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*The differences in the impact of  
management practices on firm  
performance between SMEs and large  
enterprises*

A study of three countries - France, Germany and the United Kingdom

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## **Abstract**

Over the last few years, softer firm values like management have gained importance in academia, research and practice. It has been shown, contrary to what was previously believed, that the quality of management practices has a real impact on the performance of the firm.

In this research paper, we investigate whether better management practices have an effect on firm performance and if the magnitude of this effect differs between small and medium-sized enterprises (SMEs) and large enterprises. Firm performance is defined as sales growth and return on capital employed (ROCE) in this paper. We use panel data collected from the three biggest economies in Europe – Germany, France and the UK, over a time span of 11 years from 1994 to 2004.

The results from performing pooled ordinary least squares suggest that management practices are important for a firm's performance but there is substantial heterogeneity in the magnitude of this effect. When performing a pooled regression without segregating by country, we see that management practices mostly positively impact both sales growth and return on capital employed. This effect is stronger in small and medium enterprises for sales growth when compared to large enterprises, but vice versa for return on capital employed. However, when running analyses on the different countries, we get mixed results.

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## Table of contents

<b>LIST OF TABLES .....</b>	<b>7</b>
<b>LIST OF FIGURES .....</b>	<b>8</b>
<b>1. INTRODUCTION .....</b>	<b>9</b>
1.1 BACKGROUND .....	9
1.2 GOAL.....	10
1.3 RELEVANCE.....	10
1.4 OVERVIEW OF SMES AND LARGE FIRMS IN EUROPE .....	11
1.5 STRUCTURE.....	13
<b>2. THEORIES AND LITERATURE REVIEW .....</b>	<b>14</b>
2.1 MANAGEMENT THEORY .....	14
2.1.1 <i>Management theory by Henri Foyal</i> .....	14
2.2 COMPETITIVE ADVANTAGE THEORIES .....	16
2.2.1 <i>External based: Generic strategies and Porter's five forces</i> .....	16
2.2.3 <i>Internal based: Resource-based theory</i> .....	18
2.3 PREVIOUS LITERATURE.....	19
2.3.1 <i>Interaction between management practices and firm performance</i> .....	19
2.3.2 <i>Competition, publicly listed and firm performance</i> .....	22
2.3.3 <i>Firm size and firm performance</i> .....	22
<b>3. COUNTRY SPECIFICS ABOUT SMES, LARGE FIRMS AND MANAGEMENT PRACTICES</b>	<b>24</b>
3.1 FRANCE.....	24
3.1.1 <i>SMEs and large firms</i> .....	24

---

3.1.2 Management practices.....	25
3.2 GERMANY.....	26
3.2.1 SMEs and large firms.....	26
3.2.2 Management practices.....	27
3.3 UNITED KINGDOM.....	27
3.3.1 SMEs and large firms.....	27
3.3.2 Management practices.....	28
<b>4. DATA.....</b>	<b>29</b>
4.1 DATA DESCRIPTION.....	29
4.1.1 Validity.....	31
4.2 VARIABLES.....	32
4.2.1 Dependent variables.....	32
4.2.2 Independent variables.....	33
4.2.3 Control variables.....	34
4.3 SAMPLE SELECTION.....	36
4.4 HYPOTHESES.....	39
<b>5. DESCRIPTIVE STATISTICS.....</b>	<b>40</b>
5.1 DESCRIPTIVE STATISTICS.....	40
<b>6. REGRESSIONS.....</b>	<b>48</b>
6.1 REGRESSION MODELS.....	48
6.2 REGRESSION RESULTS.....	51
<b>7. DISCUSSION.....</b>	<b>60</b>
7.1 DISCUSSION ABOUT EMPIRICAL FINDINGS.....	60
7.1.1 Average management score.....	60

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7.1.2 <i>Employees with degrees</i> .....	62
7.1.3 <i>Age of firm</i> .....	64
7.1.4 <i>Average wage</i> .....	65
7.1.5 <i>Capital</i> .....	66
7.1.6 <i>Materials cost</i> .....	67
7.1.7 <i>Publicly listed</i> .....	68
7.1.8 <i>Unconsolidated</i> .....	69
7.1.9 <i>Competition</i> .....	70
7.2 LIMITATIONS AND FURTHER RESEARCH .....	72
<b>8. CONCLUSION</b> .....	<b>74</b>
<b>REFERENCES</b> .....	<b>76</b>
<b>APPENDIX A TABLES</b> .....	<b>81</b>

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## List of tables

Table 1: Definition of firm size categories.....	12
Table 2: Summary statistics main sample .....	37
Table 3: Summary statistics for sales growth and average management score, pooled and by country.....	41
Table 4: Summary statistics for ROCE and average management score, pooled and by country.....	42
Table 5: Summary statistics, sales growth .....	43
Table 6: Summary statistics, ROCE.....	44
Table 7: Summary statistics of sales growth w/ low & high average management score .....	45
Table 8: Summary statistics of ROCE w/ low & high average management score.....	46
Table 9: Four different models on Sales growth, pooled .....	51
Table 10: Four different models on ROCE, pooled .....	52
Table 11: Four different models on sales growth, France .....	53
Table 12: Four different models on sales growth, Germany .....	54
Table 13: Four different models on sales growth, UK.....	55
Table 14: Four different models on ROCE, France .....	56
Table 15: Four different models on ROCE, Germany .....	57
Table 16: Four different models on ROCE, UK .....	58
Table A 1: Areas of interest for management interview .....	81
Table A 2: Porter's Five Forces .....	82
Table A 3: Summary statistics by country, France .....	82
Table A 4: Summary statistics by country, Germany .....	83
Table A 5: Summary statistics by country, UK.....	84
Table A 6: Distribution of firms in different size categories for our analysis sample .....	85

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## List of figures

Figure 1: Porter's generic strategies .....	17
Figure 2: ROCE equation .....	33
Figure 3: Classifying firm size within countries .....	38

# 1. Introduction

## 1.1 Background

The goal of this paper is to investigate how the quality of management practices affects performance of firms of different sizes, more specifically small and medium-sized enterprises, hereafter referred to as *SMEs*, and large enterprises. George R. Terry, American professor and one of the earliest authors on the area of management, said that «Management is a distinct process consisting of planning, organizing, actuating and controlling, performed to determine and accomplish stated objectives by the use of human beings and other resources» (1977, p.4). Managers occupy important positions within firms. They are responsible for hard tasks, such as managing daily operations but also soft tasks like motivating employees, liaising with staff and setting goals for both the company and their personal development. Managerial ability has a significant impact on employee performance, which directly affects firm performance (Zahari and Zakuan, 2016).

There are different sizes of firms when measuring the number of employees within industries, and each size typically exhibits a set of characteristics. For example, large firms more often enjoy economies of scale (University of Minnesota, n.d), but exhibit a high degree of inertia. However, SMEs enjoy more flexibility regarding their output to meet a fluctuating consumer demand, which is seen as a competitive advantage in volatile and capital-intensive industries but they do not experience as many economies of scale as large firms do (Fiegenbaum and Karnani, 1991). We find it interesting to study the effects of management quality on the performance of SMEs and large firms, given their individual differences when compared to each other. The performance of interest, in this paper, is return on capital employed, hereafter referred to as *ROCE*, and sales growth. We conduct this study for the UK, France and Germany because these are the biggest economies in Europe, when only measuring nominal GDP as of 2017, and are among the countries in Europe with the most number of SMEs (OECD, 2018).

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To access relevant data, we looked through the management datasets available on the web section of Nick Bloom, professor of Economics at Stanford University and prominent researcher, on the website of Stanford University. We picked one that fit our specifications, in terms of combining financial information on different firm sizes and stating respective management scores. This dataset was compiled by Nick Bloom and John Van Reenen, professor of Economics at Massachusetts Institute of Technology. The data was found by the authors of this study, without help from their advisor.

## 1.2 Goal

In this empirical paper, we investigate how management practices affect ROCE and sales growth in firms, and if there is a difference in the magnitude of this impact between SMEs and large enterprises. We will establish our findings by looking at firms in our data sample altogether as well as separately from three different countries, specifically France, Germany and the UK. Hence our stated research question for this paper is – *The differences in the impact of management practices on firm performance between SMEs and large enterprises. A study of three countries - France, Germany and the UK.*

To answer this question, we segregate firms by employee numbers, to distinguish between small- and medium enterprises and large enterprises, and by country. We also run a pooled regression without segregating by country, with a number of control variables, to look at an overall trend of the effect that management practices have on firm performance and if this effect varies with size when combining all countries together.

## 1.3 Relevance

This research paper contributes to the growing literature about the importance of quality of management practices. We specifically look at their effect on sales growth and ROCE, and tests to see if there is a difference in the magnitude of this effect between SMEs and large enterprises. A well-known research paper done by Bloom and Van Reenen (2007) proves the

strong relationship between management practices and different measures of firm performance. However, this paper does not make a distinction between management effects on firm performance for different firm sizes.

While there have been studies analysing the effects of management practices on performance of SMEs such as the paper by Franz et al. 'SMEs: The effects of strategic management', and Forth and Bryson's 'The Impact of Management Practices on SME Performance', there is not much research comparing the differences in the impact such practices have on SMEs and large enterprises. A limitation of the past to conduct such research was that management quality was thought to be captured in the residual terms in economic studies and was not easily quantifiable. This is something that has changed over the last decade, for example in the study done by Nick Bloom and John Van Reenen 'Measuring and Explaining Management Practices Across Firms and Countries'.

## 1.4 Overview of SMEs and large firms in Europe

In March 2000, the Lisbon Strategy was created by the European Council. One of its goals was for the European Union to become the most competitive economy in the world by 2010. Between 2002 and 2008 the number of overall SMEs rose by 13%, that equalled 2.4 million new firms. Meanwhile, large firms expanded only by 5%, that equalled 200 new companies. Even though SMEs accounted for a higher employment rate than large enterprises in France, Germany and the UK, they were still behind in terms of labour productivity. However, this productivity gap is being addressed by the implementation of lean manufacturing methods and better processing technology that help SMEs stay competitive. This indicates that it is not always necessary to have economies of scale to achieve cost effective production. Due to the recession of 2008, SME employment fell by 3 million jobs between 2009 and 2010 in the European Union. With many firms declaring bankruptcy, opportunities for SMEs to utilize market openings were greater. This is so because it is perceived that SMEs have a significant competitive advantage when it comes to making necessary, organisational changes to be able to adapt to new environments. Given a difference in size, smaller the firm, higher the responsiveness to change and the speed with which it acts (Bartlett, 2011).

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We use the European Union's definition for small and medium-sized enterprises (see Table 1). Employee numbers should be greater than or equal to 10 but less than 250 for SMEs, while employee numbers over and including 250 indicate large enterprises. Standardising the firm size definition makes it easier to do a cross-country comparison for this study. (European Commission, 2003). The European Union also categorizes firms into micro, small and medium by turnover<sup>1</sup> or balance sheet total. Below is a summary of the relevant indicators and we have highlighted small and medium-sized firms, since those are the firm sizes of interest to us.

*Table 1: Definition of firm size categories*

Definition of firm size categories			
<b>Firm size</b>	<b>Staff headcount</b>	<b>Turnover</b>	<b>Balance sheet total</b>
Medium	< 250	≤ € 50 m	≤ € 43 m
Small	< 50	≤ € 10 m	≤ € 10 m
Micro	< 10	≤ € 2 m	≤ € 2 m

The operations of large enterprises in Europe have a positive spillover effect on the economy and SMEs in a number of ways. The existence of large enterprises ensures knowledge transfer to other enterprises including SMEs. For large enterprises that have foreign divisions, there is a transfer of technology and capabilities across divisions that remains in the local economy and the Eurozone in the form of skilled workforce, equipment and expertise. All these assets, tangible and intangible, are then dispersed across other firms and SMEs. Large enterprises are also considered imperative for sustained job creation in the economy, and the capability of SMEs to create new jobs is closely tied in with the performance of large firms (Novotny and Jaburkova, 2012).

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<sup>1</sup> The yearly income from sales of products and services from the firms ordinary activities, after deducting any rebates. It is calculated without value added tax or other indirect taxes.

## 1.5 Structure

Our research paper is structured as follows; In Section 2 we list management and economic theories, followed by a summary of existing literature on management, competition, being publicly listed, firm size and performance. In Section 3 we present information about SMEs, large firms and management practices in France, Germany and the UK. Section 4 describes the data we use in the form of validity, sample selection, variables and hypotheses. Section 5 discusses our empirical methodology. In Section 6 we run regressions followed by Section 7 where we discuss our findings, the limitations of this empirical study and scope for further research. Finally, in Section 8 we conclude the paper.

## 2. Theories and Literature Review

In this chapter we look at widely used management and economic theories along with existing literature studying the effect of management practices on different aspects of firm performance. We also look at previous literature that studies firm size, competition and publicly listed firms and their relationship with firm performance.

### 2.1 Management theory

In our research, we are interested in the relationship between management practices and their effect on firm performance for SMEs and large firms. To develop our hypotheses, we look at existing theory and literature about management and its relationship with firm performance. This helps us choose accurate variables and consequently make a sound contribution to management literature.

#### 2.1.1 Management theory by Henri Foyal

Henri Foyal, a French miner and business theorist, is one of the earliest recognized authorities on management. His theory of management known as Fayolism is widely used to date to understand different aspects of management. Fayolism covers 14 principles that managers must follow to manage their staff prolifically. These principles are the following

1. **Division of work** indicates the use of specialized knowledge by employees that helps them perform better and thereby increases overall output. It also helps distribute the work and develop familiarity between co-workers.

2. **Discipline** indicates the level of discipline maintained in an organization. It is believed to be the responsibility of managers to implement a certain degree of discipline and use appropriate methods in doing so.
3. **Authority and responsibility** go hand in hand. While those in position of power have the authority to delegate work and give orders, they also have increased responsibility towards the organization and other employees.
4. **Subordination of individual interest to general interest** implies that organizational and employee welfare interests come before anything else. An individual employee's interest, including top managers, cannot supersede that of his/her organization or group.
5. **Unity of command** indicates that teams or employees should have a direct supervisor. This closely ties into unity of direction, thereby implying consistency in chain of command and avoidance of conflict.
6. **Unity of direction** indicates that a team of employees working on the same task or same project must have a shared vision and direction, and be under the supervision of a single manager, thereby ensuring smooth implementation of tasks at hand.
7. **Remuneration** refers to fair levels of pay and non-financial incentives. These should be in tandem with the tasks performed and responsibility upheld by the employee.
8. **Centralization** refers to how much say employees have in a decision making process.
9. **Scalar chain** indicates a clear hierarchy or chain of command in an organization. An employee knows exactly where he/she stands in this chain.
10. **Order** refers to the physical layout of the workplace, that should be conducive to productivity.
11. **Equity** refers to impartiality on part of managers, when leading and supervising a team.
12. **Stability of tenure personnel** implies minimizing attrition rate in the organization and of employees managed.
13. **Initiative** implies that employees should enjoy a certain degree of autonomy in terms of the tasks performed and how they are executed.
14. **Esprit de corps** emphasise the importance of team spirit and unification.

From these 14 principles, Fayol concluded that there are essentially five different factors at play when it comes to effective management and these are

1. **Planning** that refers to how every part of the manufacturing process should be scheduled and planned beforehand by top management for effective execution.
2. **Organising** that refers to the availability of the appropriate resources being available well in time.
3. **Commanding** that refers to the direction given by top management to executing personnel.
4. **Coordinating** that refers to smoothing functioning and a cohesive work environment.
5. **Controlling** that refers to effective procedural control of work processes, where management ensures that the setout rules and procedures are followed properly (Fayol, 1949).

In this paper, we see a number of these principles and factors at play when categorising better and worse management practices. An average management score is compiled by Nick Bloom and John Van Reenen, prominent economists and researchers, that uses an interconnection of the above mentioned points to assign a score to a firm. This score is further used to test certain hypotheses in our study.

## 2.2 Competitive advantage theories

### 2.2.1 External based: Generic strategies and Porter's five forces

For firms to create profits and succeed in a competitive environment they must have a competitive advantage (Dess and Davis, 1984, 467-469). Michael Porter is one of the most famous researchers within competitive advantage theory. From the Generic Strategies (see figure 1) he says that firms could position themselves within an industry where their resources could best create a competitive advantage. They would then experience profitability in the long run, having profits higher than the average in the industry. One strategy is cost leadership, implemented by reducing the producer's costs in the value chain. With lower costs and competitive prices, producers are able to accumulate profits and stay in business if micro- or macroeconomic shocks appear. Cost leadership usually arises when firms experience

economies of scale, an attribute more common among large firms (University of Minnesota, n.d).

*Figure 1: Porter's generic strategies*

<b>Michael Porter's Generic Strategies</b>		
<u>Broad Target</u>	<b>Cost leadership:</b> Increasing your market share by targeting customers in that segment, that care about costs and price.	<b>Differentiation:</b> When offering a higher value than its rivals. They have unique products for different segments and are able to charge a premium. By diversifying, they are reducing the risk of markets having varied sales and revenues can still be achieved because some markets will grow while others decline (University of Cambridge, n.d.).
<u>Narrow Target</u>	When firms are focusing on a specific segment of the market they have a Narrow Target. Customers have an established relationship with the firm and understand and appreciate the product. The risk is that this niche segment will be at a mature stage and not grow, or that the business cycle will be very short due to the products being a trend and interest disappears quickly (The Economic Times, n.d.).	

The five forces<sup>2</sup> is a theory about creating competitive advantage. Michael Porter identified five competitive forces that determine profitability in the industry. These forces are factors that affect costs, prices and the necessary investment made by firms in the industry. «Awareness of the five forces can help a company understand the structure of its industry and stake out a position that is more profitable and less vulnerable to attack.» (Porter, 2011, p.25). Profitability in the industry comes from the industry structure and not the characteristics of the products that are being sold. This theory emphasizes that it is on the industry level that profits are to be created and not on the firm level. Even when firms are considered homogenous in terms of their resources and capabilities, they can still achieve competitive advantages but only if the firms are able to utilize these competitive forces better than their rivals, will they be more profitable. Porter's framework is about a firm's position relative to other firms in competitive environments that will be the base for creating a strategy to utilize one's own resources to maximize the firm's performance (Porter, 1979, p.137-145).

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<sup>2</sup> For a detailed explanation, see Appendix A, Table A2.

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### 2.2.3 Internal based: Resource-based theory

Another theory that is widely used when explaining firm performance and profitability in competitive environments is the resource-based theory. The resource-based theory, in contrast to Porter's, focuses inward and starts by looking at what resources a firm possesses. From that, the firm creates a strategy to utilize its resources and create such value that it can stay competitive.

Robert Grant identifies a firm's resources and capabilities to be the starting point for creating strategies to achieve competitive advantages. This differs from what Porter suggests, deriving the strategies depending on the industry structure. For competitive advantage, coming from the resource, to be sustainable and generate future value depends on four factors. *Durability* is the rate at which resources depreciate or get out-dated. For a firm to sustain its competitive advantage, competitors must not be able to get insight into what actually makes up the competitive advantage, which refers to the *transparency* of the firm. *Transferability*, refers to the ease with which competitors can obtain relevant resources. *Replicability* refers to the ease with which competitors develop resources if it is difficult to obtain them outside their own firm. It is important to maintain one's competitive advantage to make it sustainable, since only having a competitive advantage is not enough. The firm must also be able to seize the rents resulting from its activity (Grant, 1991, p.114-135). This implies that employees in decision making positions such as managers, who have superior methods and strategies when assessing these four factors, should then create a sustainable competitive advantage and exhibit better firm performance compared to their competitors. However, from our knowledge Grant does not mention firm size as being a factor for competitive advantage, so this theory is interesting to use when analysing our results since it applies to both SMEs and large firms. We can then see if our results are consistent with theory or if there is a difference in firm performance between SMEs and large firms.

Edith Penrose's contribution, from when she studied the causes of growth for a firm and what factors impede growth, is «...widely acknowledged to have played a central role in providing the intellectual foundations of the resource-based view» (Lockett and Thompson, 2003,

p.193). Penrose identified physical resources and human resources as being the foundation of what makes up a firm. Hence, the size of a firm will be determined by these two. Therefore, not only do the number of employees, but also the amount of physical resources that a firm possesses, that determine size (Lockett and Thompson, 2003, p.193-203).

It is not the resources that are considered as inputs, but the services that the resources can provide. The services are a result of how the resources are managed, which is derived from the knowledge that the manager has. This implies that each firm's performance and ability to grow is an indirect result of a firm's resources, their managers. The ability to grow is therefore reliant on the manager's competence and knowledge, and not directly the environment. The environment is «...an "image" in the entrepreneur's mind of the possibilities and restrictions with which he is confronted» (Penrose, 1959, p.5). The entrepreneur here is both an entrepreneurial manager and an individual. The manager's capability to take advantage of, and act on opportunities and threats better than other firms, will affect the rate of growth. Hence, the limit for expansion is determined by what resources a firm has, and this is why small firms are able to grow in competitive environments. Large firms will be constrained by the necessary investments to stay competitive and mainly focus on opportunities they find most profitable, which will leave market shares to those smaller firms who have the ability to obtain the new openings in the market. So, it is a firm's capability of using resources better, that helps it achieve economies of scale, and not by monopolistic reasons. (Penrose, 1959, p.23-33, p.223-227). Penrose theory will be good to use when interpreting our findings and results, to see whether managers do have the ability to affect a firm's performance and also if small firms will experience sales growth or increased ROCE, when having good managers and if that is different from large firms.

## 2.3 Previous literature

### **2.3.1 Interaction between management practices and firm performance**

Most economic and financial research so far has focused on factor or product markets, assets both tangible and intangible, investments, capital structure and such, to explain firm performance. However, over the last decade many researchers and economists have developed

a keen interest in studying and understanding the kind of effect that management quality or managerial ability has on firm performance. It has been seen that corporate governance structures have a strong correlation with the return on stocks and operating performance of firms since stronger shareholder rights are associated with increased sales, higher profits, a better firm value, and lower capital expenditures and corporate acquisitions (Gompers, Ishii and Metrick, 2003). While management practices are fairly difficult to quantify since there is no universal definition of good and bad management, researchers have been successful in measuring such practices. Some have adopted an index method that constitutes aggregating measures such as management team size, share of managers with degrees or MBA's, prior work experience etc (Chemmanur et al. 2014), while some use a survey instrument to measure management practices (Bloom and Van Reenen, 2017). Measures to establish credible quality of management include team size, prior work experience, MBA, employment connections etc. It has been seen that firms with higher quality of top management have positive future stock market returns, a better market valuation and higher operating performance. These findings are justified by the fact that managers characterized by favourable capabilities when compared to their counterparts are reasoned to make better and more informed investment decisions, they select projects with a high net present value and are able to implement them in a more competent manner. They also make investment decisions quicker (Chemmanur et al. 2014).

Bloom, Eifert, Mahajan, McKenzie and Roberts (2012) ran an experiment in the Indian textile industry with large multi-plant textile firms where they randomly assigned plants to control groups and treatment groups. Over the next few months, the treatment group received extensive training to improve on 38 areas of management practices, along with support for implementation. This led to an improvement in quality, inventory and output; productivity increased by 17% and their profitability increased by USD 300,000. Firms that had better management quality then grew much faster than their counterparts, delegated responsibility more efficiently, opened more production plants and spread 'good' management practices from their treatment plants to all their other plants, showing a recognition of the effects of good management practices and the associated benefits.

There are two distinct viewpoints when looking at management. One states that management can be classified as an input variable that firms can control. Improving management practices has a cost, and for firms to take a decision to incur these costs must have a trade off in the form of future benefits. Firms that have worse management practices choose to have them after calculating an optimal level in terms of costs and benefits. The second view states that differences in management quality indicate differences in efficiency. Both these models affect the interaction between management and product market competition. Under the optimal model, an increase in competition should lead to an increase in incentives to improve management quality. However, there can be mixed consequences of this – on the one hand with increased competition there should be an increase in incentives to improve management quality to reduce per unit costs, thereby increasing a firm's market share. On the other hand, rents are significantly lower when competition is high so an increase in market share does not reflect a proportional increase in profits. Under the efficiency model, the simple principle of Darwinian selection kicks in where only the fittest firms survive. Hence, those firms with the lowest levels of efficiency will be driven out of the market and their market share will be captured by other more efficient firms. This is so because firms are initially established with their own cultures and values. They only find out how well they will perform once they enter an imperfectly competitive market and compete with other firms. Consequently, they realise how suitable and well fitted their quality of management is in the said market and then take a decision of whether to continue operating or drop out of the market (Jovanovic, 1982). A result of these two models indicates that tougher product market competition increases the incentives of a firm to invest in improving its management quality implying better management overall. This relationship is evident in the efficiency model, not so much in the optimal model but still showing a positive relationship between competition and management quality. However, we still see a tail of badly managed firms even with increased competition, that are not driven out of the market (Bloom and Van Reenen, 2017, p.1351-1408).

Overall the Bloom and Van Reenen (2004) study indicates that a firm's management quality is positively associated to its productivity, profitability, Tobins Q, and survival rate. In this paper, the researchers used a survey mechanism to classify, measure and score good and bad management practices. The evaluation tool used in the survey was constructed by an international management consultancy and scored management practices between one (worst)

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and five (best), and focused on 18 frequently used practices in organisations across areas of operations, monitoring, targets and incentives (see Appendix A, Table A1). However, the paper does not focus on the firm size.

### **2.3.2 Competition, publicly listed and firm performance**

Bloom, Sadun and Van Reenen (2017, p. 2-12) find evidence for a positive relationship between competition and firm size. With greater competition, the covariance between firm size, here measured as employment, and management increases, since firms that are better managed will gain market shares and require more inputs.

There are different types of ownership structures, which might also affect the performance of a firm. Publicly listed firms are required to share more information, which is costly, and it might affect their market value since potential investors will evaluate the information and data that will be in their interest. This could increase or decrease demand and attractiveness of the firm depending on the information that is being shared. Changes in sales might not always be a consequence of decreased demand, instead the reason can be that the firm lacks capital. Firms that rely more on external funding could experience shortage of capital during crisis or recession (Wu, 2012, p.3-9). When doing our analysis, we can see whether firms that are publicly listed differ, compared to those that are not, in terms of their sales growth and ROCE.

### **2.3.3 Firm size and firm performance**

Another attribute of firms that might have an impact on firm performance, that has been the topic of discussion in several research papers, is their size. Larger firms more often experience economies of scale than smaller firms. Economies of scale can be achieved by different reasons; *financial reason*, where the firm can negotiate better interest rates and get discounts since they are able to buy larger quantities. *Organizational reason*, where larger firms can divide into units to have specialized areas and an efficient division of labour. Economies of

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scale can occur due to *technical reasons*, when the firm's fixed costs are spread out over a great number of units (Pervan and Visic, 2012, 213-222).

Višić and Pervan (2012) find that size, here measured as the natural logarithm of a firm's assets, will have a positive effect on profitability. They use a fixed-effect model so that differences in behaviour between firms over time will get picked up by the intercept. The data Višić and Pervan had, was on enterprises ranging from medium to large sized. In our study we include small enterprises, and our results might be different from theirs.

To continue on the discussion if it is factors on industry-level that affect profits or if it is an individual firm's resources and their manager's ability to exploit them, that affect the outcome the most, Schmalensee finds arguments supporting the external based theory. He performed an analysis based on panel data, observations made over time for the same firms, where he then observed heterogeneity among firms, by capturing individual effects. By using dummy variables, he was able to capture those unobserved firm-level or industry-level effects that are constant over time. He concluded that effects that were industry-specific played a larger role when contributing to firm performance than firm-specific effects. (Schmalensee, R. 1985, 341-351). Amato and Amato also did a panel data study and found that the relationship between firm size and profitability differed in the retail industry when compared to the manufacturing industry. They looked at the return on assets gross of advertising<sup>3</sup> as a measure of profitability. They found that higher profits are linked to having lower inventory to sales ratios. This reflects how efficient the firm is at inventory management (Amato and Amato, 2004, p.181-193).

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<sup>3</sup> Measured as the sum of net income, advertising expenditure and interest paid and then dividing by total assets.

### **3. Country specifics about SMEs, large firms and management practices**

To make more accurate interpretations and analyses later, it is important to have a better understanding about each country and its typical management traits, as well as of the landscape of its SMEs and large firms and their contribution to the economy.

#### **3.1 France**

##### **3.1.1 SMEs and large firms**

In 2016, one in three companies in France were a small- and medium- sized enterprise (SME). While French micro enterprises and SMEs have suffered over the last few years, the macroeconomic landscape is now more conducive to growth. Innovation in industry still remains shaky, however a majority of it comes from intermediate sized companies. Further, SMEs represent almost 50% of both employment and value added, while the rest of represented by micro and large firms. SME productivity, defined as value added per person, is EUR 51300. SMEs are fairly active in the domestic market which has faced stagnating growth, however exports remain an important component of SME growth. Over 100,000 of such firms sell their goods and services outside the French market (European Commission, 2018). Large firms, on the other hand, represent approximately 7 percent of firms that operate outside the domestic market (Berthou, A., and Hugot, J.).

SMEs are leaner in structure and more flexible than large firms, adapting quickly to a change in the markets, new innovations and enhanced technology. They represent over 99% of the registered firms, totalling over 300000 in number with large enterprises representing less than 1% in number. Over the last few years there has been a slow down in the economy which has hit SMEs hard. SMEs have reported a drop in profitability, however access to credit has not

been as difficult as anticipated. There's been commendable innovation behaviour but French firms remain much behind their European counterparts (Abel-Koch, J. et al. 2015, p.19-35).

### **3.1.2 Management practices**

Over the years, many successes of French firms are attributed to a uniquely adjusted management style. French managers are not just trained on the job, if at all, but are taught about effective management and granted skills during the course of their studies. Management is believed to be a certain mindset rather than a set of techniques to oversee, lead and motivate one's employees. Managers do not climb an organizational ladder or follow a hierarchical order to reach a managerial position, rather they are catapulted into one depending on the studies that they have pursued. Most senior managers are Grand École graduates, which is a rigorous study programme at some of the best universities in France. Most corporates prefer to hire Grand École graduates because it is believed that the university seal guarantees superior intellect, and quality technical and managerial capabilities. Hence these graduates are expected to bring with them the competences and skills that will ensure them a managerial position, rather than learn these on the job and through experience. Management in France is believed to be a result of intellect, and consequently practices are more a product of detailed analysis, rationality and complex problem solving, rather than softer skills related to communication, team building and employee engagement. Some believe that management can be viewed as a separate profession from other titles, having its own rules that one must comply with. Quantitative thought, belief in numbers, and strategy formulation are considered top skills (Barsoux, J, and Löscher P, 2015).

French firms display a significant degree of hierarchy, central authority and are not proponents of autonomy. Decision making is mostly hierarchal, with senior management having concentrated power. This trickles down the organisational human chain in the form of tasks to be performed and direct orders where one does not question his/her seniors or methods followed by them. There's a high regard and respect for authority. Structure and planning is applauded and there is not much room for being spontaneous. French management style is highly individualistic with employees looking out only for themselves and not for others. Loyalty within peers is low but loyalty to the company remains high. Those who are non

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Grand École attempt to stay loyal to one organisation for a long period to be able to climb the ranks, but are mostly at a significant disadvantage when compared to Grand École graduates (Hofstede-insights.com, 2018).

## 3.2 Germany

### 3.2.1 SMEs and large firms

SMEs makes up around 99% of all firms, here including micro-sized<sup>4</sup> firms, while the remaining are large firms. SMEs generate roughly 35% of the total sales each year compared to large firms. Around 40% of people in jobs that required social insurance contribution were employed by large firms (Federal Ministry for Economic Affairs and Energy, n.d.).

SMEs have been given the term *Mittelstand* - these firms are usually private, family run and have few products or services. Larger firms however can also be included in the term *Mittelstand*. This is so because *Mittelstand* stands for firms sharing a spirit of caring for their employees and their job security, and where decisions are made by the owners. SMEs are usually stable during crises since they typically have a long-term focus with their investments as they emphasize the importance of building up capital so it can act as a buffer (Cologne Institute for Economic Research, n.d.). Some think that *Mittelstand* will be the solution for economic issues that a lot of countries face. Some are worried about the economic impact of having larger shares of economic activity in fewer, but bigger companies. The German *Mittelstand* firms are said to be one reason for the lower youth unemployment<sup>5</sup> (Federal Ministry for Economic Affairs and Energy, n.d.). As of 2017, 6.8% of the youth under age 25 in Germany were unemployed compared to 12.1% and 22.3% in the UK and France respectively (OECD, 2018).

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<sup>4</sup> Micro-sized firms are firms with staff headcount < 10, turnover  $\leq$  € 2 m and a balance sheet total of  $\leq$  € 2 m.

<sup>5</sup> Youth unemployment rate is the number of unemployed 15-24 year-olds, measured in percentage of the youth labour force. (OECD, 2018)

### 3.2.2 Management practices

The importance of management practices lies within improving product quality, reliability and lowering the cost. Managers are not that concerned about the details in the accounting information. However, they are highly aware of product factor costs and emphasize after-sales marketing more than pre-sales. German industry's main competitive strength is to compete on quality rather than price. Having a narrowed product range, mentioned as being one of the attributes for the SMEs in Germany, for companies in the machinery-manufacturing sector showed evidence of being more successful. Managers focused on R&D for one product, which was produced at a production site intended only for this one. This focus shapes firms into being more decentralised, and gives authority to local managers and makes them into specialists instead of generalists. This helps new products be launched at a faster pace (Warner M and Campbell A, 1993, p.89-108).

## 3.3 United Kingdom

### 3.3.1 SMEs and large firms

The proportion of small and medium sized firms in the private sector in the UK compared to large sized firms is big. They make up about 99% of all the businesses in every main industry sector. They provide 60% of all employment in the private sector compared to large firms. The number of SMEs has grown by 59% since 2000. However, the growth is mainly due to non-employing businesses. The share of businesses in the manufacturing industry for SMEs was nearly 5% and accounted for almost 10% of total employment size compared to large firms (Department for Business, Energy & Industrial Strategy, 2017). By looking at how much value each occupied person adds, *the Observatory of European SMEs* created an index, where SMEs scored 69. If we were to compare that with the entire economy of the UK, which scores 100, the labor productivity within SMEs is quite low. Improvements in the SME sector would contribute significantly to the UK economy, considering that SMEs make up a big share of total employment. *The Observatory of European SMEs* also found that SMEs have a positive external effect in the form of knowledge spillover. SMEs indirectly contribute to economic

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growth in the UK since knowledge spillover is said to be a vital instrument for endogenous growth (Steffen, 2005, p.1-6).

### **3.3.2 Management practices**

Of the employees in the UK, 34% see their manager as a role model. Those managers who are viewed as a role model, will to a larger extent, consult their employees during decision making and developing ideas and plans. They will also share information more (Ipsos MORI, 2005). British managers are perceived to have a casual leadership style. «...are diplomatic, casual, helpful, willing to compromise, and seeking to be fair, though they can be ruthless when necessary. Unfortunately, their adherence to tradition can result in a failure to comprehend differing values in others» (Lubin, 2014). Since it is derived from culture and therefore is deeply rooted, the management style will not change anytime soon. Culture, norms, values and beliefs will not change overnight from changes in the political- and economic environment (Lubin, 2014). According to Armstrong (2017), a doctor at Hult International Business School, disengagement among employees will negatively affect the entire UK economy with up to £26 billion each year.

In a study (Engage for Success, 2013) where the Ashridge Business School interviewed CEOs, they found that CEOs believe in leaders who show engagement, since that creates an organizational environment that makes employees perform their best. From the interviews they found three reasons for why leaders did not focus on engagement with employees;

1. Leaders lacked important capabilities that impeded engagement
2. Leaders were aware of potential barriers to engagement but leader pride resulted in ignoring it and not changing his/her behaviour. They did not want to show themselves as vulnerable and some acted in self-interest.
3. The culture and system is seen as directly opposed to engagement, like the focus on short-term results and hierarchy within organisations with outdated leadership styles.

## 4. Data

In this section of the study we look into our data set in terms of how it is compiled, its validity and how we will use it for the analysis of the research question of this study. Along with that we describe our variables of interest, defining and segregating the dependent, independent and controls. Subsequently, we select our sample and define our hypotheses.

### 4.1 Data description

The goal of this research paper is to establish if there are any differences in the kind of effects management practices have on sales growth and ROCE for SMEs and large enterprises. To analyse these differences it is important to have a diverse and comprehensive dataset that contains details on management practices of a firm as well as financial information for the relevant years. The sampling frame for this empirical paper is obtained from a management dataset that merges two separate datasets. These datasets are important and bring together information on variables imperative for the study of this paper.

The first dataset is Amadeus, that is a dataset used for collating financial and business related information. Amadeus is published by Moody's Analytics, and it contains financial, accounting and business related data for 522,000 of the largest companies (by assets) in Europe, both public and private firms. The database includes standardised annual accounts (consolidated and unconsolidated), financial ratios, sectoral activities and ownership data, from 43 countries. Relevant information for firms in the UK, Germany and France is collected from here.

The second is a dataset measuring and quantifying management practices compiled by Nick Bloom, a professor of Economics at Stanford University, and John Van Reenen who previously was a professor of Economics at the London School of Economics and Political Science and is now at the Massachusetts Institute of Technology. This dataset is used to score

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management practices. The researchers used a survey mechanism to interview plant managers. This survey was developed with the help of Bundesbank and HM Treasury. To collate this data set, a total of 732 firms were interviewed across the US, UK, France and Germany. The firms interviewed are representative of the manufacturing sector, with employee numbers ranging from 10 to 10,000.

Classifying management practices as ‘good’ or ‘bad’ is fairly subjective and is contingent on a firm’s environment, both internal and external. The survey, used to compile this dataset, is based on a practice evaluation tool developed by management consultants. The actual survey mimics the exact practices investigated, the scoring as well as the order of questions in the practice evaluation tool. The scoring ranges from one, that implies the worst practices, to five which implies the best ones. The questions span across four areas of interest – operations, monitoring, targets and incentives and for each question three anonymous responses are collected (see Appendix A, Table A1). There were three main hurdles encountered when the Bloom and Van Reenen data was being collected. However, requisite steps were taken to mitigate these problems to ensure as accurate and unbiased a collection as possible. The first issue with collecting the data was how these management practices were scored. There is significant dissent in what actually constitutes good or bad management. To address this, the external validity of the variables was examined to check whether the measures of management practices were correlated with data on firm performance collected from external sources like the stock market. A check for Anglo Saxon bias was performed by comparing the correlation between management practices and productivity, between continental Europe, UK and the US. The second issue with collecting the data was making sure that the responses recorded were as accurate as possible. To ensure that unbiased responses were collected, the interviewee was not told that his/her responses would be scored, thereby minimising the problem of receiving answers that were perceived as ‘correct’ by the respondent, rather than their actual response. However, the interviewer was ranking these responses according to the scoring grid. The interviewee was also asked fairly open ended questions rather than very specific ones. Conversely, to address interviewer bias, interviewees were not given additional information on the company like financials or performance related data in advance, so they did not know the firm. Further, each interviewer typically conducted 50 interviews, hence holding constant

the interviewer fixed effects. Finally, one of the biggest troubles with collecting the data was being able to obtain interviews with managers. The first step taken to address this was to not discuss any financial or performance positions of the firm, thereby making managers comfortable to participate as well as eliminating interviewer bias. Second, the questions were ordered in such a way that they would start from the least controversial and then build up to the most controversial one. Thirdly, multiple managers per firm were contacted. And lastly, a written endorsement note from major institutions in various countries were presented to interviewees, for example from the Banque de France, reiterating the seriousness of the study. An overall response rate of 54% from those contacted, was recorded. By putting in place the above list of measures, the three key issues associated with collecting the requisite data were eliminated.

We use the management dataset compiled by Nick Bloom and John Van Reenen, one that combines financial information on different firm sizes along with their management scores, as our final dataset for analysis. We believe that the Bloom and Van Reenen dataset is an ideal one for our empirical study. This is so for a number of reasons. Firstly, it is difficult to find a dataset that fits the specifications of this study, wherein one can find firm performance related data, both financial and operational as well as a score of management practices for the respective firms, in one place. This allows us to quantitatively analyse the relationship between management practices and different aspects of firm performance. We are interested in analysing some of the world's biggest economies and chose France and Germany from Continental Europe, and the UK for our study. This dataset provides us with relevant information on firms in the three economies.

#### **4.1.1 Validity**

The Amadeus database is a well known and widely used database across the world by banks, financial institutions, corporates and in research. Amadeus is published by Moody's Analytics, established in 2007, that provides quantitative analyses. Moody's Analytics is a subsidiary of Moody's Corporation, established 1909, that has been providing financial services for over 100 years. Moody's data and published work is used extensively by banks, financial institutions, governments and financial analysts, making it widely accepted and implicitly

reliable. The data compiled on management practices was done by two well known researchers Nick Bloom and John Van Reenen, who authored the paper 'Measuring and Explaining Management Practices Across Firms and Countries'. The mentioned researchers know the fitting methodology and standardised practices of research and data collection, ensuring minimum error. Additionally, the surveys were conducted by graduate students, specifically trained to do so, from the London School of Economics and Political Science. The survey and collection was endorsed by Bundesbank in Germany, the Treasury in the UK and the Banque of France, reflecting legitimacy of the study. This dataset is of high quality and suitable to perform research for this study.

## 4.2 Variables

In this section we will define all our variables. The firm level data for sales, employment and capital is based on information from proxy statements and firm accounts from the Amadeus database.

### 4.2.1 Dependent variables

#### *Growth of Sales*

The accounting data for sales for each firm in France, Germany and the UK comes from the Amadeus database and was collected at the end of the fiscal year. We look at sales in the form of growth, that makes it more comparable instead of having raw numbers since SMEs might have smaller numbers for sales than larger firms. The variable is measured in percentage.

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## ***ROCE – Return on Capital Employed***

*Figure 2: ROCE equation*

$$\text{Return on capital employed} = \frac{\text{EBIT}}{\text{Capital employed}}$$

Return on capital employed (ROCE) is calculated by dividing earnings before interest and taxes (EBIT) with the invested capital that has been used to acquire profits. The variable here is measured in percentage. We chose this measure of firm performance because we think it will reflect how well firm management managed to utilize capital, and their ability to create a return on it. We think that ROCE will better demonstrate managerial practices instead of looking at only the profit margin of firms, even though one might think that the level of cost a firm has, when looking at profit margin also reflects a manager's decisions, regarding cost of goods sold for example, but that is already reflected in the *Earnings* in EBIT. ROCE has no typical benchmarks but usually the industry, where the firm operates, has its own benchmark. Therefore, comparing ROCE for firms in different industries does not indicate whether one firm will outperform the other in terms of how well they are doing. If a firm has a ROCE below the industry benchmark, it indicates that the firm is not making good use of its capital resources. This performance measure will then be a good measurement when comparing firms since all firms have a different level of capital but are in the same industry, manufacturing (Armillary Private Capital, 2012).

### **4.2.2 Independent variables**

#### ***Average management score***

Our main variable of interest is the measure of management practices. Here we see that the score varies between one, three and five where five is the best, one is the worst. Treating average management score for firms lets us understand what kind of effect supposedly good and poor management practices have on different aspects of firm performance specifically. How this variable is measured is detailed in the paper above. To avoid repetition, we will not be describing the entire collection, compilation and measurement process again.

### **4.2.3 Control variables**

#### ***Capital***

Varying levels of capital might result in different investing schemes in management practices. By allowing capital in the regressions we can see how SME's and large firm's level of capital will affect firm performance, and how investment decisions in terms of use of capital made by managers will affect productivity. However, this could result in simultaneity where capital is jointly determined with firm performance. They could both influence each other, for example having better firm performance might lead to an increase in capital, and an increase in capital could affect firm performance. The variable is measured in log.

#### ***Materials Cost***

The data on materials cost for France and Germany is taken from accounting statements while in the UK it was created by deducting the total wage bill from the COGS. The variable is measured in log.

#### ***Publicly listed***

Publicly listed firms (1 for public, 0 otherwise) are required to practice a large amount of transparency. Since these firms are in the eyes of a large number of shareholders who have provided them with extra capital, they are required to uphold certain HRM standards and are subject to different liabilities, regulations and tax regimes. All this in turn could affect their firm performance. To ensure that we capture the effects of the means by which a firm raises capital and what effect that has on firm performance, we include this variable (avoiding bias created by omitting this variable which would then get captured by other variables in our regression).

#### ***Unconsolidated***

Unconsolidated is a dummy for being consolidated (1 for being unconsolidated, 0 otherwise). Consolidation is a form of merger strategy, an external growth strategy where there are several motives to go through with consolidation and improve firm performance. By utilizing the

synergies between firms, one can get access to new technology and clients. This can give the consolidating firm growth in products and markets. The intention to do so can be to gain size resulting in an increase of potential bargaining power. Controlling for firms that underwent consolidation can check for whether size will have an effect on firm performance. Referring to the resource theory, that it is the firm's internal resources and not the industry itself that decides firm performance, makes it reasonable to include this as a control.

### ***Average wages***

Average wages for a firm are taken from Amadeus, by analysing different firms accounting data. These indicate the overall average wage paid by a firm. To reduce the bias and establish causality between management and firm performance, and not capture the wage effect or effect of financial incentives, we include this in the regression equation. Are higher paid employees more productive and dedicated to their work, or are more productive employees better paid? There is a potential issue of simultaneity here. We include the log of average wages for employees at a firm, as a control variable.

### ***Firm age***

This variable indicates the age of the firm. Previous studies have shown that older firms are better managed than start-ups or firms with not as much experience, which in turn affects firm performance. We add this variable to our regression equation to make sure that the effect of how long the firm has been in operation is captured by it. If this variable is not included in the equation, its effect will be captured by the error term thereby causing bias in our independent variables. This control variable is measured in level.

### ***Employees with degrees***

This variable refers to the proportion or percentage of all employees in a firm, with degrees. Having educated employees that hold degrees from higher education institutions mean they are more qualified, however this does not implicitly imply that they are better managers. It does, though, increase the probability of them knowing the importance of management practices and how these affect worker performance and output, thereby affecting firm performance. To ensure we capture this effect correctly and avoid any bias in our analysis, we include this variable.

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### ***Competition***

This is a categorical dummy variable stating the perceived competitive climate for the firm, 1= no competitors 2= less than 5 competitors 3= 5 or more competitors. The respondents in the survey made by Bloom, were to answer how many competitors they perceived they had in their industry. 1% answered zero, 51% said they had less than 5, and the remaining 48% answered more than 5 competitors.

## **4.3 Sample selection**

Our initial dataset consisted of 6267 observations. For France, we had 998 observations; for Germany we had 1098 observations; for the UK we had 1251 observations and for the US we had 2920 observations. When selecting our sample, we excluded the US from the data set, which left us with 3347 observations. Since we are only interested in testing our hypotheses on small and medium-sized firms and large firms, we exclude all values belonging to firms that employ less than 10 people. In Appendix A, Table A3-A5, you will find the summary statistics for each country, France, Germany and the UK.

Table 2: Summary statistics main sample

SUMMARY STATISTICS MAIN SAMPLE						
Variables	Entire sample		SMEs		Large firms	
	Total	Non-missing	Total	Non-missing	Total	Non-missing
ROCE	3347	3072	936	814	2409	2257
Sales growth	3347	2905	936	806	2409	2099
Average management score	3347	3347	936	936	2409	2409
Capital	3347	3215	936	869	2409	2345
Materials cost	3347	2710	936	857	2409	1852
Employees w. degrees	3347	2346	936	677	2409	1667
Age of firm	3347	3347	936	936	2409	2409
Average wage	3347	3286	936	928	2409	2357
Publicly listed	3347	3347	936	936	2409	2409
Unconsolidated	3347	3347	936	936	2409	2409
Competition	3347	3347	936	936	2409	2409

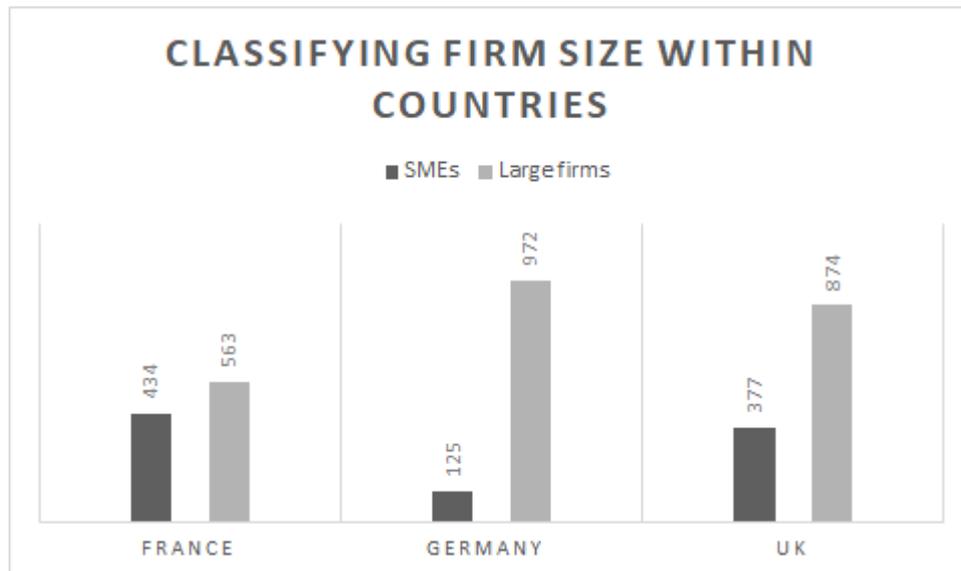
The data is from the two merged datasets (Amadeus and the Nick Bloom Van Reenen management dataset) for the year 1994-2004. We have compiled the total number of observations, along with the non-missing values and then present what percentage of the total observations are non-missing values. We have done so for the entire sample and also distinguished large firms and SMEs. The size categories are defined in line with the European standard when referring to number of employees. Large: more than 250. SMEs: larger and equal to 10 and less than 250.

The analysis sample contains 3347 observations but when excluding all missing values we are left with 2346 observations. For SMEs, we have 677 observations and for large firms, 1667. In Table A3 (see Appendix A) we see that the sample for France has 709 observations. For SMEs, there are 337 observations and for large enterprises there are 371 observations. In Table A4 (see Appendix A) for Germany, we see that when running regressions with ROCE as our dependent variable, our final sample has 474 observations. For SMEs, there are 48 observations and for large firms there are 426 observations. When performing the regression on sales growth, we have a total sample of 881 observations. For SMEs, there are 107 observations and for large firms we have 763 observations. Further, when looking at the UK in Table A5 (see Appendix A) we see that the main sample has 756 observations. For SMEs, there are 223 observations and for large firms, there are 533 observations. We see that the number of observations differ between SMEs and large firms, due to not having access to data on as many SMEs as large firms.

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When performing our analyses, we think it is important to look at the number of firms in each country to make sure, based on our understanding, that the firms are representative of the population. If the sample is too small, it could become an issue and one could lose the randomization and variation aspects of the sample, thereby resulting in changed results.

*Figure 3: Classifying firm size within countries*



The values in figure 3 are compiled from Table A6 (see Appendix A), by summarizing the number of SMEs and large firms that were interviewed. Data was collected between the years 1994 and 2004. In France, we see more of an even distribution between the two sizes, and we see the maximum gap for Germany. When performing our analyses, we might get skewed results due to the fact that number of large enterprises in our sample is much higher than SMEs and there is a possibility that the SMEs are not representative of the population. We also see from Table A6 (see Appendix A) that we lack data for Germany in year 2004, for SMEs. However, when using the dataset compiled by Bloom and Van Reenen, a dataset which is of very high quality, we expect our sample to be representative.

## 4.4 Hypotheses

From previous theory and research, we have developed the hypotheses presented below. We will try to answer these by performing descriptive and regression analyses.

***Hypothesis 1:** An increase in the score of average management practices will have a positive effect on a firm's sales growth and this effect is stronger in SMEs when compared to large enterprises.*

***Hypothesis 2:** An increase in the score of average management practices will have a positive effect on a firm's return on capital employed and this effect is stronger in SMEs when compared to large enterprises.*

We will test these on firms in three different countries - France, Germany and the UK. Based on previous research and economic theories we expect to see a positive relationship between management quality and firm performance indicators, however we anticipate a variation in the strength of the coefficient of management practices given the different levels of flexibility and resilience exhibited by SMEs and large enterprises. This is one of the aspects we are interested in analysing, that in turn helps us distinguish not only between SMEs and large enterprises, but also establish the difference in the effects of management practices on firm performance across countries.

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## 5. Descriptive statistics

In this chapter, we will present our findings from descriptive statistics. Detailed statistics about SMEs and large enterprises across our chosen countries, France, Germany and the UK are presented below. Along with that, the data is presented as pooled without segregating by country, that contributes to the analysis and understanding of the relationship between management practices and firm performance. Pooling the data allows us establish the overall trends observed in SMEs and large enterprises, how those compare to one another, and not just observe trends specific to each country.

### 5.1 Descriptive statistics

The starting point of our empirical work is to observe the data collected. We initially compile the statistics for our analysis sample, where we use two dependent variables, sales growth and ROCE, against our main variable of interest, average management. This is to see if we get consistent and plausible results. We further divide the data into SMEs and large enterprises for our entire dataset and then compare between the two sizes. We do the same for every country. This will help understand findings from the regression analysis better.

*Table 3: Summary statistics for sales growth and average management score, pooled and by country*

	SUMMARY STATISTICS					
	Total sample		SMEs		Large Firms	
	Mean	Observation	Mean	Observation	Mean	Observation
<b>Whole Sample</b>						
Sales Growth	0,0602	1911	0,062	531	0,059	1380
Average Management Score	3,21	1911	2,88	531	3,34	1380
<b>France</b>						
Sales Growth	0,053	572	0,067	258	0,042	314
Average Management Score	3,09	572	2,76	258	3,37	314
<b>Germany</b>						
Sales Growth	0,046	687	0,039	91	0,047	596
Average Management Score	3,30	687	2,96	91	3,36	596
<b>UK</b>						
Sales Growth	0,081	652	0,066	182	0,086	470
Average Management Score	3,21	652	3,02	182	3,28	470

The data is merged from two datasets, Amadeus, and the dataset measuring and quantifying management practices compiled by Nick Bloom and John Van Reenen (1994-2004). The summary statistics are reported for SMEs and large firms for the whole sample and for each country, by using sales growth as the dependent variable. Size of SMEs:  $\geq 10$  and  $< 250$ . Size of Large firms:  $\geq 250$ .

The highest average of sales growth is in the UK at 8.1% followed by France at 5.3%. SMEs in France have the highest sales growth of 6.7% with UK having a very similar growth but only 0.1% lower. For large enterprises, the UK leads the way with a sales growth of 8.6% followed by Germany that is at a much lower 4.7%. There is a small variation in average management scores for the three countries, with Germany having the highest average of 3.30 followed by the UK at 3.21 and France at 3.09. For SMEs in France and Germany, average management quality is below three but will plausibly be rounded up. However, SMEs in the UK are better managed, with a score of 3.02. We see that the average management score is higher in large enterprises than in SMEs for all countries.

*Table 4: Summary statistics for ROCE and average management score, pooled and by country*

	SUMMARY STATISTICS					
	Total sample		SMEs		Large Firms	
	Mean	Observation	Mean	Observation	Mean	Observation
<b>Whole Sample</b>						
ROCE	14,380	1601	15,933	473	13,740	1127
Average Management Score	3,19	1601	2,84	473	3,33	1127
<b>France</b>						
ROCE	15,216	627	17,994	273	13,106	353
Average Management Score	3,07	627	2,70	273	3,36	353
<b>Germany</b>						
ROCE	9,916	358	9,949	41	9,912	317
Average Management Score	3,31	358	2,90	41	3,36	317
<b>UK</b>						
ROCE	16,124	616	13,936	159	16,886	457
Average Management Score	3,24	616	3,06	159	3,30	457

The data is merged from two datasets, Amadeus and the dataset measuring and quantifying management practices compiled by Nick Bloom and John Van Reenen (1994-2004). The summary statistics are reported for SMEs and large firms for the whole sample and for each country, by using ROCE as the dependent variable. Size of SMEs:  $\geq 10$  and  $< 250$ . Size of Large firms:  $\geq 250$ .

ROCE is a good measure of firm performance, indicating profitability and how efficiently a firm's capital has been utilised. Efficiency is a good sign of how managers inside a firm are taking important decisions, of methods used and changes made, and of how these are impacting performance. Poorly managed firms where decisions are a direct or indirect consequence of the management quality will, in most cases, have inferior ROCE as compared to a similar firm with a better quality of management. However, it is important to note that some firms naturally have a high ROCE, and the magnitude of ROCE differs between industries. Hence two firms cannot be compared just on the value of their return on capital; it is important to dig deeper and see why this difference in value arises. The mean for this measure in our sample is 14.38%. The UK has the highest value for ROCE at 16.12% followed

by France at 15.22%. However, SMEs in France and Germany lead the way for ROCE, in contrast to large enterprises in these countries, but the opposite is true for the UK. The mean value for average management practices when looking at observations for ROCE are similar to those that we see when looking at observations for sales growth. There is a small variation in average management scores for the three countries, with Germany having the highest average of 3.31 followed by the UK at 3.24 and France at 3.07. For SMEs in France and Germany, average management quality is below three but when will plausibly be rounded up. However, SMEs in the UK are better managed, with a score of 3.06. We see that the average management score is higher in large enterprises than in SMEs for all countries.

*Table 5: Summary statistics, sales growth*

	SUMMARY STATISTICS								
	Total sample			SMEs			Large Firms		
	Mean	SD	Observations	Mean	SD	Observations	Mean	SD	Observations
Sales growth	0,060	0,209	1911	0,062	0,227	531	0,059	0,201	1380
Average management score	3,21	0,725	1911	2,88	0,775	531	3,34	0,664	1380
Average wage	3,649	0,329	1911	3,554	0,326	531	3,686	0,323	1380
Capital	9,728	1,532	1911	8,197	0,943	531	10,317	1,289	1380
Employees w/ degrees	14,508	11,723	1911	13,935	10,989	531	14,728	11,991	1380
Age of firm	61,1	61,862	1911	58,8	87,158	531	61,9	48,767	1380
Publicly listed	0,314	0,464	1911	0,111	0,315	531	0,392	0,488	1380
Unconsolidated	0,411	0,492	1911	0,608	0,489	531	0,336	0,472	1380
Competition	2,4	0,525	1911	2,4	0,487	531	2,4	0,539	1380
<i>N</i>	1911			531			1380		

The data is merged from two datasets, Amadeus and the dataset measuring and quantifying management practices compiled by Nick Bloom and John Van Reenen (1994-2004). The summary statistics reported for SMEs and large firms by using our main analysis sample with sales growth as the dependent variable. Size of SMEs:  $\geq 10$  and  $< 250$ . Size of Large firms:  $\geq 250$ .

The total number of observations in our regression sample is 1911. SMEs account for 531 firms whereas large enterprises are more in number at 1380. The average sales growth for the total sample is 6%, with an average management score of 3.21. The number of employees with degrees is 14.5% of the total sample with an average firm age of 61.1 years. SMEs have a higher sales growth than large firms, at 6.2% and 5.9% respectively. However, when looking at the average management score for the two firm sizes we see that large firms score higher at 3.34, than small and medium sized ones that have a score of 2.88. SMEs have a lower share of employees that hold relevant degrees at 13.935%, while large firms stand at 14.728%. Large

firms have a higher mean value for age, by almost three years, when compared to small firms. They also hold a higher share of firms that are listed at 39.2%, while SMEs stand at 11.1%. 60.8% of SMEs in this sample are unconsolidated while only 33.6% of large firms are. Both sizes of firms have a similar level of perceived competition, but a greater share of workforce in the large firms has more education, and on average are paid more. Therefore, we think it is important to control for these different factors to see if its due to these that larger firms have better firm performance than small firms. We will add year to control for a linear time trend that accounts for any changes in market conditions.

*Table 6: Summary statistics, ROCE*

	SUMMARY STATISTICS								
	Total sample			SMEs			Large Firms		
	Mean	SD	Observations	Mean	SD	Observations	Mean	SD	Observations
ROCE	14,380	15,808	1601	15,933	16,516	473	13,740	15,466	1127
Average management score	3,19	0,753	1601	2,84	0,745	473	3,33	0,707	1127
Capital	9,536	1,536	1601	8,092	1,003	473	10,148	1,282	1127
Materials cost	10,408	1,428	1601	9,175	0,977	473	10,929	1,252	1127
Average wage	3,592	0,335	1601	3,505	0,314	473	3,628	0,337	1127
Employees w/ degrees	14,596	10,767	1601	14,153	10,155	473	14,786	11,017	1127
Age of firm	54,1	53,395	1601	50,4	69,943	473	55,7	44,625	1127
Publicly listed	0,323	0,468	1601	0,125	0,331	473	0,406	0,491	1127
Unconsolidated	0,416	0,493	1601	0,609	0,489	473	0,335	0,472	1127
Competition	2,4	0,538	1601	2,4	0,482	473	2,4	0,560	1127
<i>N</i>	1601			473			1127		

The data is merged from two datasets, Amadeus and the dataset measuring and quantifying management practices compiled by Nick Bloom and John Van Reenen (1994-2004). The summary statistics reported for SMEs and large firms by using our main analysis sample with ROCE as the dependent variable. Size of SMEs:  $\geq 10$  and  $< 250$ , Size of Large firms:  $\geq 250$ .

The total number of observations in our regression sample is 1601. SMEs account for 473 firms whereas large enterprises are more in number at 1127. The average ROCE for the total sample is 14.380%, with an average management score of 3.19. Both sizes of firms have a similar level of perceived competition. SMEs experience a higher ROCE than large firms, 15.933% and 13.74% respectively. On the contrary, large firms have a higher management score than SMEs as well as a higher share of them are publicly listed. They also have a higher

average wage and a more educated workforce than SMEs. With the unconsolidated status, small firms occupy a higher percentage.

*Table 7: Summary statistics of sales growth w/ low & high average management score*

SUMMARY STATISTICS						
Sales growth w/ low & high average management score						
	Total sample		SMEs		Large Firms	
	Mean	Observations	Mean	Observations	Mean	Observations
<b>Average management score - Low</b>						
<b>Whole Sample</b>						
Sales growth	0,054	673	0,056	315	0,052	358
<b>France</b>						
Sales growth	0,063	249	0,069	174	0,048	75
<b>Germany</b>						
Sales growth	0,028	183	0,033	49	0,027	134
<b>UK</b>						
Sales growth	0,064	241	0,044	92	0,077	149
<b>Average management score - High</b>						
<b>Whole Sample</b>						
Sales growth	0,064	1238	0,071	216	0,062	1022
<b>France</b>						
Sales growth	0,046	323	0,064	84	0,040	239
<b>Germany</b>						
Sales growth	0,053	504	0,045	42	0,054	462
<b>UK</b>						
Sales growth	0,09	411	0,09	90	0,09	321

The data is merged from two datasets, Amadeus and the dataset measuring and quantifying management practices compiled by Nick Bloom and John Van Reenen (1994-2004). The summary statistics are reported for SMEs and large firms for the whole sample and for each country, by using sales growth as the dependent variable. Size of SMEs:  $\geq 10$  and  $< 250$ . Size of Large firms:  $\geq 250$ .

Germany has more than half of their firms with high average management scores. The UK has 241 firms among low and 411 among high average management scores. France has 249 firms with a low management score, and 323 with a high management score. Among firms with a low average management score, UK has the highest average sales growth of 6.4% followed

by France and Germany at 6.3% and 2.8% respectively. For SMEs and large firms, firms with a high average management score far exceed those with a low average score in all the countries except France. The UK has the highest sales growth among SMEs where the manager has a high average management score, followed by France. The UK has the highest mean sales growth among large firms at 9% followed by Germany and France at 5.4% and 4.8% respectively.

*Table 8: Summary statistics of ROCE w/ low & high average management score*

SUMMARY STATISTICS						
ROCE w/ low & high average management score						
	Total sample		SMEs		Large Firms	
	Mean	Observations	Mean	Observations	Mean	Observations
<b>Average management score - Low</b>						
<b>Whole Sample</b>						
ROCE	14,186	590	15,512	294	12,868	296
<b>France</b>						
ROCE	17,235	278	17,355	191	16,973	87
<b>Germany</b>						
ROCE	7,650	90	8,856	22	7,260	68
<b>UK</b>						
ROCE	13,016	222	12,975	81	13,040	141
<b>Average Management Score - High</b>						
<b>Whole Sample</b>						
ROCE	14,494	1011	16,623	179	14,051	831
<b>France</b>						
ROCE	13,608	349	19,483	82	11,842	266
<b>Germany</b>						
ROCE	10,677	268	11,214	19	10,636	249
<b>UK</b>						
ROCE	17,876	394	14,93	78	18,60	316

The data is merged from two datasets, Amadeus and the dataset measuring and quantifying management practices compiled by Nick Bloom and John Van Reenen (1994-2004). The summary statistics are reported for SMEs and large firms for the whole sample and for each country, by ROCE as the dependent variable. Size of SMEs:  $\geq 10$  and  $< 250$ . Size of Large firms:  $\geq 250$ .

We see that in France, among SMEs, more than double have an average management score in the lower range. For Germany and the UK, firms are almost equally distributed between high and low average management scores among SMEs. Among large firms, we see that for all countries almost three times the number of them in the low management score, are in the high management score. We see that for all countries, among SMEs they have a higher average ROCE when having managers who score in the higher range within the same countries. For large firms, France experiences a higher ROCE when having a lower average score. We find the opposite to be true for Germany and the UK, they have a higher average ROCE when firms have a higher average management score. We see that SMEs in France have a higher average ROCE than large firms no matter which management score range they lie in. We see the same for Germany but for the UK, large firms have, on average, a higher ROCE than SMEs.

For SMEs and large firms, France has a higher ROCE (and sales growth), when having managers with a low average management score compared to high, which goes against both Penrose and Grant's resource theory and does not support our hypothesis. We will see from our regression analysis if this observation is consistent with our findings. We will include requisite control variables so as to not overstate the effect of average management scores on firm performance.

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## 6. Regressions

In this section we first detail the regression model we will use to assess the effect of different factors on firm performance. This regression will be performed as pooled OLS without segregating by country, that will allow us to treat each observation in the data independently and observe the overall pattern in terms of the kind of effects management practices have on firm performance. Second, we will specify the four regression models that we are using to investigate our hypotheses. We add control variables in stages to establish a coefficient for our sample that will converge with one for the population. These regressions are run by country. More in depth details about the regression variables that are used can be found in Section 4.2. We are using STATA, a statistical software to estimate our models.

### 6.1 Regression models

#### Main regression model

$$\begin{aligned} Sales\ growth_{i,t} = & \beta_0 + \beta_1 AverageManagementScore_{i,t} + \beta_2 Year + \beta_3 EmployeeswDegrees_{i,t} + \\ & \beta_4 FirmAge_{i,t} + \beta_5 AverageWage_{i,t} + \beta_6 Capital_{i,t} + \beta_7 PubliclyListed_{i,t} + \beta_8 Unconsolidated_{i,t} + \\ & + \beta_9 Competition_{i,t} + \mu_{i,t} \end{aligned}$$

$$\begin{aligned} ROCE_{i,t} = & \beta_0 + \beta_1 AverageManagementScore_{i,t} + \beta_2 Year + \beta_3 EmployeeswDegrees_{i,t} + \\ & \beta_4 FirmAge_{i,t} + \beta_5 AverageWage_{i,t} + \beta_6 Capital_{i,t} + \beta_7 MaterialsCost_{i,t} + \beta_8 PubliclyListed_{i,t} + \\ & \beta_9 Unconsolidated_{i,t} + \beta_{10} Competition_{i,t} + \mu_{i,t} \end{aligned}$$

From extensive theory in economics and management, we believe that these independent and control variables can have a significant effect on different aspects of firm performance.

When investigating and researching the effects on firm performance, we will use four different models to see how firm performance (sales growth and ROCE) changes when controlling for spectres of different conditions. In Model 1, we just want to see the effect of average

management when controlling for year. In Model 2, we add firm specific controls. In model 3, we add firm specific financial controls, and lastly we add external controls. *Firm Performance*<sub>Y1-2</sub> refers to sales growth and ROCE respectively, for firm  $i$  in year  $t$ .

### **Regression model 1: with average management score and time trend**

Our first model is a linear regression where we do a simple estimate of the effect of average management score on firm performance. The coefficient  $\beta_1$  represents the change in percentage on firm performance for firm  $i$  in year  $t$ , when a unit of management score changes, that is an increase of two points for average management score. The independent variable year is included to capture the time trend so that any effects, from micro- and macro shocks that happened during the year that the firm got interviewed in, are captured and accounted for.

$$Firm\ Performance_{Y1-2} = \beta_0 + \beta_1 AverageManagementScore_{i,t} + \beta_2 Year + \mu_{i,t}$$

### **Regression model 2: with firm specific controls**

In model 2, we add employees with degrees and firm age as firm specific controls. We think that they are firm specific since they represent a unique age and a unique aggregate educational level within firms. We are interested in seeing if internal factors have an effect on firm performance.  $\beta_3$  and  $\beta_4$  represent the change in percentage of firm performance for firm  $i$  in year  $t$ , when employees with degrees increases with one unit and when the age of firm increases by one year.

$$Firm\ Performance_{Y1-2} = \beta_0 + \beta_1 AverageManagementScore_{i,t} + \beta_2 Year + \beta_3 EmployeeswDegrees_{i,t} + \beta_4 FirmAge_{i,t} + \mu_{i,t}$$

### **Regression model 3: with financial controls**

In model 3, we add average wage and capital when having sales growth as our dependent variable. For ROCE, we also add materials cost. From theory, we see that firms with more resources perform better than those with relatively less. Larger firms typically have a larger capital base and therefore we think it is reasonable to control for financial resources. Firms with more capital have the ability to pay higher wages and that could act as a motivational factor to increase productivity and efficiency.

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A 1% increase in average wage, capital and materials cost for firm  $i$  in year  $t$ , will lead to a  $\beta_5/100$ ,  $\beta_6/100$  and  $\beta_7/100$  change of firm performance. All three coefficients are measured in log.

$$\text{Sales Growth}_{i,t} = \beta_0 + \beta_1 \text{AverageManagementScore}_{i,t} + \beta_2 \text{Year} + \beta_3 \text{EmployeeswDegrees}_{i,t} + \beta_4 \text{FirmAge}_{i,t} + \beta_5 \text{AverageWage}_{i,t} + \beta_6 \text{Capital}_{i,t} + \mu_{i,t}$$

$$\text{ROCE}_{i,t} = \beta_0 + \beta_1 \text{AverageManagementScore}_{i,t} + \beta_2 \text{Year} + \beta_3 \text{EmployeeswDegrees}_{i,t} + \beta_4 \text{FirmAge}_{i,t} + \beta_5 \text{AverageWage}_{i,t} + \beta_6 \text{Capital}_{i,t} + \beta_7 \text{MaterialsCost}_{i,t} + \mu_{i,t}$$

#### **Regression model 4: with external controls**

In model 4, we add publicly listed, unconsolidated and competition variables. These are external influences that change a firm's initial strategy, business structure, management practices and culture. The resources and capital come from outside the firm and are subsequently internalized but these are not firm specific in this moment in time. It is important to note that these occurrences have a considerable external effect. Publicly listed and unconsolidated are both dummy variables. Their coefficients represent the change in percentage of firm performance for firm  $i$  in year  $t$ , when taking the value one. The coefficient of competition represents the change in percentage of firm performance for firm  $i$  in year  $t$ , when competition increases by one unit.

$$\text{Sales Growth}_{i,t} = \beta_0 + \beta_1 \text{AverageManagementScore}_{i,t} + \beta_2 \text{Year} + \beta_3 \text{EmployeeswDegrees}_{i,t} + \beta_4 \text{FirmAge}_{i,t} + \beta_5 \text{AverageWage}_{i,t} + \beta_6 \text{Capital}_{i,t} + \beta_7 \text{PubliclyListed}_{i,t} + \beta_8 \text{Unconsolidated}_{i,t} + \beta_9 \text{Competition}_{i,t} + \mu_{i,t}$$

$$\text{ROCE}_{i,t} = \beta_0 + \beta_1 \text{AverageManagementScore}_{i,t} + \beta_2 \text{Year} + \beta_3 \text{EmployeeswDegrees}_{i,t} + \beta_4 \text{FirmAge}_{i,t} + \beta_5 \text{AverageWage}_{i,t} + \beta_6 \text{Capital}_{i,t} + \beta_7 \text{MaterialsCost}_{i,t} + \beta_8 \text{PubliclyListed}_{i,t} + \beta_9 \text{Unconsolidated}_{i,t} + \beta_{10} \text{Competition}_{i,t} + \mu_{i,t}$$

## 6.2 Regression results

Table 9: Four different models on Sales growth, pooled

	SMEs				Large Firms			
	Model 1	Model 2	Model 3	Model 4	Model 1	Model 2	Model 3	Model 4
Average management score	0.0202 (1.56)	0.0198 (1.48)	0.0168 (1.26)	0.0149 (1.15)	0.00574 (0.69)	0.00515 (0.62)	-0.0000887 (-0.01)	0.00389 (0.46)
Year	0.00462 (1.05)	0.00394 (0.86)	0.00446 (1.02)	0.00419 (0.95)	0.00717*** (3.54)	0.00638** (3.09)	0.00616** (2.93)	0.00581** (2.77)
<b>Firm specific controls</b>								
Employees w/ degrees		-0.000812 (-0.99)	-0.000645 (-0.78)	-0.000862 (-1.05)		0.000958 (1.90)	0.000969 (1.89)	0.000926 (1.80)
Age of firm		-0.000165 (-1.95)	-0.000174 (-1.93)	-0.000255* (-2.53)		-0.000277* (-2.08)	-0.000364* (-2.54)	-0.000429** (-2.93)
<b>Financial controls</b>								
Average wage			-0.0209 (-0.61)	-0.00759 (-0.21)			0.00712 (0.35)	0.0281 (1.32)
Capital			0.0116 (0.91)	0.00859 (0.67)			0.0114* (2.46)	0.00612 (1.26)
<b>External Controls</b>								
Publicly listed				0.0188 (0.69)				-0.0112 (-0.80)
Unconsolidated				-0.0302 (-1.21)				-0.0543*** (-3.77)
Competition				-0.0117 (-0.55)				-0.0154 (-1.59)
_cons	-9.231 (-1.04)	-7.852 (-0.86)	-8.915 (-1.02)	-8.324 (-0.95)	-14.30*** (-3.53)	-12.71** (-3.08)	-12.40** (-2.96)	-11.66** (-2.79)
<i>N</i>	531	531	531	531	1380	1380	1380	1380

*t* statistics in parentheses

\*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$

In the table above, we have pooled results without segregating by country. For SMEs we have 531 observations and 1380 for large firms. We see that for all the models for SMEs, an increase in average management score by two points will have an increase in sales growth by approximately 2%. However, this effect is decreasing while adding controls at different stages. The same goes for large firms where the effect is decreasing but in model 3, it becomes negative. Year is significant in all models for large firms, all values are around 6% to 7%. Firm specific controls all have a negative effect on sales growth for SMEs, and the age of firm is significant at the lowest level. For large firms, employees with degrees have a positive effect, so the addition of one new educated worker leads to a 0.009 increase in sales growth in all models. An increase of one year in the age of the firm will have a negative effect on sales growth and we find that to be true and significant for all models. For financial controls, an

increase in average wage has a negative effect on sales growth for SMEs but we find it to have a positive effect for large firms. An increase in capital has a positive effect for all models for both SMEs and large enterprises. In model three, this effect is significant for large firms. When we add external controls, all of them have a negative effect for large firms and being unconsolidated gives a 5.43% decrease in sales growth as compared to consolidated firms. For SMEs, external controls have a negative effect except for being publicly listed which increases the sales growth by 1.88%.

*Table 10: Four different models on ROCE, pooled*

	SMEs				Large Firms			
	Model 1	Model 2	Model 3	Model 4	Model 1	Model 2	Model 3	Model 4
Average management score	0.374 (0.36)	0.576 (0.56)	0.507 (0.45)	1.030 (0.88)	1.406* (2.24)	1.375* (2.23)	1.783** (2.75)	1.904** (2.89)
Year	-0.858** (-3.04)	-0.880** (-3.08)	-0.917** (-3.11)	-0.945** (-3.12)	-1.253*** (-6.92)	-1.220*** (-6.76)	-1.097*** (-5.69)	-1.108*** (-5.74)
<b>Firm specific controls</b>								
Employees w/ degrees		-0.118 (-1.34)	-0.143 (-1.54)	-0.122 (-1.41)		0.109* (2.23)	0.119* (2.45)	0.111* (2.23)
Age of firm		-0.0108 (-1.76)	-0.0140* (-2.08)	-0.00794 (-1.11)		-0.0330*** (-3.81)	-0.0284** (-3.23)	-0.0331*** (-3.47)
<b>Financial controls</b>								
Average wage			2.006 (0.67)	0.720 (0.23)			-2.441 (-1.62)	-1.598 (-0.95)
Capital			0.198 (0.20)	0.783 (0.75)			-1.130* (-2.16)	-1.538** (-2.88)
Materials cost			-0.446 (-0.52)	-0.700 (-0.78)			0.963 (1.79)	1.142* (2.17)
<b>External Controls</b>								
Publicly listed				0.574 (0.22)				0.348 (0.31)
Unconsolidated				4.046 (1.94)				-1.830 (-1.35)
Competition				-0.464 (-0.27)				-0.0679 (-0.08)
_cons	1730.7** (3.07)	1776.3** (3.11)	1846.4** (3.14)	1901.7** (3.15)	2515.1*** (6.94)	2449.2*** (6.78)	2211.2*** (5.77)	2233.7*** (5.82)
<i>N</i>	473	473	473	473	1127	1127	1127	1127

*t* statistics in parentheses

\*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$

In the table above, we have pooled results for France, Germany and the UK. For SMEs we have 473 observations and for large firms we have 1127 observations. An increase in average

management score for SMEs increases ROCE when adding the controls except in model 3, where it decreases. In model 4, it has the highest effect on ROCE with an increase of 1%. We see the same trend for large firms when adding controls but the effect on ROCE is more than double when average management score increases. These coefficients are all significant. Firm specific controls all have a negative effect on ROCE and in model 3, we see that the effect of firm age is significant. For large firms, only firm age has a negative effect and all firm specific controls are significant. Financial controls all have a positive effect on ROCE for SMEs except materials cost. When materials cost increases, ROCE will decline. We find the opposite for large firms where when average wages and capital increase, ROCE will decrease and when the materials cost increases, ROCE will increase. For external controls, being publicly listed and unconsolidated has a positive effect on ROCE for SMEs, but when competition increases ROCE will decrease by 0.464%. For large firms, competition will also have a negative effect on ROCE but not as much as for SMEs. Being unconsolidated will have a negative effect of 1.83% but being publicly listed will have a positive effect compared to not being publicly listed, of 0.348%.

*Table 11: Four different models on sales growth, France*

	SMEs				Large Firms			
	Model 1	Model 2	Model 3	Model 4	Model 1	Model 2	Model 3	Model 4
Average management score	0,0129 (-0,64)	0,01 (-0,5)	0,01 -0,5	0,0137 (-0,71)	0,00257 (-0,21)	0,00277 (-0,22)	-0,00291 (-0,20)	-0,000857 (-0,06)
Year	0,00861 (-1,07)	0,00932 (-1,18)	0,00871 (-1,16)	0,0077 (-0,98)	0,0149** (-3,21)	0,0147** (-3,16)	0,0143** (-3,14)	0,0148** (-3,21)
<b>Firm specific controls</b>								
Employees w/ degrees		-0,000393 (-0,25)	-0,00101 (-0,60)	-0,000698 (-0,42)		0,000842 (-0,79)	0,000609 (-0,52)	0,000669 (-0,52)
Age of firm		-0,000907 (-1,69)	-0,000985 (-1,76)	-0,00102 (-1,77)		-0,000129 (-0,44)	-0,00014 (-0,47)	-0,0000729 (-0,26)
<b>Financial controls</b>								
Average wage			0,0475 (-0,66)	0,0275 (-0,41)			0,0395 (-1,07)	0,0309 (-0,8)
Capital			-0,00592 (-0,32)	-0,00559 (-0,31)			0,00315 (-0,3)	0,00329 (-0,29)
<b>External Controls</b>								
Publicly listed				-0,670*** (-9,83)				0,0346 (-0,86)
Unconsolidated				-0,681*** (-16,08)				0,0262 (-0,67)
Competition				0,0048 (-0,16)				-0,0242 (-1,23)
_cons	-17,19 (-1,06)	-18,55 (-1,18)	-17,45 (-1,16)	-14,7 (-0,93)	-29,79** (-3,21)	-29,35** (-3,16)	-28,69** (-3,15)	-29,74** (-3,20)
<i>N</i>	258	258	258	258	314	314	314	314

*t* statistics in parentheses

\*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$

The number of observations for SMEs in France is 258, and for large enterprises is 314. For SMEs, we see that average management has the highest positive effect on sales growth in the fourth model with a coefficient of 0.0137 implying that for a two digit increase in management score (capped at five) sales growth increases by 1.3%. For large enterprises, though, the average management score has a negative effect in model 3 and 4. Further, for SMEs we find that the coefficients for unconsolidated and publicly listed are significant at 1% in model 4. For large firms we have significant values for year in all four models. The coefficients for employees with relevant degrees for SMEs, have a negative effect compared to those for large firms where they have a positive effect on sales growth for model 3 and 4. Firm age has a negative effect on sales growth in model 2, 3 and 4 for both SMEs and large enterprises. For financial controls, average wage has a positive effect for both SMEs and large enterprises in model 3 and 4, and capital has a negative effect for SMEs. External controls have a negative effect on SMEs except for the variable on competition. For large firms, external controls have a positive effect on sales growth except for the variable on competition.

*Table 12: Four different models on sales growth, Germany*

	SMEs				Large Firms			
	Model 1	Model 2	Model 3	Model 4	Model 1	Model 2	Model 3	Model 4
Average management score	0,0249 (-0,96)	0,0398 (-1,28)	0,0121 (-0,33)	0,049 (-1,52)	0,0276 (-1,28)	0,0282 (-1,31)	0,0172 (-0,82)	0,0183 (-0,89)
Year	0,0112 (-1,09)	0,0082 (-0,75)	0,00987 (-0,89)	0,00262 (-0,2)	0,0113*** (-3,86)	0,0110*** (-3,74)	0,0110*** (-3,7)	0,0103*** (-3,48)
<b>Firm specific controls</b>								
Employees w/ degrees		-0,002 (-1,50)	-0,00177 (-1,28)	-0,00390* (-2,16)		0,00128 (-1,36)	0,00111 (-1,1)	0,00107 (-1,07)
Age of firm		-0,0000536 (-0,54)	-0,000113 (-1,04)	-0,000142 (-1,02)		-0,000118 (-0,55)	-0,0000902 (-0,41)	-0,000199 (-0,87)
<b>Financial controls</b>								
Average wage			-0,0701 (-0,93)	-0,0548 (-0,65)			0,0834 (-1,46)	0,112 (-1,85)
Capital			0,0541 (-1,73)	0,0592 (-1,65)			0,0188* (-2,46)	0,0138 (-1,75)
<b>External Controls</b>								
Publicly listed				-0,107 (-1,01)				-0,00576 (-0,24)
Unconsolidated				-0,134 (-1,54)				-0,0569* (-2,22)
Competition				-0,0629 (-1,21)				-0,0216 (-1,25)
_cons	-22,47 (-1,09)	-16,44 (-0,75)	-19,89 (-0,90)	-5,32 (-0,21)	-22,67*** (-3,86)	-22,11*** (-3,75)	-22,51*** (-3,80)	-21,05*** (-3,57)
<i>N</i>	91	91	91	91	596	596	596	596

*t* statistics in parentheses

\*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$

The number of observations for SMEs is 91, and for large enterprises is 596. Employees with degrees is significant for SMEs, but only in model 4, at a 10% significance level. We see that for large firms, the coefficient for year is significant in all models at the 5% level. Continuing for large firms, the coefficient for capital in model 3, and the coefficient for unconsolidated in model 4 are both significant at the 10% level. For SMEs, average management has the biggest effect in model 4 with a coefficient of 0.049 implying that for a two digit increase in management score (capped at five), the sales growth increases by 4.9%, followed by the coefficient for average management in model 2 with a value of 0.0398 implying a 3.9% increase. Further, average management has a lesser effect on sales growth for large firms when including only firm specific controls, with the highest coefficient being 0.0282 equvaling a 2.8% increase. All firm specific controls for SMEs have a negative effect on sales growth. For large firms, only firm age has a negative effect among firm specific controls. As for financial controls, we see that average wage has a negative effect for SMEs while having a positive effect for large enterprises. Lastly, capital has a positive effect on sales growth for SMEs as well as for large firms, but a larger effect for SMEs than for large firms.

*Table 13: Four different models on sales growth, UK*

	SMEs				Large Firms			
	Model 1	Model 2	Model 3	Model 4	Model 1	Model 2	Model 3	Model 4
Average management score	0,031 (-1,7)	0,026 (-1,6)	0,0227 (-1,41)	0,0219 (-1,26)	-0,00191 (-0,17)	-0,00178 (-0,15)	-0,00398 (-0,33)	-0,00311 (-0,25)
Year	-0,00271 (-0,50)	-0,00335 (-0,61)	-0,00284 (-0,49)	-0,00231 (-0,38)	-9,17E-06 (-0,00)	-0,00155 (-0,46)	-0,0025 (-0,63)	-0,00284 (-0,69)
<b>Firm specific controls</b>								
Employees w/ degrees		-0,000611 (-0,41)	-0,0002 (-0,12)	-0,000558 (-0,24)		0,000613 (-0,97)	0,00055 (-0,86)	0,000693 (-0,99)
Age of firm		-0,000309 (-0,95)	-0,000344 (-0,99)	-0,00055 (-1,31)		-0,000743** (-2,84)	-0,000846** (-2,89)	-0,000865** (-2,80)
<b>Financial controls</b>								
Average wage			-0,0153 (-0,24)	-0,0106 (-0,17)			0,00907 (-0,26)	0,0164 (-0,44)
Capital			0,036 (-1,17)	0,026 (-0,88)			0,00851 (-1,08)	0,00894 (-1,07)
<b>External Controls</b>								
Publicly listed				0,0357 (-0,94)				-0,00062 (-0,03)
Unconsolidated				-0,0693 (-1,29)				-0,0387 (-0,89)
Competition				-0,0106 (-0,21)				0,000262 (-0,02)
_cons	5,392 (-0,5)	6,718 (-0,61)	5,463 (-0,48)	4,512 (-0,38)	0,111 (-0,02)	3,209 (-0,48)	5,012 (-0,64)	5,647 (-0,7)
<i>N</i>	182	182	182	182	470	470	470	470

*t* statistics in parentheses

\*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$

The number of observations for SMEs is 182, and for large enterprises is 470. We observe no significant values in any of the models for SMEs, and only firm age is significant for large firms. Firm specific controls are all negative for SMEs. However, for large firms, having a relevant degree will have a positive effect on sales growth, while firm age will have a negative and significant effect. In terms of financial controls, we see that an increase in wage has a negative effect on sales growth for SMEs but for large firms, we find that the opposite is true. An increase in capital will have a positive effect for both SMEs and large firms. For external controls, being publicly listed will have a positive effect for SMEs but a negative effect for large firms, and being unconsolidated will have a negative effect for both SMEs and large firms. Lastly, an increase in competition will have a negative effect for SMEs while having a positive effect on sales growth for large firms.

*Table 14: Four different models on ROCE, France*

	SMEs				Large Firms			
	Model 1	Model 2	Model 3	Model 4	Model 1	Model 2	Model 3	Model 4
Average management score	0,809 (-0,72)	0,843 (-0,73)	1,276 (-1,11)	1,728 (-1,46)	-1,126 (-1,21)	-1,016 (-1,13)	-0,726 (-0,73)	-0,106 (-0,11)
Year	-0,499 (-1,30)	-0,481 (-1,25)	-0,355 (-0,90)	-0,374 (-0,95)	-0,708* (-2,00)	-0,751* (-2,15)	-0,719* (-2,02)	-0,653 (-1,89)
<b>Firm specific controls</b>								
Employees w/ degrees		-0,034 (-0,31)	-0,0343 (-0,29)	-0,0907 (-0,70)		0,346*** (-3,68)	0,355*** (-3,54)	0,313** (-2,95)
Age of firm		-0,0263 (-0,76)	-0,0176 (-0,49)	-0,0277 (-0,74)		-0,00793 (-0,34)	-0,00914 (-0,37)	-0,0109 (-0,42)
<b>Financial controls</b>								
Average wage			-3,001 (-0,70)	-2,112 (-0,47)			-5,311* (-2,15)	-8,279*** (-3,37)
Capital			-0,178 (-0,13)	-0,00362 (-0,00)			0,14 (-0,16)	-0,276 (-0,32)
Materials cost			-1,811* (-2,03)	-2,389* (-2,46)			0,393 (-0,48)	0,779 (-0,9)
<b>External Controls</b>								
Publicly listed				9,052 (-1,8)				-1,038 (-0,27)
Unconsolidated				13,98*** (-4,34)				-3,527 (-0,90)
Competition				-2,639 (-1,17)				-7,843*** (-4,75)
_cons	1014,3 (-1,33)	979,4 (-1,27)	754 (-0,96)	785,9 (-0,99)	1433,0* (-2,03)	1512,3* (-2,17)	1461,3* (-2,06)	1360,5 (-1,96)
N	273	273	273	273	353	353	353	353

*t* statistics in parentheses

\*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$

The number of observations for SMEs is 273, and for large enterprises is 353. For SMEs we find that the coefficient for materials cost is significant, in model 3 and 4, and the coefficient for being unconsolidated is significant at 1%. For large enterprises, the variables for year (except in model 4), employees with degrees, average wage and competition are significant in all models. Typically for SMEs, an increase in management score leads to an increase in ROCE in all models, with an increase of 1.728% being the highest, in model 4. Conversely, for large enterprises an increase in management score always leads to a decrease in ROCE. For all SMEs and most large firms, firm specific controls have a negative effect. However, the coefficient for the variable of employees with degrees has a positive and significant effect on ROCE in all models. All financial controls have a negative effect on ROCE. Further, an increase in average wage in large firms when controlling for external controls is almost four times as negative as in the same model for SMEs. For large firms, capital has a positive effect in model 3 but when we control for external factors, this effect becomes negative. An increase in materials cost has a negative effect on ROCE for small firms, but a positive effect for large firms. Lastly, being publicly listed and unconsolidated have a positive effect on ROCE for SMEs versus a negative effect for large firms, and an increase in competition effects ROCE negatively for both SMEs and large firms.

*Table 15: Four different models on ROCE, Germany*

	SMEs				Large Firms			
	Model 1	Model 2	Model 3	Model 4	Model 1	Model 2	Model 3	Model 4
Average management score	0,254 (-0,07)	2,385 (-0,72)	-4,425 (-1,05)	-6,664 (-0,84)	2,478 (-1,81)	2,568 (-1,96)	3,699** (-2,61)	3,006* (-2,29)
Year	0,625 (-0,28)	0,415 (-0,18)	-1,469 (-0,84)	-0,904 (-0,46)	-0,683 (-1,51)	-0,811 (-1,77)	-0,591 (-1,22)	-0,806 (-1,70)
<b>Firm specific controls</b>								
Employees w/ degrees		-0,341* (-2,11)	0,305 (-1,79)	0,23 (-1,08)		0,175* (-2,51)	0,137 (-1,79)	0,152* (-1,99)
Age of firm		0,00667 (-0,8)	0,0141 (-1,72)	0,00455 (-0,25)		-0,00941 (-0,72)	-0,00126 (-0,10)	0,00046 (-0,03)
<b>Financial controls</b>								
Average wage			2,407 (-0,33)	2,612 (-0,25)			0,685 (-0,25)	1,068 (-0,34)
Capital			8,964* (-2,48)	7,981 (-1,85)			-3,998*** (-4,58)	-3,592*** (-4,30)
Materials cost			13,83*** (-5,69)	13,16** (-2,8)			1,593 (-1,78)	1,691* (-1,98)
<b>External Controls</b>								
Publicly listed				6,819 (-0,81)				-1,282 (-0,96)
Unconsolidated				2,433 (-0,23)				1,32 (-0,55)
Competition				2,398 (-0,24)				4,037** (-3,25)
_cons	-1240,9 (-0,28)	-824,3 (-0,18)	2746,5 (-0,79)	1628,3 (-0,41)	1368,9 (-1,51)	1623,9 (-1,77)	1201,6 (-1,25)	1617,4 (-1,71)
N	41	41	41	41	317	317	317	317

*t* statistics in parentheses

\*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$

The number of observations for SMEs is 41, and for large enterprises is 317. For SMEs, average management score exhibits both a positive and negative effect on ROCE but no significant effect. However, for large firms the coefficient for average management score is positive throughout and this coefficient becomes significant when controlling for financial- and external controls. For SMEs, we find that the coefficient for capital is significant at a 5% level in model 3 and for materials cost is positive and significant for both model 3 and 4. For large enterprises, we see that the coefficient for capital is negative but significant at the 1% level for all models. Materials cost has a positive effect throughout and is significant in model 4. The coefficient for employees with degrees is positive in both models, and significant in model 2 and 4. As the age of SMEs increases by one year, this has a positive effect on ROCE, whereas large firms only experience a positive effect of firm age when adding external controls. An increase in average wage has a positive effect on ROCE for both SMEs and large firms. All external controls have a positive effect on ROCE for SMEs. Being publicly listed for large firms has a negative effect but an increase in competition which is significant at a 5% level, as well as being unconsolidated, has a positive effect.

*Table 16: Four different models on ROCE, UK*

	SMEs				Large Firms			
	Model 1	Model 2	Model 3	Model 4	Model 1	Model 2	Model 3	Model 4
Average management score	1,496 (-0,53)	0,793 (-0,22)	1,062 (-0,3)	0,634 (-0,19)	4,205*** (-3,92)	4,647*** (-4,21)	4,841*** (-4,36)	4,419*** (-3,84)
Year	-1,358** (-2,85)	-1,518** (-3,00)	-2,286*** (-4,74)	-2,316*** (-4,23)	-1,232*** (-4,88)	-1,355*** (-5,49)	-1,512*** (-5,99)	-1,450*** (-5,65)
<b>Firm specific controls</b>								
Employees w/ degrees		-0,161 (-0,92)	-0,288 (-1,79)	-0,209 (-1,31)		-0,0479 (-0,64)	-0,0627 (-0,85)	-0,0952 (-1,30)
Age of firm		-0,0346 (-0,71)	-0,0629 (-1,34)	-0,0712 (-1,52)		-0,0830*** (-3,86)	-0,0903*** (-4,07)	-0,0857*** (-3,89)
<b>Financial controls</b>								
Average wage			19,49** (-3,06)	20,32** (-3,15)			4,871 (-1,87)	3,052 (-1,06)
Capital			4,801* (-2,44)	4,327* (-2,26)			-1,81 (-1,56)	-1,566 (-1,40)
Materials cost			-0,194 (-0,11)	-0,746 (-0,41)			1,546 (-1,5)	1,007 (-1,01)
<b>External Controls</b>								
Publicly listed				-2,24 (-0,44)				2,842 (-1,62)
Unconsolidated				-7,316 (-1,77)				8,324 (-1,61)
Competition				-2,79 (-0,91)				0,367 (-0,23)
_cons	2724,6** (-2,86)	3050,0** (-3,01)	4482,4*** (-4,68)	4557,9*** (-4,18)	2465,4*** (-4,88)	2714,7*** (-5,5)	3013,8*** (-6)	2897,1*** (-5,7)
N	159	159	159	159	457	457	457	457

t statistics in parentheses

\*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$

The number of observations for SMEs is 159, and for large enterprises is 457. The coefficient of year is significant and negative for all models, for both SMEs and large firms. Other than that, only the coefficients for average wage and capital are significant in all models at a significance level at 5% and 10% respectively. An increase in average management score has a positive effect on ROCE in all models for both SMEs and large firms. Firm specific controls have a negative effect in all models for SMEs as well as for large enterprises. An increase in average wage has a positive effect for both SMEs and large enterprises and we see the largest effect for SMEs, which is more than double that of large firms. Further, an increase in capital has a positive and significant effect on ROCE for SMEs but a negative one for large firms in all models. An increase in materials cost has a negative effect on ROCE when looking at SMEs but a positive effect for large firms. Lastly, all external controls have a negative effect for SMEs but the opposite effect for large enterprises.

## **7. Discussion**

In this section, we examine each variable in depth to understand what kind of effect it has on our dependent variables. We also look at what kind of results we get in terms of the effects that management practices have on sales growth and ROCE. We then look at the limitations of this study and the data used, so those can be addressed in further research, for which we give some suggestions.

### **7.1 Discussion about empirical findings**

#### **7.1.1 Average management score**

From theory (Gallo, 2011), we learn that better management practices are positively correlated with different metrics of firm performance like sales, revenue, profitability and survival. Management quality has a notable effect on productivity, efficiency and motivation levels.

##### **Sales Growth**

In France, we see that the coefficient for average management score for SMEs is always positive and there is not much variation between the different coefficients. However, when looking at large enterprises, we see a fair amount of variation between the models, and for models 3 and 4, the coefficient becomes negative. This negative result is consistent with our findings from the descriptive statistics, (see Table 7). However, it is not statistically significant. The coefficient for SMEs is much higher in magnitude and effect than it is for larger enterprises. Seeing a negative coefficient for average management goes against most academic and empirical research on the subject of quality of management, which says that better management should lead to increased sales and improved performance (Gallo, 2011). This effect comes into play when we control for wage and capital. Doing so allows us to capture the effect of one or both of these variables which could have been causing a significant

bias in the coefficient for average management in the previous models. However, this seems fairly unlikely since there is no theory to suggest that better management practices lead to decreased or poorer sales, and it goes against common logic and intuition of management studies. The coefficient for average management is positive for both SMEs and large enterprises in model 1 and 2. In SMEs, we see the strongest effect for sales growth when controlling for external controls in model 4. When controlling for wage and capital, the management effect on sales growth decreases. We do not know whether this is because management is capturing the effect of capital and/or wage in model 1 and model 2.

In Germany, for both SMEs and large firms we see a positive effect on sales growth when average management score increases. However, for large enterprises we see a decreased positive effect when adding financial and external controls. Finally, in the UK, for SMEs, we see the same effect on sales growth as we did for France and Germany. The coefficients are positive and without much variation. However, we see the opposite for large firms, the effect on sales growth is negative and the effect becomes stronger in model 3 and 4 compared to model 1 and 2, when controlling for financial and external controls.

When performing pooled OLS regression without segregating by country (see Table 9) and performing the four regression models, we get positive coefficients for each of them except in model 3 for large firms, where it becomes negative. This is not in line with the other results. We see a positive trend for both SMEs and large enterprises, which indicates that our hypothesis about management practices having a positive effect on sales growth is accurate. However, it is worth noting that there is a difference in the magnitude of the effect on sales growth for different firm sizes. With SMEs being more sensitive to changes in management practices than large firms.

## **ROCE**

For France, the coefficient of average management is positive through all the models for SMEs and successively increasing. However, for large enterprises we see that average management score has a negative, but not statistical significant effect on ROCE for all models. It is interesting to note from our summary statistics in Table 8, that when we have a lower average management score the main value for ROCE is higher than it is for when we have a higher

management score. One possible explanation for this could be that there is a very particular management culture in France that clashes with what the survey categorizes as good management. However, since these practices are accepted norms in France, they do better, in terms of the effect on performance than they might otherwise in a globalised context.

For Germany, we see mixed results for SMEs where average management score has a positive effect for model 1 and 2, but a negative effect for model 3 and 4. For large enterprises average management score has a positive effect throughout and is significant in model 2, 3 and 4. For SMEs and large firms in the UK, average management always has a positive effect on ROCE and for large enterprises, this effect is significant at the 1% level. This is in line with our hypothesis that better management has a positive effect on firm performance.

In table 10, we have the regression results from the four models for France, Germany and the UK pooled together. We see positive results for both SMEs and large firms, as hypothesized. Typically, with better management practices we see better efficiency and productivity, improved investment decisions and optimal use of resources and capital. All these factors contribute to a positive ROCE. We see that the results are greater and significant for large firms. This could be because large firms have more capital to hire better managers with overall experience.

Seeing a positive effect on sales growth and ROCE for both SMEs and large firms, is in line with Penrose's resource theory (1959). Firm performance is not only due to size, but also a reflection of a manager's ability to use his/her resources.

### **7.1.2 Employees with degrees**

Knowledge is a crucial aspect of the resource based theory and forms the basis of a sustained competitive advantage. Human capital with requisite knowledge is known to have a positive effect on firm growth and firm performance (Greene, 2015).

### **Sales Growth**

In France, for SMEs we see that the coefficient is always negative indicating that having more educated employees will decrease sales growth. However, for large enterprises we see a mixed set of results where the coefficient becomes positive when adding financial and external controls. Agiomirgianakis et al. state that education is positively correlated with different aspects of firm performance. Education enables employees to take more informed decisions coupled with improved communication abilities which makes them better leaders. Magoutas et al. augment these findings by suggesting that the education level of firm employees has a positive effect on economic performance. Finding a negative relationship between education and sales growth goes against previous research, since it suggests that having more educated employees is bad for sales. The coefficients for education become positive in the last two models for large enterprises.

Germany has similar results to France for SMEs, that indicate having a degree decreases sales growth. In model 4 we find a significant effect for SMEs at the 10% level. However, for large firms, we find that when employees have a relevant degree sales growth increases, implying education has a positive effect on sales growth. This is more in line with earlier results. For the UK, we find the same effect on sales growth when the share of employees with a degrees increases, as we do for Germany for both SMEs and large firms, causing us draw the same conclusions.

### **ROCE**

In France, an increase in employees that hold degrees reduces ROCE in all models for SMEs. However, we see the exact opposite for large enterprises with significant coefficients. While employee education levels should have a positive effect on metrics of firm performance, one explanation for SMEs having a negative effect is that they have lower capital reserves and hence, paying high wages to a higher share of educated employees can negatively impact the return on capital employed.

In Germany, the effect of employees with degrees is positive for SMEs, except for in model 2. Model 2 possibly captures a bias from financial controls. For large enterprises, this effect is

positive for all models and significant for model 2 and model 4. In the UK, the effect of employees with degrees is always negative for both SMEs and large enterprises.

### **7.1.3 Age of firm**

Evans, Caves and Chun et al., all suggest that with firms becoming older, the cost of goods sold (COGS) increases, while investments in R&D decrease; machinery and existing technology become increasingly outdated implying a decrease in firm performance. Another study suggests a more directed approach towards sales growth, that says with increasing time competition increases thereby reducing the aging firms market share which directly impacts sales growth rates (Loderer and Waelchli, 2010, p.22).

#### **Sales Growth**

For SMEs in France, we note that with an increase in firm age the effect on sales growth is negative. This is so for large enterprises as well. These findings are consistent with existing research. For both SMEs and large firms in Germany, with an increase in firm age, sales growth will decrease and there is not much variation within the value of the coefficients for either SMEs or large enterprises. We see a similar effect in the UK, for both SMEs and large enterprises, as we do in France and Germany - a negative effect on sales growth when there is an increase in firm age. For large firms this effect is significant when using all models, at a 5% level and the negative effect gets stronger when adding financial- and external controls. Another plausible explanation for a negative relation between the two variables could be that with time, irrespective of competition, products manufactured by firms experience a decline in demand due to an evolution in customer preferences, hence experiencing a decline in sales growth (Loderer and Waelchli, 2010, p.22). Larger the firm more the time it will take to adjust to changes in the market since large firms are known to exhibit a level of inertia that is not seen in SMEs. Some studies, however, suggest that SMEs should be able to adjust to changes faster and that with age, firms accumulate experience and knowledge that show us a positive effect of firm age on sales growth.

## **ROCE**

In France, firm age has a negative effect on ROCE for both SMEs and large enterprises. We see the same effect in the UK. This is in line with theory. But in Germany for SMEs, age has a positive effect for all models. For large enterprises this effect starts out negative but gradually becomes positive when adding external controls. This could be so because Germany is known for being more aware of customer preferences, improving quality and lowering the cost of production. They capitalise on this knowledge in the long run and therefore can experience a positive effect on ROCE when firm age increases.

### **7.1.4 Average wage**

Theory states that wages can be seen as an incentive to perform better, and increase both productivity and efficiency. Workers also perform better and work harder when they feel like they are being fairly compensated for their work. All these factors are known to increase firm performance, including overall sales and sales per employee (Ouimet and Simintzi, 2018).

#### **Sales Growth**

We see results for France that are in line with findings from theory. For both SMEs and large enterprises, an increase in average wage leads to a positive impact on sales growth. However, in Germany, we see mixed results. For SMEs, when average wages increase, there is a negative effect on sales growth, but for large firms the results are again consistent with theory that when wages increase, sales growth increases. In model 3 we even see that the relevant coefficient is significant at the 10% level. When controlling for external factors, this effect gets stronger but no longer remains significant. Finally, in the UK both SMEs and large firms will have a similar effect on sales growth as their respective counterparts in Germany, however none of these coefficients are significant.

## **ROCE**

For France, the average wage has a negative effect for both SMEs, and large enterprises, where the coefficient is found to be significant. However, for Germany and the UK, we see the exact opposite results. France is not in line with theory. This could be explained just by looking at the equation (see figure 2) for the calculation of ROCE. It says that when costs increase,

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earnings decrease, and we know that wages are included in the calculation for cost of goods sold. Keeping this in mind, it is possible to understand the negative relation between average wages and ROCE for France.

### **7.1.5 Capital**

Motlíček et al. (2014) suggest that the degree of sales is greatly impacted by the level of working capital, especially by receivables and stocks. While we may not always know the source of capital, we know that an increase in capital will always increase working capital so it is safe to capture this indirect effect and say with confidence that an increase in capital increases sales growth. From this model, we can also state that ROCE increases with increased earnings, which are a consequence of sales.

#### **Sales Growth**

In France, for SMEs, capital has a negative coefficient indicating a decrease in sales growth when capital increases. This is contradictory to previous findings. However, large enterprises are more in line with existing research that say an increase in capital leads to increased sales. In Germany, we see that for both SMEs and large firms, when capital increases sales growth increases. When testing model 3 for large firms, capital becomes positive and significant at the 10% level. But when adding external controls, the coefficient is not significant anymore attributing the previous statistical significance to other controls and their effects. The coefficients for capital have a stronger effect in SMEs when compared to large enterprises, however they are not significant. Why this is so could be because the marginal effect of increase in capital is much stronger for SMEs due to them having a smaller capital base in comparison to large firms. In the UK, SMEs see a positive effect of having an increase in capital in all the models. When controlling for external factors in model 4, the effect is weaker but remains positive. This effect is positive for large enterprises as well. The effect on sales growth is stronger for SMEs than for large firms. The same reasoning could be applied for as to why this happens, as was done for Germany.

## **ROCE**

In France, we see that for SMEs, the effect of an increase in capital is negative. For large enterprises, the effect starts out positive then becomes negative. In Germany, for SMEs capital has a positive and significant effect but for large enterprises it has a negative yet significant effect. We see the same for the UK. With an increase in capital we can see a heightened level of investments that would lead to lower ROCE in the moment, due to an increase in expenses. However, these investments are done assuming that they will yield a higher ROCE in future. Due to measurement specifications, though, this coefficient is negative.

### **7.1.6 Materials cost**

From Porter's 5 forces we know that the bargaining power of a supplier will affect the cost of materials. Depending on how competitive the environment is, costs can increase by suppliers increasing their prices which in turn will lead to a decrease in the firm's EBIT.

## **ROCE**

In France, for SMEs an increase in materials cost has a negative effect on ROCE for all models, and for model 4 this effect is significant. However, materials cost has a positive effect on ROCE for large enterprises and this effect increases from model 3 to 4. In Germany, for both SMEs and large enterprises, materials cost has a positive and significant, and positive effect respectively for all models. Lastly for the UK, we see mixed results between SMEs and large enterprises where the cost of materials has a negative effect in case of SMEs and a positive effect otherwise. The effect of materials cost on ROCE can be both positive or negative depending on the company situation. If a company is making investments in high quality and/or superior materials, which in turn is increasing the materials cost from the usual average, this can lead to a positive effect on ROCE because this cost can be transferred along with an element of margin to the customer. Alternatively, if a company makes new investments that lead to higher production, materials cost will increase because of the increase in quantity. The return of this investment can still have a positive margin after covering the cost of the investment, and that will give us an increase in ROCE.

### **7.1.7 Publicly listed**

There are many benefits associated with going public, one of the biggest ones being access to more capital. Becoming a publicly listed company also gives the company a lot more exposure in the market. However, there are a number of downsides associated with going public as well, like increased scrutiny from the government and various stakeholders, disclosure of information being time consuming and expensive, and a lot more regulatory and compliance requirements.

#### **Sales growth**

While an increase in capital can indicate increased sales growth, all negative factors associated with going public can actually hamper sales growth. There is not much research out there on how sales growth is affected with a private firm becoming a listed one. Hence, we can expect mixed results on different aspects of firm performance for the same.

In France, being publicly listed has a negative and significant effect on sales growth for SMEs, however the result is opposite for large enterprises but not significant. A conceivable explanation for the contradictory results could be that the increase in sales is due to the increase in capital for publicly listed firms, however the decrease is because those resources that were dedicated to augmenting sales have now been diverted to expensive regulatory and compliance activities. For Germany, being publicly listed has a negative effect for SMEs as well as for large enterprises, although we find a stronger effect for SMEs. Yi Wu (2012) explain a decrease in sales when becoming publicly listed by citing a lack of capital. From the descriptive statistics (see Table 5 and 6) we see that SMEs have less capital than large firms. The UK is the only country in our sample where SMEs show an increase in sales growth from being publicly listed compared to not being listed. Although, the coefficient is not significant, a rationale for seeing a higher coefficient for SMEs is that they get more market exposure and better access to capital when they list, implying a positive effect on sales. Another reason for this could be that the firms in our sample that are publicly listed already have good procedures for reporting and complying with controls and regulations and do not experience as much cost as is usually associated with being publicly listed. They could therefore capitalize on all the

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benefits that come with the listing, like having better access to capital and being more exposed to potential markets. Large enterprises see a decrease in sales growth if they are publicly listed, but this coefficient is not significant. Another reason for why firms show a negative effect on sales growth when being publicly listed can be referred to in Grant's 4 reasons. Here we focus on transparency, stating that it is easier for other firms to access information and hence, the firm is not as competitive and will not perform as well as before. As hypothesized earlier, we see mixed results that could be justified with a range of explanations.

### **ROCE**

In France, being publicly listed has a positive effect on ROCE for SMEs, but a negative effect for large enterprises. We see the same pattern for Germany, but the exact opposite for the UK where being publicly listed has a negative effect on ROCE for SMEs, but a positive effect for large enterprises. By nature of being publicly listed the coefficient could have both a positive and negative effect on ROCE. The coefficient could be positive because when a firm is publicly listed, it is under constant scrutiny ensuring quality products. However, to maintain these standards of quality, significant costs are incurred. As hypothesized earlier this cost could be passed onto the customer thereby making ROCE positive. Additionally, due to their tendency to incorporate various stakeholders view, publicly listed firms could make a lesser return compared to if they did not have to incorporate these stakeholder views. All these factors could lead to a negative effect on ROCE when compared to unlisted firms.

### **7.1.8 Unconsolidated**

Firms that have undergone consolidation have access to the acquirer's resources. These are extra resources that unconsolidated firms may not have. This is one of the main pillars in the resource theory that with increased size, resources increase. The theory implies that large firms should have a higher and positive effect on sales growth and ROCE than SMEs.

#### **Sales growth**

For SMEs in France, being unconsolidated has a negative effect on sales growth in contrast to when one is consolidated, and this effect is significant at 1%. This is in line with resource theory - small firms get access to more resources and therefore are able to stay competitive.

For example, utilizing the acquiring firm's distribution channels can help the SME increase its sales by reaching new markets. For large firms, we see a suspicious result which is positive yet insignificant. In Germany, SMEs and large firms have a negative sales growth if they are unconsolidated. The coefficient for large firms is significant at the 10% level and decreases sales growth by .05%. This is, again, in line with resource theory, and even though we now look at large firms, that typically compete with other large firms, we see them accrue the same benefits from consolidation as do smaller firms. SMEs and large firms in the UK have similar results as Germany for being unconsolidated, but none of these coefficients are significant.

### **ROCE**

In France, being unconsolidated has a positive effect on ROCE for SMEs but a negative one for large enterprises. In Germany, this effect is positive for both SMEs and large enterprises. In the UK, the effect is mixed again but the opposite of that in France, with unconsolidated enterprises having a negative effect for SMEs and a positive one otherwise. One explanation for having a positive coefficient, when being unconsolidated, could be that those firms do not have to adapt to new management practices which consolidated firms have to. Over time, the consolidated firm should perform better since there has been an internal reallocation of resources and processes to be as efficient as possible. This maximises the probability of making optimal investments and doing away with waste, thereby making the coefficient positive.

### **7.1.9 Competition**

Competition here is reported as how the managers perceive the competitive climate for their firm. According to Porter's theories, firms with a competitive advantage will be able to withstand increased competition and utilize the market shares that becomes open when other firms have to exit. The resource-based theory emphasizes the importance of having superior resources, such as managers, to be competitive and gain profits.

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### **Sales growth**

An increase in competition suggests an increase in sales growth for SMEs in France. However, it decreases sales growth for large enterprises. Theory suggests that competition should have a negative effect on sales growth since more firms are sharing market sales. Alternatively, competition also pushes firms out of the market which increases available market share, and hence leads to an increase in sales growth as was shown by Bloom, Sadun and Van Reenen (2017) in their paper. The researchers also found that with increased competition, better managed firms increased their market share which required more inputs. So, firm size had a positive relationship with competition. In Germany, we see for both SMEs and large firms that when competition increases, sales growth decreases. There is a stronger effect for SMEs which is supported by theory that says that SMEs are more sensitive since they do not have very strong internal capital markets or economies of scale to absorb a loss of customers. They are also extremely price sensitive and are affected by fluctuations in price that may be caused by competition. This is, again, in line with theory and an expected result. For large firms, increased competition results in a positive effect on sales growth. The reason for this could be the same as that for SMEs in France, resulting in a higher market share. However, this coefficient is not significant. In the UK, SMEs experience a negative effect on sales growth from increased competition, while large firms have a positive effect. Again, with competition, more firms exit the market and as seen from the descriptives (see table 5), large firms have more capital on average than SMEs, which could help large firms survive in a more competitive environment.

### **ROCE**

In France, a unit increase in competition has a negative effect on ROCE, for SMEs and for large enterprises. This effect is significant at 1% for large enterprises. In Germany, this effect is positive for both SMEs and large enterprises, but mixed for the UK, where the effect of competition is negative for SMEs and positive for large enterprises. With economies of scale, large firms could experience a positive effect on ROCE because they have lower unit costs when compared to small firms, and their market share could increase if SMEs have to exit the market. This will lead to a decrease in the competitive environment, which was what Bloom and Van Reenen found in their paper. From the descriptive statistics, we find that SMEs have a lower average management score in the UK than large firms. According to resource theory,

larger firms have more capital than SMEs and can still invest during intense competitive conditions. This is in line with one of Grant's 4 reasons for why firms stay competitive, *durability*. This can explain why we find that SMEs have a negative effect from increased competition and could be so since SMEs might have less capital than larger firms, and are unable to replace their outdated machines or buy more efficient ones to stay competitive.

## 7.2 Limitations and further research

There is not much literature out there comparing the differences in the impact of management practices between SMEs and large enterprises. While this study adds to existing literature, there are certain drawbacks that should be addressed for incorporating into future research. The first limitation we come across is the very definition of 'good' and 'bad' management. Countries vary in terms of culture, ways of doing business and organisational management making management practices a fairly subjective topic. A pertinent example is that of France that has a very distinct management style. As per the survey used to collect management data and score it, such a management style would be scored as 'poor' or 'bad' management. But this approach is flawed because it does not take into view local worker perception that might view this as an effective and 'good' style of management. The workers are asked to answer a fixed set of questions that have a predetermined management score. It is important that when collecting this data, country specific customisation is enforced. Next, we see a skewed result in terms of the ratio of SMEs to large enterprises that could potentially lead to variation between the accurate numbers and the result of this study. Further, this could also be the case for country wise samples where one country is represented in a more balanced way or with a larger overall sample size than another. When scoring management practices, there is always a margin for human error since human beings are not completely rational. There is also a possibility of workers of the same plant answering the same question in differing ways, thereby inducing a bias. Finally, there is a possibility of having a selection bias when selecting the firms to be interviewed.

Consequently, there is a number different directions future research could go in. One interesting aspect would be for researchers to look at how these differences pan out in emerging economies to see if management is as crucial a variable, and if there is the same level of awareness regarding its importance, as in developed economies. Additionally, it is interesting to see the evolution of the effects of management over the years since this data was collected, more than a decade ago. The awareness surrounding the topic has substantially grown over the years. It is also important to score management practices country wise and not standardise them globally. Finally, research could look at lagged effects to get a more accurate estimate of the effect on ROCE from an increase in capital and investing, that does not reflect immediately.

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## 8. Conclusion

The goal of our study was to investigate whether there is a relationship between having good management practices and better firm performance and if there is a difference in the magnitude of this effect for SMEs and large firms. More specifically, we wanted to test the following two hypotheses,

***Hypothesis 1:** An increase in the score of average management practices will have a positive effect on a firm's sales growth and this effect is stronger in SMEs when compared to large enterprises.*

***Hypothesis 2:** An increase in the score of average management practices will have a positive effect on the return on capital employed in a firm and this effect is stronger in SMEs when compared to large enterprises.*

We wanted to test these on the leading economies in Europe - France, Germany and the UK - and check if we get homogenous results.

For our pooled sample without segregating by country, we found that management practices do have a positive effect on sales growth (except in model 3 for large firms) and this effect is stronger for SMEs when compared to large firms. For ROCE, we also found that better management practices have a positive effect. However, this effect is stronger and statistically significant for large firms. When looking at the countries separately, we do discover differences between them and findings that do not support our hypotheses.

For SMEs in France, an improved average management score results in increased sales growth and a higher ROCE. The effect is stronger for SMEs than for large firms. Large firms experience a decline in ROCE when their management practices get better and see a negative effect on sales growth when controlling for financial and external effects.

For Germany, we found that an increase in average management score has a positive and similar effect on sales growth for both SMEs and large firms. When measuring ROCE, we found that better management practices have a positive effect for large firms but for SMEs, there is a positive effect only when not controlling for financial- and external effects. SMEs in Germany tend to be less capital driven and have a long-term focus on their investments than large firms. The effect of better management practices being negative could be because the capital invested will not result in an instant payoff, instead expecting a higher return in the future.

When testing the same for the UK, SMEs experience a positive effect on sales growth from having better management practices, while large firms show the opposite result. CEOs in the UK value managers who show engagement, and that it is the foundation of their leadership style, since they believe that engagement motivates their employees and will result in better firm performance. Monitoring and motivating employees is typically easier when a firm has concentrated ownership rather than fragmented ownership. SMEs more often than not, have only a handful of top managers and a smaller workforce when compared to large firms. This could explain the positive results. When measuring ROCE, both SMEs and large firms benefit from improving their management practices but this effect is stronger and statistically significant for large firms.

We can draw the conclusion that management practices are important for a firm's performance, but there is a lot of heterogeneity in their strength of impact. For a reader of this study, the main takeaways depend on what kind of role he/she occupies in a firm, his/her responsibilities and the size of the firm he/she works in. For all managers, there is an overall indication that following certain generally accepted norms of good management tend to improve firm performance related to sales and return on capital. Additionally, it depends on the country that a reader works in, as to how sensitive a firm is to management style and practices, and how much impact these can have on tangible aspects of performance, like sales growth and ROCE.

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## Appendix A Tables

*Table A 1: Areas of interest for management interview*

Areas of Interest for Management Interview	
<b>Operations focuses on</b>	<ol style="list-style-type: none"> <li>1. The introduction to lean manufacturing techniques into the production process</li> <li>2. The documentation of operations improvement</li> <li>3. The motivation and reasoning behind introducing lean manufacturing techniques</li> </ol>
<b>Monitoring focuses on</b>	<ol style="list-style-type: none"> <li>1. Tracking the performance of individuals</li> <li>2. Reviewing individual performance through regular assessments and job plans</li> <li>3. Speaking about performance and KPI's with the relevant authority</li> <li>4. Managing consequences when employees and workers do not meet targets</li> <li>5. Balancing financial and operational targets, as well as emphasizing the importance of nonfinancial goals</li> </ol>
<b>Targets focus on</b>	<ol style="list-style-type: none"> <li>1. The relevant interconnection of targets detailing what the goals of the company are, how these are communicated and tied in with individual worker goals, and vice versa</li> <li>2. The kind of target time horizon that is set, detailing time periods set for achieving goals as well as the distribution of emphasis placed on short and long term goals</li> <li>3. The consistent fulfillment of targets detailing whether workers meet their targets in time or overshoot their deadlines</li> <li>4. The transparency of targets detailing how simple or complex they are</li> <li>5. The interconnection of targets that refers to whether targets are equally and fairly distributed across the organization, and if they are aligned with the mission and vision of the same</li> </ol>
<b>Incentives focus on</b>	<ol style="list-style-type: none"> <li>1. How employees move to senior positions in the firm, if the process is performance based or if it is purely based on tenure</li> <li>2. How employees are remunerated</li> <li>3. What kinds of bonuses employees receive</li> <li>4. How poor performers are dealt with</li> <li>5. If an employees are unable to improve, how often and how quickly are they let go off</li> </ol>

Table A 2: Porter's Five Forces

<b>Industry rivalry:</b> Refers to how the current competition in the market is. High level of rivalry can be due to low switching cost among customers and having few competitors that are offering the same service or product. Intense rivalry can lead to competing on price and less profit for firms.
<b>Bargaining power of customers:</b> Analyses how much customers can affect a product's price and quality, for example when there are more sellers than customers. Also when switching costs are low the bargaining power of customers increases.
<b>Bargaining power of suppliers.</b> The fewer suppliers the more power they have so for businesses it is better when there are a lot of suppliers. A supplier's power increases when it has the ability to raise its prices which results in a lower profit for the business here acting as a customer.
<b>Threat of new entrants.</b> The easier it is for a firm to enter the market, the higher chance for existing firms to have their market share decreased. Entry barriers will impede new firms to enter the market. Barriers could be high start-up costs, patents and strong brand brand identity.
<b>Threat of substitutes (products or services).</b> This force analyse the ease for a customer to switch product or service. The lower switching costs and if the quality of a product (or service) is lower than competitor's, threat of substitutes will increase.

Table A 3: Summary statistics by country, France

SUMMARY STATISTICS BY COUNTRY - FRANCE						
Variables	Entire sample		SMEs		Large firms	
	Total	Non-missing	Total	Non-missing	Total	Non-missing
ROCE	998	951	434	404	563	546
Sales growth	998	863	434	375	563	488
Average management score	998	998	434	434	563	563
Capital	998	937	434	383	563	553
Materials cost	998	998	434	434	563	563
Employees w. degrees	998	709	434	337	563	371
Age of firm	998	998	434	434	563	563
Average wage	998	992	434	434	563	557
Publicly listed	998	998	434	434	563	563
Unconsolidated	998	998	434	434	563	563
Competition	998	998	434	434	563	563

The data is from the two merged datasets (Amadeus and the Nick Bloom Van Reenen management dataset) for the year 1994-2004. We have compiled the total number of observations, along with the non-missing values and then present what percentage of the total observations are non-missing values. We have done so for the entire sample and also distinguished large firms and SMEs. The size categories are defined in line with the European standard when referring to number of employees. Large: more than 250. SMEs: larger and equal to 10 and less than 250.

*Table A 4: Summary statistics by country, Germany*

SUMMARY STATISTICS BY COUNTRY - GERMANY						
Variables	Entire sample		SMEs		Large firms	
	Total	Non-missing	Total	Non-missing	Total	Non-missing
ROCE	1098	1025	125	105	972	920
Sales growth	1098	942	125	107	972	835
Average management score	1098	1098	125	125	972	972
Capital	1098	1048	125	121	972	927
Materials cost	1098	474	125	48	972	426
Employees w. degrees	1098	881	125	117	972	763
Age of firm	1098	1098	125	125	972	972
Average wage	1098	1043	125	117	972	926
Publicly listed	1098	1098	125	125	972	972
Unconsolidated	1098	1098	125	125	972	972
Competition	1098	1098	125	125	972	972

The data is from the two merged datasets (Amadeus and the Nick Bloom Van Reenen management dataset) for the year 1994-2004. We have compiled the total number of observations, along with the non-missing values and then present what percentage of the total observations are non-missing values. We have done so for the entire sample and also distinguished large firms and SMEs. The size categories are defined in line with the European standard when referring to number of employees. Large: more than 250. SMEs: larger and equal to 10 and less than 250.

*Table A 5: Summary statistics by country, UK*

SUMMARY STATISTICS BY COUNTRY - THE UK						
Variables	Entire sample		SMEs		Large firms	
	Total	Non-missing	Total	Non-missing	Total	Non-missing
ROCE	1251	1096	377	305	874	791
Sales growth	1251	1100	377	324	874	776
Average management score	1251	1251	377	377	874	874
Capital	1251	1230	377	365	874	865
Materials cost	1251	1238	377	375	874	863
Employees w. degrees	1251	756	377	223	874	533
Age of firm	1251	1251	377	377	874	874
Average wage	1251	1251	377	377	874	874
Publicly listed	1251	1251	377	377	874	874
Unconsolidated	1251	1251	377	377	874	874
Competition	1251	1251	377	377	874	874

The data is from the two merged datasets (Amadeus and the Nick Bloom Van Reenen management dataset) for the year 1994-2004. We have compiled the total number of observations, along with the non-missing values and then present what percentage of the total observations are non-missing values. We have done so for the entire sample and also distinguished large firms and SMEs. The size categories are defined in line with the European standard when referring to number of employees. Large: more than 250. SMEs: larger and equal to 10 and less than 250.

*Table A 6: Distribution of firms in different size categories for our analysis sample*

		<b>Number of firms in each size category</b>										
		<b>1994</b>	<b>1995</b>	<b>1996</b>	<b>1997</b>	<b>1998</b>	<b>1999</b>	<b>2000</b>	<b>2001</b>	<b>2002</b>	<b>2003</b>	<b>2004</b>
<b>Whole Sample</b>												
Total sample		179	230	268	291	328	373	420	429	424	371	34
SMEs		46	59	66	76	92	109	120	125	123	108	12
Large		132	171	202	215	235	264	300	304	301	263	22
<b>France</b>												
Total sample		27	51	77	87	105	120	127	131	130	131	12
SMEs		14	26	31	34	44	54	59	59	55	50	8
Large		12	25	46	53	61	66	68	72	75	81	4
<b>Germany</b>												
Total sample		61	81	88	94	104	121	149	152	145	101	2
SMEs		3	6	8	11	12	15	20	21	18	11	0
Large		58	75	80	83	91	106	129	131	127	90	2
<b>UK</b>												
Total sample		91	98	103	110	119	132	144	146	149	139	20
SMEs		29	27	27	31	36	40	41	45	50	47	4
Large		62	71	76	79	83	92	103	101	99	92	16
Number of employees within each size category; Total Sample: >=0. SMEs: >=10 and <250. Large: >=250												