sales remaining the same. A dummy variable will then be constructed indicating with a value of '1' for increased sales and a value of '0' for decreased sales. We can then look at whether a different value for the independent variable, causes the dependent variable to change. In their article Bradley et al. (2012) operationalize firm performance by comparing last year's results with this year's results. In line with this operationalization, but using the World Bank data, this research uses a similar measure for firm performance by comparing the results from three years ago with current results. This gives a relative performance result which can be used in the analysis.

3.2.2 (in)dependent variable 2: Firm innovation

Firm innovation has been defined in this research using OECD (2005) definition. *'An innovation is 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.'* In the survey this definition is reflected by indicator [t7] in the question *'During the last three years, has this establishment introduced new or significantly improved products or services?'* (World Bank Group, 2017). This can be answered by either 'Yes', 'No' or 'I don't know'. This operationalization of the variable firm innovation is similar to the operationalization used by Ayyagari et al. (2011). A dummy variable will be created in which those who responded 'Yes' will have a value of '1' and those who responded 'No' will have a value of '0'. Firm innovation is an independent variable in the first analysis and a dependent variable in the second analysis, due to its central role in this study.

Since these analyses are performed separately no complications are to be expected regarding this duality.

This research looks at the drivers of firm innovation. The following independent variables are thus thought to have a causal relationship with the dependent variable (Field, 2018). The independent variables are: Prior industry knowledge, Indebtedness and Women in top management.

3.2.3 Independent variable 1: Prior industry knowledge

The first independent variable is about the prior industry knowledge of the top manager. Indicator [wk8] in the survey provides the data for this variable. Question B.7 *'how many years of experience working in this sector does the top manager have?'* can be answered by the amount of years, less than one year or I don't know (World Bank Group, 2017). For this analysis managers having more than ten years of experience will be seen as having prior industry knowledge, whereas those with less than ten years of experience will be seen as not having prior industry knowledge. In their research Ayyagari et al. (2011) used a similar approach. They found firms run by managers with ten or more years of experience to be more innovative than firms lead by less experienced managers. But where their research focussed on all developing markets, this research has a specific focus on emerging markets. The cut-off at ten years translates this question into a dichotomous variable by creating a dummy variable in which those who responded with less than three years will be given a value of '0' and those who responded ten years or more will be given a value of '1'.

3.2.4 Independent variable 2: Indebtedness

For the second independent variable Indebtedness indicator [fin14] is used. Question K.8 *'At this time, does this establishment have a line of credit or a loan from a financial institution?'* can only be answered by 'Yes', 'No' or 'I don't know' (World Bank Group, 2017). The two valid responses are 'Yes' and 'No', 'I don't know' will result in a missing value for this question. Bradley et al. (2012) use the size of the loan as a measure for indebtedness. Since this research is focussed on the effect of having a debt regardless of the size of the debt, the presence of a loan will be used as a measure of indebtedness. Operationalizing indebtedness by looking at whether there is an outstanding line of credit or loan (Tsai et al., 2016). This approach, similarly to the prior industry knowledge, allows for the creation of a dichotomous dummy variable in which those who responded 'Yes' will get a value of '1' and those who responded 'No' will get a value of '0'.

3.2.5 Independent variable 3: Women in top management

The final independent variable Women in top management is also a dichotomous variable. This is indicator [gend4] in the survey. Question B.7a *'Is the top manager female?'* can also only be answered by 'Yes', 'No' or 'I don't know' (World Bank Group, 2017). The two valid responses are 'Yes' and 'No', 'I don't know' will result in a missing value for this question. In other studies the same or similar questions have been used to measure women in top management (Krishnan & Park, 2005; Dezso & Ross, 2012; Dezso, Ross & Uribe, 2016). The answers to question B.7a can therefore be seen as valid measurements for the concept of women in top management in this research. They will be converted into a dummy variable where 'Yes' will be given a value of '1' and 'No' will be given a value of '0'. Creating a final dichotomous variable.

3.3 Control variables

There will be two control variables to control for spurious relationships. The first being industry sector. Different types of industry have different growth rates and are in different maturity phases. This could cause differences in firm performance. Furthermore they have different rates of innovation. As for example manufacturing, knowledge-intensive services and financial service firms innovate more than firms in other sectors (De Jong & Vermeulen, 2006; Zemplerová & Hromádková, 2012). Therefore a control variable 'Firm Sector' will be added. This consists of the three categories. manufacturing, retail services and 'other' services. This lead to the creation of two dummy variables for manufacturing and retail services, with 'other' services being the reference category.

The second and last control variable will be firm age. Newer firms tend to suffer from a liability of newness (Hannan & Freeman, 1984). Possibly hindering their firm performance. Meanwhile older firms tend to innovate less compared to younger firms (Balasubramanian & Lee, 2008; Coad, Segarran & Teruel, 2016). Thus the control variable 'firm age' will be added.

3.4 Data analysis procedure

This research focusses on unveiling some of the drivers of firm innovation and how firm innovation affects firm performance. It wants to show which variables cause firm innovation to occur. A logistic regression predicts the likelihood of a dependent variable occurring given the known values of several independent variables (Field, 2018). As the variables will all be dichotomous (dummy) variables, a logistic regression can be used. According to Hair et al. (2018) it can be used when the dependent variable is a dichotomous categorical variable and

the independent variables are metric or non-metrically scaled. Several assumptions need to be met in order to be able to conduct a logistic regression analysis. The sample size needs to be over 400, observations need to be independent, the independent variables should have little to no multicollinearity and there should be linearity of the continuous independent variable and log odds (Hair et al., 2018). Two logistic regression analyses will be conducted. First one with firm performance as the dependent variable to test the relationship between firm innovation and firm performance for emerging market micro-organisations. Secondly an analysis will be conducted looking at the determinants of firm innovation by taking firm innovation as dependent variable in this analysis.

3.5 Sample

As discussed before the data for this analysis comes from the Enterprise Survey of the World Bank Group (2021). Emerging markets are changing rapidly (Ramamurti, 2012). Hence the countries included or excluded in the list of emerging markets can change quickly. An example is the recent exclusion of Russia from the list following their invasion of Ukraine. These rapid changes call for the use of recent data to increase the validity of the research. Together with the changes in the Enterprise Survey questionnaire itself, a decision has been made to use data from 2017 onwards. This results in a sample of 8 countries with data from 4 different years: Czech Republic (2019), Colombia (2017), Greece (2018), Hungary (2019), Peru (2017), Poland (2019), South Africa (2020) and Turkey (2019). The other 17 emerging countries discussed in chapter three are excluded from the analysis due to a lack of relevant recent data. In terms of generalizability of the research it is important to note that this leads to an exclusion of all Asian emerging markets.

The cases with no data about the amount of employees have been deleted since the size of the firm is an integral distinction. Accidentally having larger firms in the sample would deter from this research's objective of giving more insight in drivers of innovation for micro-organisations. Lastly two cases (one from Turkey and one from Poland) with missing data about firm innovation (variable h1 in the dataset) have been deleted. Since firm innovation is such a central concept in both analyses conducted in this research, a missing value on this question leads to the cases being unusable for this research. With only a few cases having missing values, listwise deletion is a valid option of dealing with these missing values (Hair et al., 2014).

Distilling all cases with 5 employees or less from the remaining data gives the following distribution of firms between the different countries.

		Country Code			Cumulative Percent
		Frequency	Percent	Valid Percent	
Valid	Colombia	68	8,9	8,9	8,9
	Peru	89	11,7	11,7	20,6
	South Africa	111	14,6	14,6	35,2
	Turkey	151	19,8	19,8	55,0
	Poland	167	21,9	21,9	76,9
	Czech Republic	49	6,4	6,4	83,3
	Hungary	70	9,2	9,2	92,5
	Greece	57	7,5	7,5	100,0
	Total	762	100,0	100,0	

Table 2. Sample distribution

3.6 Research ethics

This research will use the data collected by the World Bank Group. The World Bank Group is a renowned organisation which makes their data publicly available, giving transparency about their process. The researcher did not have any influence in this process nor did he change or manipulate this data. In order to access the data the World Bank Group asks researchers to comply with a confidentiality agreement (World Bank Group, 2022).

This study adheres to the principles codified in the Netherlands Code of Conduct for research integrity (2018). The research was conducted in an honest manner, meaning the process has been accurately reported and the data and results were not altered in any way. Secondly a scrupulous approach was followed, meaning scholarly methods were used to create this research. Thirdly everything surrounding the research has been done with the utmost transparency, describing every step of the research in a clear and transparent manner. Fourthly the research has been conducted independent and impartial. Choices were made on a strict academic basis. Lastly the principle of responsibility has been followed. This research is scientifically and socially relevant as seen in the contributions. Thus the principles of honesty, scrupulousness, transparency, independence and responsibility will all be followed (Universities of the Netherlands, 2018).

4. FINDINGS

In this chapter the data will be analysed. First the descriptive statistics will be discussed. Secondly the assumptions for the logistic regression analysis will be discussed, to then follow with the conduction of the logistic regression analyses and elaboration of the results. Lastly these results will be used to confirm or deny the formulated hypotheses.

4.1 Descriptive statistics

We need to take a look at the descriptive statistics before we can take a look whether the assumptions for logistic regression are met.

Firm performance was indicated by checking whether last year's net sales were larger than the net sales from three years ago. Similar to Bradley et al. (2012) a dummy for Firm performance is then created indicating either an increase in performance (1) or a decrease in performance (0). This was done by taking the sales from last year (d2) and subtracting the sales from three years ago (n3). This resulted in either a positive or negative outcome. Those cases with a positive outcome were labelled as having an increase in performance and those with a negative outcome as having a decrease in performance. For managerial experience a dummy has been made with 10 years as a cutoff point (Ayyagarri et al, 2011). Meaning that managers working in a specific sector for 10 years or more are deemed to be experienced and have prior industry knowledge as discussed in chapter 2. These cases got a value of 1 in the dummy variable PriorIndustryKnowledge and the less experienced managers got a value of 0. Then a descriptive analysis was conducted to check the data.

The first descriptive point of interest is the amount of missing values. According to Hair et al. (2018) missing values become problematic when a variable has 10% or more missing values. However, this can be fixed by using different statistical techniques (Hair et al., 2018).

Looking at the data the variable FirmPerformance is the only variable with more than 10% missing values. These cases could be deleted in order, since the remaining cases still pass the threshold of 400 cases required to conduct a binary logistic regression analysis. However, this does have an influence on the validity of this research. Therefore the choice has been made to conduct both an analysis with these cases deleted and an analysis after imputation to deal with the missing variables. In order to deal with the missing values we need to know if these values are missing at random (MAR) or missing completely at random (MCAR). Little's MCAR test

(appendix 1) is significant meaning the data are assumed to be MAR. Therefore not all imputation techniques are acceptable (Hair et al., 2018). The multiple imputation method is deemed to be the best imputation method in case of data missing at random (Hair et al., 2018). With this method multiple versions of a completed dataset are estimated and created which can then be used to conduct the analysis. The results from each of these imputed datasets are then pooled to give a nuanced outcome. For the analysis 3 to 10 imputations would typically suffice (Rubin, 1987). To get the most valid results 10 imputations have been conducted.

For all other variables the missing values are below 10% meaning they do not pose any concerns. Secondly the Skewness and Kurtosis are checked. These should have a value between -3 and +3 to be appropriate (Hair et al., 2018). FirmAge did have a Kurtosis above +3 and needed to be transformed (appendix 2). This has been done using a Log transformation which results in the least Skewed and Kurtosed FirmAge data. For each of the 10 imputations the Skewness and Kurtosis are also within the range of -3 and +3 (appendix 3). Furthermore all other variables are either binary or categorical, meaning the Skewness and Kurtosis of these variables is irrelevant.

		Statistics						
		FirmPerform ance	FirmInnovati on	PriorIndustr yKnowledge	Indebtednes s	FemaleMan ager	AgeLogTran sform	FirmSect or
N	Valid	563	762	748	754	761	754	762
	Missing	199	0	14	8	1	8	0
Mean		,5933	,2231	,7553	,3581	,2615	1,2519	2,03
Median		1,0000	,0000	1,0000	,0000	,0000	1,2553	2,00
Mode		1,00	,00	1,00	,00	,00	1,08	3
Std. Deviation		,49166	,41660	,43017	,47976	,43974	,25070	,854
Skewness		-,381	1,333	-1,190	,593	1,088	-,131	-,053
Std. Error of Skewness		,103	,089	,089	,089	,089	,089	,089
Kurtosis		-1,862	-,224	-,585	-1,653	-,819	,028	-1,626
Std. Error of Kurtosis		,206	,177	,179	,178	,177	,178	,177
Minimum		,00	,00	,00	,00	,00	,60	1
Maximum		1,00	1,00	1,00	1,00	1,00	2,09	3

Table 3. Descriptive statistics

4.2 Assumptions logistic regression analyses

In order to be able to perform a logistic regression analysis there are several assumptions which need to be met in order for the data to be suited to perform a logistic regression analysis. (1) Dichotomous dependant variable, (2) sample size, (3) multicollinearity amongst variables, (4) independent observations and (5) Linearity of independent variables and Log odds (Hair et al., 2018).

First, the dependent variable should be a dichotomous variable. Both Firm Performance and Firm Innovation are dichotomous variables in this research. The answers can be either yes/positive performance or no/negative performance, hence in both analyses the dependent variable is dichotomous.

Second, the sample size should be over 400 in order to get the best results from the analysis. The overall sample has 762 cases meaning this threshold is met. As said before there are some missing cases in the first logistic regression analysis which results in this sample having 558 cases, still meeting the threshold. While the dataset after imputation has the full sample size 762.

Third, there should be no multicollinearity amongst variables. According to Hair et al. (2018) multicollinearity exists when a variable in the analysis can be explained by other variables or if there is a strong correlation between predictors in the model. There should be no multicollinearity in order to be able to conduct a logistic regression analysis. To test this multicollinearity, we look at the VIF-value and tolerance in the correlation table. The VIF-value should be smaller than 10 and the tolerance larger than 0.10 (Hair et al., 2018). For the first logistic analysis we can see the VIF-values in table 4. For the 10 imputations the VIF-values can be found in appendix 4.

Coefficients^a

Model		Collinearity Statistics	
		Tolerance	VIF
1	FirmInnovation	,999	1,001
	AgeLogTransform	,982	1,018
	ManufacturingDummy	,793	1,261
	RetailDummy	,802	1,246

a. Dependent Variable: FirmPerformance

Table 4. Multicollinearity 1

The VIF-values range from 1,001-1,261 and the tolerance ranges from 0,793-0,999. While in the imputations the VIF-values range from 1,003-1,270 and the tolerance ranges from 0,787-0,997. From this we can conclude there is no multicollinearity between the independent variables in the first logistic analysis.

For the second logistic analysis we can see the multicollinearity figures in table 5. Here all VIF-values range from 1,002-1,056 and the tolerance ranges from 0,947-0,998. This leads to the conclusion that there is no multicollinearity between the independent variables in this analysis either. This means this assumption is met for both analyses.

Coefficients^a

Model		Collinearity Statistics	
		Tolerance	VIF
1	PriorIndustryKnowledge	,947	1,056
	Indebtedness	,998	1,002
	FemaleManager	,947	1,056

a. Dependent Variable: FirmInnovation

Table 5. Multicollinearity 2

Another way to test for multicollinearity is to check if the variables correlate using Pearson's correlation. Tables 6 shows both the possible correlations for the dataset with the missing values deleted and the pooled results for the imputed dataset. In tables 6 and 7 the correlations can be seen. Although there are some significant correlations, none of these are correlations of 0.80 or higher. This means the earlier conclusion that there is no multicollinearity is confirmed and the variables do not pose a problem for the analyses (Field, 2018).

Correlations

Imputation Number				FirmPerfo rmance	FirmInnov ation	Manufact uringDum my	RetailDu mmy	AgeLogTr ansform
Pooled	Spearman' s rho	FirmInnovation	Correlation Coefficient	,060				
			Sig. (2-tailed)	,170				
			N	762				
		Manufacturing Dummy	Correlation Coefficient	,080	,049			
			Sig. (2-tailed)	,057	,176			
			N	762	762			
		RetailDummy	Correlation Coefficient	-,031	-,001	-,449**		
			Sig. (2-tailed)	,484	,972	,000		
			N	762	762	762		
		AgeLogTransfo rm	Correlation Coefficient	-,154**	-,020	,055	,060	
			Sig. (2-tailed)	,000	,589	,129	,102	
			N	762	762	762	762	
Original data	Spearman' s rho	FirmInnovation	Correlation Coefficient	,053				
			Sig. (2-tailed)	,207	--			
			N	563	762			
		Manufacturing Dummy	Correlation Coefficient	,078	,049	--		
			Sig. (2-tailed)	,063	,176	.		
			N	563	762	762		
		RetailDummy	Correlation Coefficient	-,029	-,001	-,449**	--	
			Sig. (2-tailed)	,489	,972	,000	.	
			N	563	762	762	762	
		AgeLogTransfo rm	Correlation Coefficient	-,142**	-,020	,057	,058	--
			Sig. (2-tailed)	,001	,574	,119	,114	.
			N	558	754	754	754	754

** . Correlation is significant at the 0.01 level (2-tailed).

* . Correlation is significant at the 0.05 level (2-tailed).

Table 6 Pearson's correlation 1

			Correlations					
			FirmInnovation	PriorIndustryKnowledge	Indebtedness	FemaleManager	FirmSector	AgeLogTransform
Spearman's rho	FirmInnovation	Correlation Coefficient	--					
		Sig. (2-tailed)	.					
	PriorIndustryKnowledge	Correlation Coefficient	,031	--				
		Sig. (2-tailed)	,404	.				
	Indebtedness	Correlation Coefficient	,097**	,035	--			
		Sig. (2-tailed)	,008	,345	.			
	FemaleManager	Correlation Coefficient	,076*	-,232**	-,036	--		
		Sig. (2-tailed)	,037	,000	,323	.		
	FirmSector	Correlation Coefficient	-,054	-,006	,036	,014	--	
		Sig. (2-tailed)	,135	,864	,319	,696	.	
	AgeLogTransform	Correlation Coefficient	-,020	,328**	-,036	-,071	-,094**	--
		Sig. (2-tailed)	,574	,000	,328	,050	,010	.

** . Correlation is significant at the 0.01 level (2-tailed).

* . Correlation is significant at the 0.05 level (2-tailed).

Table 7. Pearson's correlation 2

The fourth assumption is that all observations are independent. Observations should not influence each other. Since all observations have been made at a single point in time, making it impossible for respondents to have been influenced by each other. This assumption is therefore also met.

Lastly the test for linearity of independent variables and log odds. This is only relevant for continuous variables. Since all independent variables are categorical, this assumption can automatically be deemed to be met.

4.3 Logistic regression analysis (1)

For hypothesis 1 different models were run with firm performance as a dependent variable. First the model is run with only the control variables firm age and sector. Secondly the independent variable firm innovation is added.

In the first model the control variables were added. By looking at the Nagelkerke R squared we can determine how much of the variance in the dependent variable is explained by the model. The average R^2 of the first model is 0.051 for the imputations, meaning the control variables explain between 5.1% of the variance in the dependent variable in the different imputations. The R^2 for the original data is 0.043, meaning the control variables explain 4.3% of the variance in the dependent variable. In table 8 the pooled results from the imputation data and the results for the original data can be seen. Firm age has a significance of <0.001 and an odds ratio of 0.227, while for firm sector only the manufacturing dummy (0.029) proved to be significant. The R^2 for both models can be found in appendix 5.

			Variables in the Equation								
Imputation Number			B	S.E.	Wald	df	Sig.	Exp(B)	Fraction Missing Info.	Relative Increase Variance	Relative Efficiency
Pooled	Step 1 ^a	Manufacturing Dummy	,461	,210			,029	1,586	,271	,351	,974
		RetailDummy	,115	,229			,617	1,122	,339	,478	,967
		AgeLogTransform	-1,483	,372			,000	,227	,292	,389	,972
		Constant	2,122	,472			,000	8,348	,267	,345	,974
Original data	Step 1 ^a	Manufacturing Dummy	,447	,209	4,595	1	,032	1,564			
		RetailDummy	,111	,219	,254	1	,614	1,117			
		AgeLogTransform	-1,529	,402	14,491	1	,000	,217			
		Constant	2,179	,524	17,267	1	,000	8,839			

a. Variable(s) entered on step 1: ManufacturingDummy, RetailDummy, AgeLogTransform.

Table 8. Logistic regression 1 model 1 results

In the second model the independent variable is included. The average R^2 of this model for the imputed data is 0.055, meaning the independent variables explain 5.5% of the variance in the dependent variable. This means the added independent variable Firm Innovation helps explain an extra 0.4% variance in the dependent variable. However, the independent variable firm innovation is insignificant in this model. The odds ratio of 1.315 can thus not be interpreted as a significant result. For the original data a similar image emerges. With the R^2

increasing to 0.047. Meaning the addition of the variable Firm Innovation helps explain an extra 0.4% variance in the dependent variable. But in this analysis Firm Innovation is insignificant as well. Therefore no proof has been found for firm innovation increasing firm performance in emerging markets. Hypothesis 1 is thus rejected.

Imputation Number			B	S.E.	Wald	df	Sig.	Exp(B)
Pooled	Step 1 ^a	ManufacturingDummy	,448	,209			,034	1,565
		RetailDummy	,109	,230			,636	1,115
		AgeLogTransform	-1,477	,373			,000	,228
		FirmInnovation	,274	,226			,228	1,315
		Constant	2,062	,473			,000	7,858
Original data	Step 1 ^a	ManufacturingDummy	,439	,209	4,423	1	,035	1,551
		RetailDummy	,111	,220	,253	1	,615	1,117
		AgeLogTransform	-1,522	,402	14,327	1	,000	,218
		FirmInnovation	,271	,220	1,520	1	,218	1,311
		Constant	2,117	,527	16,150	1	,000	8,310

Table 9. Logistic regression 1 model 2 results

It is worth noting that in both the imputed analysis and the original data analysis the control variables firm age and manufacturing show significant results.

4.4 Logistic regression analysis (2)

For the second logistic regression analysis, testing hypotheses 2 through 4, different models were run with firm innovation as a dependent variable. First the model is run with only the control variables firm age and sector. Secondly the independent variables, the manager's industry knowledge, indebtedness and gender of the top manager, are added to test the effects.

In the first model with only the control variables we can look at the Nagelkerke R squared to determine how much of the variance in the dependent variable is explained by the model. The R^2 of the first model is 0.006, meaning the control variables explain 0.6% of the variance in the dependent variable (appendix 6). However, of these control variables only the manufacturing dummy shows weak support. This would mean that only being a manufacturing firm has a weak influence on firm innovation. Being active in a different sector or the age of a firm have no influence on firm innovation.

Variables in the Equation		B	S.E.	Wald	df	Sig.	Exp(B)
Step 1 ^a	AgeLogTransform	-,351	,356	,974	1	,324	,704
	ManufacturingDummy	,309	,209	2,185	1	,139	1,362
	RetailDummy	,142	,228	,386	1	,534	1,152
	Constant	-,962	,453	4,501	1	,034	,382

a. Variable(s) entered on step 1: AgeLogTransform, ManufacturingDummy, RetailDummy.

Table 10. Logistic regression 2 first model results

In the second model the independent variables are included. The R^2 of this model is 0.037, meaning the independent variables explain only 3.7% of the variance in the dependent variable (appendix 6). Hypotheses which are one sided allow for the two-sided significance levels to be divided by two (Hair et al., 2018). Since H2, H3 and H4 are one sided, the significance in the table for the corresponding variables can be divided by two resulting. For prior industry knowledge (0.155) this results in 0.078 meaning there is weak support for the impact of industry knowledge on firm innovation. The variables indebtedness (0.006) and female manager (0.007) result in significance levels of 0.003 and 0.004 respectively. Both these outcomes are thus significant with the following odds ratios; 1.654 for indebtedness and 1.713 for female manager. Lastly there is now weak support for the manufacturing dummy having an influence on firm innovation.

Variables in the Equation		B	S.E.	Wald	df	Sig.	Exp(B)	95% C.I. for EXP(B)	
								Lower	Upper
Step 1 ^a	PriorIndustryKnowledge	,331	,233	2,025	1	,155	1,392	,883	2,196
	Indebtedness	,503	,182	7,607	1	,006	1,654	1,157	2,364
	FemaleManager	,538	,201	7,205	1	,007	1,713	1,156	2,539
	AgeLogTransform	-,452	,384	1,387	1	,239	,636	,300	1,350
	ManufacturingDummy	,352	,212	2,763	1	,096	1,422	,939	2,153
	RetailDummy	,140	,231	,369	1	,543	1,151	,732	1,810
	Constant	-1,457	,481	9,170	1	,002	,233		

a. Variable(s) entered on step 1: PriorIndustryKnowledge, Indebtedness, FemaleManager, AgeLogTransform, ManufacturingDummy, RetailDummy.

Table 11. Logistic regression 2 second model results

The second hypothesis stated that prior industry knowledge would have a positive relationship with firm innovation in emerging markets. Despite the theoretical grounding for this hypothesis, it could not be supported using the data from this research. With prior industry knowledge yielding a weak effect in the analysis. This leads to the support of hypothesis 2. For the third hypothesis, it was hypothesised that indebtedness would have a negative relationship with firm innovation in emerging markets. The results show a significant relationship between indebtedness and firm innovation, however this relationship is positive instead of negative. Firms with a loan from a financial institution introduce 65.4% more firm innovations than firms without a loan from a financial institution. It seems having a loan from a financial institution has a positive influence on firm innovation. Therefore hypothesis 3 is rejected.

Lastly hypothesis 4 theorised having a female top manager would positively influence firm innovation in emerging markets. Following the analysis there is a significant difference between firms with female managers and male managers in terms of firm innovation. Firms with female managers tend to innovate 71.3% more than firms with male managers, meaning having a female manager has a positive relationship with firm innovation in emerging markets. Hypothesis 4 is thus supported.

Hypothesis	Odds ratio	%	Sig.	Supported/Rejected
H1 (+) Firm Innovation → Firm Performance	1.315	31.5	0.114	Rejected
H2 (+) Prior industry knowledge → Firm innovation	1.392	39.2	0.078	Supported
H3 (-) Indebtedness → Firm innovation	1.654	65.4	0.003	Rejected
H4 (+) Women in top management → Firm innovation	1.713	71.3	0.004	Supported

Table 12. Hypothesis testing overview

5. DISCUSSION

In this chapter the results from the analysis will be discussed and compared to earlier research literature. Hypotheses 2 and 4 could be supported. A possible explanation will be sought for the insignificant result leading to a rejection of the first hypothesis, as well as for the significant result with unexpected polarity which lead to the rejection of the third hypothesis.

5.1 Firm innovation and firm performance

The first hypothesis was about the relationship between firm innovation and firm performance. It was hypothesized that there would be a positive relationship. The results from the analyses did not support this relationship. The positive effect firm innovation would have on firm performance was found to be insignificant. The hypothesised positive relationship between firm innovation and firm performance is a well-established relationship in the literature (Schumpeter, 1937; Bradley et al, 2012; Barasa et al., 2017). This study has tried to replicate this relationship in micro-organisations operating in an emerging market environment. The absence of a relationship could be caused by the resource constraints micro-organisations face. Due to their lack of resources these firms often have to choose where to invest said resources (Laforet & Tann, 2006). This leads to firms sacrificing some firm performance in order to invest in innovation. This could explain the absence of a significant relationship in combination with the operationalisation of this study. After implementing an innovation, some time is needed for said innovation to show its worth and increase firm performance (Cainelli et al., 2006). In other words there is a certain time-lag before the firm actually benefits from the innovation. In this study the data did not account for said time-lag, possibly influencing the results. Firms choosing to sacrifice short-term gains in order to invest in innovation, would not immediately see their performance increasing. However this does not mean the innovation did not lead to an increase of firm performance, it just means it did not lead to an increase of firm performance yet. For now the results are as they are and no relationship was found between firm innovation and firm performance in emerging market micro-organisations.

5.2 Drivers of firm innovation

Before delving deeper into the hypotheses surrounding the second logistic regression analysis, the relatively low R^2 of the model deserves discussion. This low R^2 means only a small amount of the variance in innovation was explained by the independent variables. A possible explanation for this could be found in the article by Chen et al. (2015) which emphasizes the

role of non-executive personnel as a main determinant for innovative output. Following this theory we can interpret the low R^2 as meaning that although all independent variables showed a significant influence, they are not the main determinants for firm innovation by micro-organisations in emerging markets.

5.2.1 Prior industry knowledge effect

The other hypotheses all had firm innovation as outcome variable. The first hypothesized effect was the positive influence of prior industry knowledge on firm innovation. Prior industry knowledge did have a positive effect according to the analysis. Although weak, this hypothesis is thus supported. This hypothesis was created with the idea to test if the proven relationship between managerial experience and firm innovation in developed markets translates to emerging markets (Rao and Drazin 2002; Almeida et al. 2003). The focus of the research, micro-organisations, might be a reason for this hypothesis having a weak relationship. Managing a micro-organisation poses different challenges than managing larger organisations. The focus can be more on survival, which leads to the manager becoming more experienced in dealing with these types of challenges instead of allowing them to explore more new combinations like Bradley et al. (2012) suggested.

5.2.2 Indebtedness effect

The third hypothesis focussed on indebtedness having a negative relationship with firm innovation. A significant relationship between indebtedness and firm innovation was found, however this relationship is positive instead of negative. Indebted firms tend to innovate more than not-indebted firms in emerging markets. This hypothesis was driven by the idea that having a debt lead to entrepreneurs prioritizing current firm performance over firm innovation (Bradley et al., 2012) and maximizing their earnings instead of innovating (Debrulle et al., 2020). This hypothesis was thus rooted in the preferential orientation of the entrepreneur. It followed the idea that an entrepreneur with a debt will want to maximize its earnings in order to repay said debt. This forgoes the idea that taking out a loan is a conscious decision. Those who take out a loan might have thought about it thoroughly and have a clear idea of how to use said loan. Being able to access finance gives firms the means to innovate (Kaur et al., 2022). This could be a possible explanation for indebted firms innovating more than not-indebted firms. Those who have a loan at a financial institution, have been able to acquire the necessary capital to invest in innovation. However there could be an interplay between the burden a loan brings, which is dependent of the interest rate, length and presence of other debts, and the opportunities the capital provides.



5.2.3 women in top management effect

The final hypothesis was about the positive relationship between female top managers and firm innovation. This relationship was found to be supported by the analysis. Firms whose top manager is female are more likely to innovate. The theories founded in developing and developed markets can be translated to emerging markets (Ruiz-Jiménez & del Mar Fuentes-Fuentes, 2015; Ritter-Hayashi et al., 2019). This implies that, no matter the market context, having a female top manager leads to more firm innovation. A comparison of the strength of this relationship with existing literature about larger firms in developed markets is difficult since these firms often look at the percentage of females on the board instead of the binary condition of having a female manager or not (Galia & Zenou, 2012; Galia et al., 2015). Looking at the earlier research conducted on all sizes of firms in developing countries by Ritter-Hayashi et al. (2019), we can see that they found that firms with a female top manager were 2.19% more likely to innovate. This study has found micro-organisations in emerging markets to be 71.3% more likely to innovate when they have a female top manager. Having a female top manager leads to a greater increase in innovation for micro-organisations in emerging markets than for any size organisation in a developing market. Two possible explanations come forward from the literature. The first is concerned with the differences between emerging countries and developing countries. As Na and Shin (2019) argued that emerging markets are usually situated in more conservative countries compared to developed countries, the same can be said for countries with developing markets compared to emerging countries. They argue how risk-aversity in these markets could deter women in these countries from pursuing risky innovations. A second explanation can be sought in the size of the firms included in the research. With the top manager having a relatively large influence in a micro-organisation compared to a larger firm, the female top manager can exert its positive effect on innovation more directly.

6. CONCLUSION

This chapter contains the conclusions of this research. These consist of the most important findings, the theoretical and managerial implications. Finally the limitations of this study will be addressed while also giving suggestions for further research.

6.1 Concluding findings

This research has attempted to provide more insight into the drivers of micro-organisation innovation in emerging markets, because most literature is focussed larger organisations and developed markets. A quantitative analysis was constructed to enhance the literature by answering the following research question: *For emerging market micro-organisations, what is the effect of firm innovation on firm performance and is firm innovation driven by prior industry knowledge, indebtedness and women in top management?*

The relationship between firm innovation and firm performance was not found to be significant, despite a large volume of literature suggesting its existence (Miller, 1983; Lumpkin & Dess, 1996; Lööf & Heshmati, 2006; Rosenbusch et al., 2011). Two of the drivers focussed on the managerial characteristics which could foster innovation, for both of these a positive relationship was found. Although the relationship between prior industry knowledge and firm innovation was only weak. Indebtedness was also found to have a positive relationship with firm innovation, even though a negative relationship was hypothesised.

6.2 Theoretical implications

The results of this study have several theoretical implications. For the relationship between firm innovation and firm performance it could not be proven that the existing theories can be translated to micro-organisations in emerging markets. All three drivers of firm innovation were found to be significant. This extends the current literature by showing these relationships originally found in larger developed market firms are also relevant for emerging market micro-organisations. This allows for a further generalization of these theories.

It also showed how the polarity of the relationship between indebtedness and firm innovation is different than theorized, challenging the current literature and opening opportunities for further research.

6.3 Managerial implications

This study also has some managerial implications. The results of this study might have some valuable insights for managers and policy makers. Since the findings give a deeper insight into the drivers of innovation for emerging market micro-organisations.

Micro-organisations searching for a new manager in order to become more innovative, should prioritise gender over prior industry knowledge in their search. Since having a female manager had a stronger and larger positive effect than prior industry knowledge. While the owners of these micro-organisations should not be scared of taking on loans in order to increase their innovation endeavours.

Policymakers in emerging markets should focus on increasing the amount of women in top management positions (Stefanovic et al., 2014). Since innovation is known to increase economic growth in a country (Pece et al., 2015).

Foreign firms seeking to penetrate an emerging market through the acquisition of an interesting micro-organisation or start-up, could use the findings from this research to select those firms which are most likely to yield innovations in the future.

Lastly investors or financial institutions can make an assessment of a micro-organisation's likelihood to innovate based on the managerial characteristics. This would decrease some of the risk for these institutions when providing a loan to an emerging-market micro-organisation.

6.4 Limitations

Like all studies, there are some limitations to this study which could offer opportunities for future research. The first is related to the sample. 17 emerging countries have been excluded from this research. due to the emerging market nature of rapid change in combination with the innovation part of the survey being different before 2017 (Ramamurti, 2012). This lead to the exclusion of all Asian emerging countries, hampering the generalizability of this study. Secondly this study has only looked at emerging countries as a whole. Differences within countries are not accounted for, possibly resulting in biased results.

Secondly the low R^2 value of the models should considered when interpreting the findings. Since the independent variables included only explained a small amount of the variance in the dependent variables (Hair et al., 2018).

Thirdly, a limitation exists in the way this study was operationalized. All data was collected between 2017 and 2020 with all firms only answering the questions once. This lead to a firm's data stemming from one moment, meaning there was no time-lag. This clouded the results regarding the effect of firm innovation on firm performance, since an innovation needs time to be fruitful and does not instantly increase performance.

Finally this study used indicator [t7] from the World Bank Enterprise Survey to measure firm innovation. However this question has a subjective element to it, by asking about ‘significantly improved’ products or services (World Bank Group, 2017).

6.5 Recommendations

In further research the found results could be further developed, while mending some of the limitations. A new study using a different dataset focussing on all emerging markets, the excluded countries or the differences between micro-organisations within a country, could increase the generalizability of the found relationships. In further research time should play a bigger role. Firstly to study the relationship between firm innovation and firm performance in emerging market micro-organisations after a time-lag, but secondly it could be interesting to see how long after a managerial change the positive effects found in this study can be seen in the innovative output of a micro-organisation. Lastly further research could focus on how the availability of capital through a loan seems to outweigh the hypothesised burden of having a debt in this study.

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8. APPENDICES

Appendix 1. Little's MCAR test

EM Means ^a	
FirmPerformance	AgeLogTransformation
,6044	1,2520

a. Little's MCAR test: Chi-Square = 40,921, DF = 2, Sig. = ,000

Appendix 2. Descriptive statistics before transformation

		Statistics						
		FirmPerformance	FirmInnovation	PriorIndustry Knowledge	Indebtedness	FemaleManager	FirmAge	FirmSector
N	Valid	563	762	748	754	761	754	762
	Missing	199	0	14	8	1	8	0
Mean		,5933	,2231	,7553	,3581	,2615	21,0225	2,03
Median		1,0000	,0000	1,0000	,0000	,0000	18,0000	2,00
Mode		1,00	,00	1,00	,00	,00	12,00	3
Std. Deviation		,49166	,41660	,43017	,47976	,43974	13,08916	,854
Skewness		-,381	1,333	-1,190	,593	1,088	2,492	-,053
Std. Error of Skewness		,103	,089	,089	,089	,089	,089	,089
Kurtosis		-1,862	-,224	-,585	-1,653	-,819	12,222	-1,626
Std. Error of Kurtosis		,206	,177	,179	,178	,177	,178	,177
Minimum		,00	,00	,00	,00	,00	4,00	1
Maximum		1,00	1,00	1,00	1,00	1,00	122,00	3

Appendix 3. Descriptive statistics imputations

Descriptive Statistics									
Imputation Number	N	Minimum	Maximum	Mean	Std. Deviation	Skewness		Kurtosis	
	Statistic			Statistic		Statistic	Std. Error	Statistic	Std. Error
	c	Statistic	Statistic	c	Statistic	c	Error	c	Error

1	FirmPerformance	762	,00	1,00	,5919	,49181	-,375	,089	-1,865	,177
	FirmInnovation	762	,00	1,00	,2231	,41660	1,333	,089	-,224	,177
	ManufacturingDu mmy	762	,00	1,00	,3504	,47741	,628	,089	-1,609	,177
	RetailDummy	762	,00	1,00	,2717	,44510	1,029	,089	-,944	,177
	AgeLogTransform	762	,60	2,09	1,2514	,25044	-,131	,089	,023	,177
	Valid N (listwise)	762								
2	FirmPerformance	762	,00	1,00	,6155	,48680	-,476	,089	-1,778	,177
	FirmInnovation	762	,00	1,00	,2231	,41660	1,333	,089	-,224	,177
	ManufacturingDu mmy	762	,00	1,00	,3504	,47741	,628	,089	-1,609	,177
	RetailDummy	762	,00	1,00	,2717	,44510	1,029	,089	-,944	,177
	AgeLogTransform	762	,60	2,09	1,2520	,25064	-,140	,089	,030	,177
	Valid N (listwise)	762								
3	FirmPerformance	762	,00	1,00	,6089	,48831	-,447	,089	-1,805	,177
	FirmInnovation	762	,00	1,00	,2231	,41660	1,333	,089	-,224	,177
	ManufacturingDu mmy	762	,00	1,00	,3504	,47741	,628	,089	-1,609	,177
	RetailDummy	762	,00	1,00	,2717	,44510	1,029	,089	-,944	,177
	AgeLogTransform	762	,60	2,09	1,2517	,24996	-,130	,089	,034	,177
	Valid N (listwise)	762								
4	FirmPerformance	762	,00	1,00	,6220	,48519	-,504	,089	-1,750	,177
	FirmInnovation	762	,00	1,00	,2231	,41660	1,333	,089	-,224	,177
	ManufacturingDu mmy	762	,00	1,00	,3504	,47741	,628	,089	-1,609	,177
	RetailDummy	762	,00	1,00	,2717	,44510	1,029	,089	-,944	,177
	AgeLogTransform	762	,60	2,09	1,2511	,25114	-,130	,089	,020	,177
	Valid N (listwise)	762								
5	FirmPerformance	762	,00	1,00	,5984	,49054	-,402	,089	-1,843	,177
	FirmInnovation	762	,00	1,00	,2231	,41660	1,333	,089	-,224	,177
	ManufacturingDu mmy	762	,00	1,00	,3504	,47741	,628	,089	-1,609	,177
	RetailDummy	762	,00	1,00	,2717	,44510	1,029	,089	-,944	,177
	AgeLogTransform	762	,60	2,09	1,2518	,24970	-,131	,089	,046	,177
	Valid N (listwise)	762								
6	FirmPerformance	762	,00	1,00	,6063	,48889	-,436	,089	-1,815	,177
	FirmInnovation	762	,00	1,00	,2231	,41660	1,333	,089	-,224	,177
	ManufacturingDu mmy	762	,00	1,00	,3504	,47741	,628	,089	-1,609	,177
	RetailDummy	762	,00	1,00	,2717	,44510	1,029	,089	-,944	,177

	AgeLogTransform	762	,60	2,09	1,2511	,25113	-,116	,089	,017	,177
	Valid N (listwise)	762								
7	FirmPerformance	762	,00	1,00	,6063	,48889	-,436	,089	-1,815	,177
	FirmInnovation	762	,00	1,00	,2231	,41660	1,333	,089	-,224	,177
	ManufacturingDu mmy	762	,00	1,00	,3504	,47741	,628	,089	-1,609	,177
	RetailDummy	762	,00	1,00	,2717	,44510	1,029	,089	-,944	,177
	AgeLogTransform	762	,60	2,09	1,2530	,24993	-,140	,089	,040	,177
	Valid N (listwise)	762								
8	FirmPerformance	762	,00	1,00	,6155	,48680	-,476	,089	-1,778	,177
	FirmInnovation	762	,00	1,00	,2231	,41660	1,333	,089	-,224	,177
	ManufacturingDu mmy	762	,00	1,00	,3504	,47741	,628	,089	-1,609	,177
	RetailDummy	762	,00	1,00	,2717	,44510	1,029	,089	-,944	,177
	AgeLogTransform	762	,60	2,09	1,2522	,25041	-,132	,089	,019	,177
	Valid N (listwise)	762								
9	FirmPerformance	762	,00	1,00	,6142	,48711	-,470	,089	-1,784	,177
	FirmInnovation	762	,00	1,00	,2231	,41660	1,333	,089	-,224	,177
	ManufacturingDu mmy	762	,00	1,00	,3504	,47741	,628	,089	-1,609	,177
	RetailDummy	762	,00	1,00	,2717	,44510	1,029	,089	-,944	,177
	AgeLogTransform	762	,60	2,09	1,2522	,25019	-,125	,089	,041	,177
	Valid N (listwise)	762								
10	FirmPerformance	762	,00	1,00	,6024	,48973	-,419	,089	-1,829	,177
	FirmInnovation	762	,00	1,00	,2231	,41660	1,333	,089	-,224	,177
	ManufacturingDu mmy	762	,00	1,00	,3504	,47741	,628	,089	-1,609	,177
	RetailDummy	762	,00	1,00	,2717	,44510	1,029	,089	-,944	,177
	AgeLogTransform	762	,60	2,09	1,2524	,25029	-,136	,089	,025	,177
	Valid N (listwise)	762								
Pooled	FirmPerformance	762			,6081					
	FirmInnovation	762			,2231					
	ManufacturingDu mmy	762			,3504					
	RetailDummy	762			,2717					
	AgeLogTransform	762			1,2519					
	Valid N (listwise)	762								

Appendix 4. VIF values imputations

Coefficients ^a			Collinearity Statistics	
Imputation Number	Model		Tolerance	VIF
1	1	FirmInnovation	,996	1,004
		ManufacturingDummy	,788	1,270
		RetailDummy	,792	1,263
		AgeLogTransform	,986	1,014
2	1	FirmInnovation	,997	1,003
		ManufacturingDummy	,789	1,268
		RetailDummy	,791	1,265
		AgeLogTransform	,986	1,014
3	1	FirmInnovation	,996	1,004
		ManufacturingDummy	,788	1,269
		RetailDummy	,792	1,263
		AgeLogTransform	,986	1,014
4	1	FirmInnovation	,996	1,004
		ManufacturingDummy	,788	1,270
		RetailDummy	,791	1,265
		AgeLogTransform	,985	1,015
5	1	FirmInnovation	,996	1,004
		ManufacturingDummy	,788	1,269
		RetailDummy	,791	1,264
		AgeLogTransform	,986	1,014
6	1	FirmInnovation	,996	1,004
		ManufacturingDummy	,788	1,268
		RetailDummy	,792	1,263
		AgeLogTransform	,987	1,013
7	1	FirmInnovation	,996	1,004
		ManufacturingDummy	,788	1,269
		RetailDummy	,791	1,264
		AgeLogTransform	,986	1,014
8	1	FirmInnovation	,997	1,004
		ManufacturingDummy	,787	1,270
		RetailDummy	,791	1,265
		AgeLogTransform	,985	1,015
9	1	FirmInnovation	,996	1,004
		ManufacturingDummy	,787	1,270
		RetailDummy	,791	1,264

10	1	AgeLogTransform	,986	1,015
		FirmInnovation	,996	1,004
		ManufacturingDummy	,788	1,269
		RetailDummy	,791	1,265
		AgeLogTransform	,986	1,014

a. Dependent Variable: FirmPerformance

Appendix 5. R² logistic regression 1

Model 1 Summary

Imputation Number	Step	Nagelkerke R Square
Original data	1	,043
1	1	,048
2	1	,044
3	1	,068
4	1	,061
5	1	,048
6	1	,045
7	1	,032
8	1	,040
9	1	,065
10	1	,056
Average	1	,051

Model 2 Summary

Imputation Number	Step	Nagelkerke R Square
Original data	1	,047
1	1	,050
2	1	,046
3	1	,070
4	1	,076
5	1	,051
6	1	,053
7	1	,037
8	1	,041
9	1	,067
10	1	,059
Average	1	,055

Appendix 6. R² Logistic regression 2

Model	Nagelkerke R Square
1	,006
2	,037