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The Moderating Effect of ERP System Complexity on the Growth—Profitability Relationship in Young SMEs

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Abstract

In this study, we investigate the relationship between growth and profitability in young SMEs. Prior discussions in this area have primarily concerned how well either the market or resource perspective explains the performance of companies. We argue that those two perspectives do not provide competing explanations, but rather complementary explanations. We test our hypotheses on longitudinal register data paired with cross-sectional survey data (N=451). Specifically, we found that whether growth increases or decreases the profitability of young SMEs depends on the ERP system complexity in the firms.

Introduction

In recent years, the relationship between growth and profitability has been increasingly discussed in the entrepreneurship literature (Davidsson et al. 2009; Senderovitz et al. 2016). Different positions concerning the effect of firm growth on firm performance are found, and these depend upon whether the author has taken a market or resource perspective (Markman and Gartner, 2002). According to the market perspective, growth has a positive effect on performance, because high growth firms more easily capture premium segments, achieve economies of scale, set industry standards, and/or control distribution channels during their period of growth (Senderovitz et al. 2016; Markman and Gartner 2002; Rannikko et al. 2018). According to the resource perspective, on the other hand, there will be a short-term negative effect on growth, caused by the cost of building resources within the firm in order to create sustainable competitive advantage, which will only provide benefits at a later point in time (Davidsson et al. 2009; Senderovitz et al. 2016). These two perspectives are perceived as competing explanations of the relationship between growth and profitability (Markman and Gartner 2002; Davidsson et al. 2009; Senderovitz et al. 2016).

Inconsistencies in arguments related to the two perspectives, and in prior empirical results about the growth—profitability relationship, can be partly explained by contingencies related to industry (Hawawini, Subramanian, and Verdin, 2003), firm size (Beck, Demirgüç-Kunt, and Maksimovic, 2005), firm age (Sapienza, Autio, George, and Zahra, 2006), access to financial capital (Becchetti and Trovato, 2002) and environmental hostility (Zahra and Garvis, 2000). Whilst these
contingencies provide partial explanations for the inconsistency, there is at least one other important unexplored factor that potentially helps us understand how growth leads to profitability, namely enterprise resource planning systems (ERP systems). ERP systems are expected to enable firms to better utilize, control and manage the benefits of growth (Buonanno et al. 2005; Buonanno et al. 2006; Galy and Sauceda 2014).

In this paper, we focus on how firm growth affects firm performance among young, small and medium-sized companies (SMEs). We also investigate how the introduction of increasingly complicated ERP systems will directly affect SMEs’ profitability and whether ERP systems enhance or restrict the effect of growth on profitability (Buonanno et al., 2006; Mabert, Soni, and Venkataramanan, 2003; Tenhiälä and Helkiö, 2015). In contrast to prior, conflicting, arguments concerning the market and the resource perspectives, we argue that both perspectives are necessary in order to explain the relationship between growth and profitability for young SMEs. Focusing on ERP systems as the enabler of both perspectives, we argue that advanced ERP systems, which are perceived as difficult to use in business, will influence the effect of growth on profitability both through market and resource mechanisms (Swafford, Ghosh, and Murthy, 2008). Our proposed theoretical model is shown in Figure 1.

Insert Figure 1

The introduction of simpler ERP systems designed for young SMEs can be the key to better utilization of the benefits of growth (Bock and Kim, 2002; Buonanno et al., 2005). The first waves of ERP systems were primarily designed for large firms (Loh and Koh 2004; Muscatello et al. 2006), but because of the development of both systems and the technological know-how of the users, as well as the saturation of the ERP market for large companies (Zach, Munkvold, and Olsen, 2012), ERP systems have transitioned to the SME sector. This has provided new opportunities for SME firms who can finally implement ERP systems designed and developed for their specific characteristics (Koh and Simpson 1996; Petroni and Rizzi 2005).
In order to increase sales, normally leading to increased market share and number of employees, there is a need for firms to develop organizational resources in a manner that supports profit making. This particularly applies to young SME’s in their quest to create legitimacy and survivability as an organization (Human and Provan, 2000). According to theories of liability of newness (Stinchcombe 2000) and liability of smallness (Aldrich and Auster, 1986), young SMEs need to create legitimacy in their relationship with stakeholders. Both liability of newness and liability of smallness are theories that relate to growth and survival of young SMEs; specifically, the disadvantages that young SMEs experience compared to their older and larger competitors with regards to legitimacy. Therefore, to gain legitimacy the focus for young SMEs will often be on initiatives that create a short-term profit and a reduction in time from investing in firm resources to the return on that investment.

We test our theoretical model on a dataset consisting of longitudinal register data paired with cross-sectional survey data (N=451). Our study makes three contributions. First, we contribute to the ongoing debate on the growth-profitability relation in entrepreneurship (Markman and Gartner, 2002; Davidsson et al., 2009; Senderovitz et al., 2016); second, we contribute to the debate on use of ERP systems in SMEs (Andersen and Samuelsson, 2016; Haddara and Zach 2011); and finally, we contribute by changing the debate on competitive advantages from competing explanations to complementary explanations.

**Theoretical background**

**Discussion of the Growth—Profitability Relationship**

Prior studies of the relationship between growth and profitability have produced very different results (e.g. Demir, Wennberg, and McKelvie 2017; Markman and Gartner 2002); from a strong positive correlation (e.g. Chandler and Jansen 1992; Delmar et al. 2013; Russo and Fouts 1997), a weak positive correlation (e.g. Cho and Pucik 2005; Coad, 2007), and an insignificant correlation (e.g. Roper, 1999; Sexton and Smilor 1997), to a negative correlation (Brännback et al., 2009; Davidsson et al., 2009). The quest to explain the growth—profitability relationship continues
(Brännback, Carsrud, and Kiviluoto, 2014; Demir et al., 2017). In order to resolve this puzzle, Markman and Gartner (2002) argued for two different explanations: one related to the market perspective (Porter, 1985) and one related to the resource perspective (Barney 1991a; Kogut and Zander 1992).

**The market perspective**

The market perspective builds on a presumption that growth generates economic advantages, which ultimately lead to performance. Competitive advantages are achieved in beneficial positions in heterogeneous markets (Porter, 1985). Among the economic advantages that firms may obtain from growth are, economies of scale (Besanko and Wu, 2013; Teece, 2012), being able to set industry standards (Zammuto et al. 2007; Lieberman and Montgomery 1987), first mover advantages (Lechner and Gudmundsson 2012; Lieberman and Montgomery 1987), controlling distribution channels (Zahra and Garvis, 2000), and better possibilities to fit market needs (Porter, 1985). Together these are expected to enable firms to increase performance.

**The resource perspective**

In contrast, the resource perspective builds on the presumption that unique sustainable resources, rather than beneficial positions in heterogeneous markets, are the key to creating long-term profitable growth (Barney, 1991b). Unique resources are characterized by being of high value, are rare and are hard to imitate (Barney, 2001). Thus, the focus switches from the market to the organization and its resources. According to the resource perspective, growth has a short-term negative effect on profitability (e.g. Brännback et al., 2009; Davidsson, Steffens, and Fitzsimmons, 2009). It emphasizes that in order for a firm to grow it is necessary for the management to replicate and transfer organizational knowledge (Grant, 1996; J Wiklund and Shepherd, 2003). The required transition of the firm, in order to enable the knowledge transfer process, involves managerial challenges (e.g. Garnsey, Stam, and Heffernan, 2006; Lewis and Churchill, 1983) that can be costly when there is a lack of formal structure; especially if firms simultaneously have to create knowledge structures whilst decentralizing and empowering middle managers and employees.
Thus, unique resources in the form of knowledge, which according to the resource perspective is of great importance for firm performance, are more difficult to create, maintain and develop during periods of growth. Accordingly, growing firms will experience a short-term negative effect on performance until the knowledge administration is updated.

**The combination of the market and the resource perspectives**

Whilst prior studies have, for the most part, considered one explanation rather than the other, we believe that it is a combination of both the market perspective and the resource perspective that explains the relationship between growth and profitability. This may also explain why empirical evidence points in different directions. Specifically, we argue that in order to grow, firms simultaneously seek to achieve market advantages given their positioning in the market, as suggested by the market perspective, as well as building up unique resources with increased costs as suggested by the resource perspective. Accordingly, to gain an accumulative positive effect of growth on profitability, the advantages of the market position have to exceed the short-term increased cost of building the organization and its related unique resources.

In our following hypothesis development, we are arguing that both the market and resource perspectives are necessary in order explain the relationship between growth and profitability for young SMEs. Particularly, we focus on ERP systems as the enabler of both perspectives. We argue that advanced ERP systems modify the effect of growth on profitability both through market and resource mechanisms (Swafford et al., 2008).

**Hypothesis development**

**The Growth—Profitability Relationship in Young SMEs**

The reason why the relationship between growth and profitability can be looked upon differently is partly due to the liability of newness and liability of smallness. Young SMEs often have a short-term focus (Stonehouse and Pemberton, 2002; Gielnik et al. 2017) due to both limited resources and the demand for legitimacy from within their environment (e.g. Aldrich and Auster, 1986;
The concepts of liability of newness (e.g. Freeman, Richard, Miller, Carroll, and Hannan, 1983; Stuart and Hybels, 2016) and liability of smallness (e.g. Aldrich and Auster, 1986; Stinchcombe, 1965) are both mostly used to describe the survival mechanisms of young and small firms; however, they also indicate why profitable growth is necessary for these firms, in order to survive.

Both liability of newness and liability of smallness, in line with the resource perspective, suggest that the cost of growth is larger for young SMEs than for older and larger firms (March and Shapira, 1992; Wennberg, Delmar, and Mckelvie, 2016). In this context, Aldrich and Auster (1986) suggest three reasons attached to the concept of liability of smallness explaining why smaller firms experience disadvantages compared to larger firms. First, raising capital can be challenging for small firms and the costs of obtaining capital weighted average cost of capital (WACC) are often higher compared to larger firms. Second, even with recent legislation focusing on reducing documentation and bureaucratic costs for SMEs, such costs still represent a larger comparative cost for SMEs than for large firms. Furthermore, even though it is not necessary for firms under a certain size to make a formal financial statement, most of their stakeholders still demand it, making the legislation redundant. Lastly, in competition for labor, SMEs also face a disadvantage in the form of the security and stability that they can offer their employees. Attached to this is the challenge emerging from increasing specialization in education and training, which is not well aligned with the demand for generalists among SMEs (Kyobe, 2004).

With his concept of liability of newness, Stinchcombe (2000) provides three main reasons why young firms experience disadvantages compared to older firms. First, young firms need to transfer the skills held by individuals to skills that belong to and are embedded in the organizational norms, procedures, and structures. This is a costly and time-consuming process. Second, because there is less structure in young firms it is also costlier and more time consuming for new employees to adapt and fit into the organization. Finally, in young firms the relationships with internal as well as external contacts are still mainly based on ‘social relations among strangers’ – arm’s-length
relationships characterized by limited trust that requires more time and resources in order to benefit from them.

However, liability of newness and liability of smallness simultaneously emphasize the need for legitimacy and suggest obtaining market advantages through growth as a solution to this same legitimization problem. In order to strengthen firms’ positions, both internally and externally, and overcome growth related issues associated with liabilities of smallness and newness, firms need to establish some sort of legitimacy (Delmar and Shane, 2004). Delmar and Shane (2004) divide legitimacy into three different categories: (1) to be obtained by making the firm appear reliable and accountable (Hannan and Freeman, 2016; Meyer and Rowan, 1977); (2) to strengthen the relationship with external stakeholders (Stinchcombe, 1965; Stuart and Hybels, 2016); and (3) to develop control over resources and recombining them in a way better than the established firms in the market (Schumpeter, 1934; Winter and Nelson, 1982).

Legitimacy for young SMEs can be attained by having a short-term focus on the relationship between growth and profitability linking investment in organizational resources and economic profitability. This would benefit a firm that looks reliable and trustworthy as well as improve the willingness of external stakeholders to invest time in creating ties with that firm (Bruneel et al. 2017).

Accordingly, we argue that both liability of newness and liability of smallness have a negative and a positive effect on young SMEs’ relationship between growth and profitability — negative in the sense that the disadvantages of organizational growth is more pronounced (Aldrich and Auster, 1986), and positive in the sense that it encourages and fosters firms to achieve short-term economies of scale. Due to the pressure for young SMEs to generate legitimacy (Aldrich, 1994; Suchman, 1995), we claim that firms that grow will achieve more advantages from their market position than disadvantages related to organizational arrangements. Thus, we argue that among young SMEs’ growth has a positive effect on performance in term of profit.

*Hypothesis 1: Growth is positively associated with profitability.*
Resource based view and ERP systems

The resource-based view builds on the assumption that companies must have unique resources in order to be competitive and profitable (Barney, 1991; 1997; Wernerfelt, 1984; 1995). The assumption that companies within an industry are heterogeneous in their resource possession explains why companies with the same market position encounter different performance. In the field of entrepreneurship, acquisition of knowledge and exploitation of advanced technology have been understood as means for producing unique resources (Alvarez and Busenitz, 2001; Barney, 2001; Wiklund and Shepherd, 2003). We focus on the process of gathering knowledge in ERP systems and the possibilities for exploiting this knowledge. This is a development seen in SMEs where ERP systems and information absorption capabilities are factors that have been proven to receive considerable investment in recent years (Loh and Koh 2004).

IT systems, not least ERP systems, have been an important part of the sensemaking process of changing data into information, thereby making it a unique resource (Bock and Kim, 2002; Hendriks, 1999). The discussion within this field has changed in character from, who has the best system, to who can utilize their system the best way (Olsen and Sætre 2007). This is especially the case for young SMEs; here systems are mostly standardized, although sometimes with industry specific variants (Olsen and Sætre, 2007).

Studies have shown that IT systems can allow firms to both minimize costs and achieve growth in sales (Kauffman and Walden, 2001; Kulatilaka and Venkatraman, 2001; Sambamurthy et al., 2002). On the other hand, more recent studies have indicated that the effect of IT systems primarily influences growth in sales, as opposed to cost reductions (Mithas, Tafti, Bardhan, and Goh, 2012).

IT systems can also be applied for making small companies look bigger than they actually are, thereby creating some legitimacy in the early stages of the organization (Tornikoski and Newbert, 2007). This will negate some of the negative effects of liability of newness and liability of smallness, providing higher profitability caused by the lower cost of transferring knowledge, and better grounds for establishing relationships with external stakeholders (Aldrich and Auster, 1986).
Specifically, we focus on ERP complexity as a way of conceptualizing how well firms gather and store knowledge within the organization. ERP complexity is, in this paper, defined as “the extent to which an ERP system is perceived as relatively difficult to understand and use” (Chang, Cheung, Cheng, and Yeung, 2008). Thus, it is understood as perceived complexity rather than the consequences of using the technology (Chang et al., 2008). The ability to generate knowledge with low complexity can be considered a unique resource (Wade and Hulland 2004; Ross et al. 1996; Bruneel et al. 2017), because it impacts 1) the cost of information and 2) the quality of information. On the other hand, ‘low ERP complexity’ should not be understood as ERP systems being simple from a functional point of view, in the sense that they might be too simple to adequately support operations.

If the perceived ERP complexity is high, firms will experience higher costs of information, due to a longer time being needed to learn how to operate the systems, as well as using these in daily operations. This increases the time it takes to share knowledge across the entire organization. Further, when ERP complexity is high, firms are more likely to experience data quality problems (Haug, Zachariassen, and Liempd, 2011). With high complexity, employees have a harder time understanding the purpose of the system and easily become sloppy in data generation and data administration (Wade and Hulland, 2004). This results in an ERP system that provides data with lower precision and quality. On the other hand, if the perceived ERP complexity is low, firms can share information across the entire organization at a lower cost and expect higher data quality.

Thus, with low perceived ERP complexity – and consequently high-quality data and low costs – firms are in a position to extract valuable and precise information about various customer segments that better enable them to grow and exploit economics of scale (Länsiluoto, Aapo, et al. 2018).

Hypothesis 2: Perceived ERP complexity is negatively associated with profitability

Moderating Role of ERP Complexity on the Growth—Profitability Relationship

Although we have an overall expectation of growth positively impacting performance, it is questionable whether this impact is universal and generic, and whether, and to what extent, it is
subject to certain contingencies; specifically, whether it depends on perceived ERP complexity. We claim that perceived ERP complexity can be linked to the market and resource perspectives by enhancing the gain and minimizing the cost of growing.

We argue that ERP complexity negatively moderates the growth-profit relationship for two reasons. First, as SMEs grow, the importance of the knowledge structure increases, due to increased organizational complexity (Lewis and Churchill, 1983; Theory, 2010). Such a knowledge structure enables the dissimination of organizational knowledge to new employees (Miller and Shamsie, 1996). With an aligned knowledge structure and with low ERP complexity, new employees can, more quickly, become familiar with the organizational routines and thereby focus on value-creating activities sooner. On the other hand, in firms where the ERP complexity is high, new employees will use more time and resources on learning and adapting to new routines. In this way, the SME will not fully benefit from growth until employees have acquired the necessary ERP system competencies. In other words, with high ERP complexity, there will be a period in which this complexity works counter to the growth benefits; to some extent balancing each other out.

Second, when an SME experiences high activity and stress levels, employees are more likely to try and work around complex systems by creating their own subsystems, neglect ensuring high data quality, or simply not register the data in ERP systems — as opposed to pushing urgent business matters aside to use the time needed in order to understand these systems well enough to use them correctly or efficiently (Bharadwaj, 2000; Feeny and Willcocks, 1998). These ‘work-around-systems’ are hard to integrate with the main ERP system(s) in the companies, implying that the company’s data quality decreases. This lack of data quality is particularly problematic when companies need to make strategic changes, such as in growth situations. Simultaneously, under such conditions of high activity and organizational stress, the need for data and information increases in order for SMEs to understand new markets, products or processes. Thus, it seems that the growth-profitability relationship is weaker for firms with high ERP complexity. The discussion above can be formulated as the hypothesis:
Hypothesis 3: The growth-profitability association is negatively moderated by perceived ERP complexity.

Methodology

Data & Sample

Our hypotheses were tested using a dataset consisting of longitudinal register data paired with cross-sectional survey data. The register data included information about profit and were complemented by a survey conducted in January 2015. The survey was conducted by Epinion, which is one of the largest Danish survey companies. The respondents to the survey were the CEO or the IT executive of the companies sampled. Because the firms in the sample are of a small size we think it is reasonable to assume that the CEO or IT executive of the firms will have good insights into the general state of the firm.

We operationalize SMEs as firms with less than 250 employees, but with a minimum of one (European Commission, 2015). We identify young firms (Davidsson and Klotsten, 2003; Reuber and Fischer, 2002; Steffens et al., 2009) as firms with a company age between two and twelve years. In order to make the growth measure comparable we need at least 2 years of register data for all companies in the sample. This also enables a robustness test of the growth variable based on register data.

At the time of sampling, the population of firms between 2 and 12 years old, and not larger than 250 employees, in Denmark adds up to 5582 firms. Of those, 1255 firms were picked randomly to complete the survey. We ended up with 604 completed responses, which equals a response rate of 48.1 percent — or 10.3 percent of the entire population. These 604 companies were then reduced to 531 companies, because 73 of them did not report the number of employees (control variable) or their Return on Invested Capital (dependent variable). A further 80 companies were also excluded due to their size placing them out of the SME category, or because they did not answer questions regarding ERP complexity or growth. In the end, the sample size was 451 companies.
We centered all categorical variables in order to move the mean to zero, and thus better interpret the models. Specifically, we centered number of employees, number of months since startup, ERP use, growth and ERP complexity.

**Measures**

*Dependent variable*

Profitability is measured by return on invested capital (ROIC) and is a collected from the database ‘Navne og numre erhverv’ [‘Names and numbers of businesses’], which contains the financial data for many Danish companies. ROIC is measured by EBIT (Earnings before interest and taxes) multiplied by 100 and divided by the total assets of the company (Fombrun and Shanley, 1990 and Porter, 2008). This measure enables removal of the size factor when comparing companies. ROIC determines the profitability of invested capital in the firm. This is a measure commonly referred to in the ERP literature as one of the most important performance measures (e.g. Hunton, Lippincott, and Reck, 2003; Mabert, Soni, and Venkataramanan, 2003; Stedman, 1999).

*Independent variables*

One of the independent variables is firm growth. Firm growth is measured in many different ways and with many different approaches (Davidsson, 2006; Gilbert, McDougall, and Audretsch, 2006): this can vary according to different perspectives. In this survey, we use a growth construct consisting of 3 items (Anderson and Eshima, 2013), i.e. growth in sales, market share and employees. The firm growth is measured on a 5 point Likert scale, ranging from “very high (5)” to “very low (1)”, which is a subjective measure based on these three items. In order to limit industry bias, we measure firm growth compared to the growth of their competitors over a three year period, instead of growth compared to change in growth for the specific company (Delmar, 1997). It is stated that the use of multiple growth variables (Davidsson, 1991) provides a better overall variable, because growth varies from industry to industry. This measure has been used, for a long time, as a base for evaluating relative firm growth within the management literature (Covin and Slevin, 1989; Lawrence and Lorsch, 1967; Tan and Peng, 2003).
These three items are combined into a single variable by taking the average score of the items. The Cronbach alpha for this scale was 0.804, which is above 0.8 and considered to be good (Gliem and Gliem, 2003). A Cronbach alpha above 0.7 is considered acceptable and all variables in this survey are above 0.7. Our Firm Growth variable is measured cross-sectionally as growth compared to an earlier point of time (Davidsson, Per; Achtenhagen, Leona; Naldi, 2010).

We measure the perceived ERP complexity compared to industry standards based on three items: “Working with the ERP system is complicated, it is difficult to understand what is going on”, “It takes too long to learn how to use the ERP system to make it worth the effort” and “In general, the ERP system is very complex to use”. Respondents evaluated these statements on a 5 point Likert scale, ranging from highly agree to highly disagree. The Cronbach alpha for perceived ERP complexity was 0.857.

**Control variables**

In order to control for different factors that could have influenced profitability, we controlled for a variety of confounding variables. Firstly, prior literature suggests that firm size plays a significant role in both the relationship between growth and profitability, and in the interaction between ERP capability and profitability (Hall and Weiss, 1967; Wiklund and Shepherd, 2005). Therefore, we controlled for **firm size** measured by number of employees. Secondly, we controlled for **company age**, which is known to influence growth as well as profitability (Almus and Nerlinger, 1999; Coad, Daunfeldt, and Halvarsson, 2014). We measured company age as the number of months since startup. Thirdly, we controlled for **ERP use** based on the number of central areas covered by an ERP system (Davenport et al. 2002). This was measured on a scale from 0 to 6, based on how many of the following areas are covered by an ERP system: finance, supply, sales, production, HR and R&D. This measure indicates the reach of the ERP system within the company, which is assumed to affect performance (Davenport, 2000; Wieder, Booth, Matolcsy, and Ossimitz, 2006). Finally, we controlled for **industry**. The effect of industry on growth and profitability are well known (Almus and Nerlinger, 1999; Tanriverdi, 2006; Wieder et al., 2006). We divided the companies into the
following industry categories: manufacturing, retail, service, transport and public utilities and financial (Harter, Schmidt, and Hayes, 2002; Killham, 2003).

Findings

Descriptive findings

Pearson correlation coefficients, means and standard deviations are shown in Table 1. The table shows that the average age of the firms in the survey is approximately 7 years and 9 months. They are divided into 5 industries with service firms and manufacturing firms being the largest groups constituting 32 percent and 29 percent of the total population, respectively.

The dependent variable, ROIC (return on invested capital) is significantly and positively correlated with the independent variable growth (r = .18), and significant negatively correlated with ERP complexity (r = -.16). There is a positive correlation between growth and size (r = .11) and a negative correlation between growth and age (r = -.12).

The data suggest no indications of multicollinearity, because the largest correlation is 0.43 between manufacturing and service. As an additional precaution, we computed variance inflation factors (VIFs) for all models in order to establish the VIF factors. These should be under a maximum level of 10 (Kutner, Nachtsheim, and Neter, 2004), and were in an area between 1 and 1.6, which indicates that there are no multicollinearity problems.

By combining survey data with register data, we were able to eliminate some of the risks associated with self-reported measurement. More specifically, we validated the survey measure of firm growth based on register data. We looked at the self-reported growth in employees and matched it with the development based on register data. The significant positive correlation (r = .27) indicates that the CEOs of the companies were aware of their general development. Given the fact that growth is measured cross-sectionally, a potential risk of reverse causality appears. We reduced this risk by asking about development in growth over the last three years, instead of asking about the current level of growth.
**Multivariate Statistics**

To test our hypotheses concerning the relationship between company growth and ERP complexity on performance, we completed stepwise linear regression models (see Table 2). The first model included the four control variables (number of employees, number of months since start up, industry and ERP use). Next, we introduced our main independent variable, growth, in Model 2 and perceived ERP complexity in Model 3. Lastly, Model 4 adds the interaction effect between growth and ERP complexity.

**Insert Table 2**

Model 1 showed only a small negative correlation between performance and age ($\beta=.057$, $p<.10$). All other control variables were insignificantly correlated with ROIC. Model 2 shows a significant and positive effect of growth on ROIC ($\beta=.197$, $p<.001$). By adding the growth variable, the proportion of explained variance (R Square) increases from 0.020 to 0.057. Model 3 indicates a negative effect of ERP complexity on ROIC ($\beta=-.150$, $p<.001$) and still a significant positive correlation between growth and ROIC ($\beta=.185$, $p<.001$): The R Square increases from 0.057 to 0.079. Model 4 shows that ERP complexity significantly and positively moderates the association between growth and ROIC ($\beta=.370$, $p<.001$). By adding the interaction effect of perceived ERP complexity and growth, the explained variance dramatically improves from 0.079 to .208.

The results described above indicate support for Hypothesis 1, i.e., that growth is positively associated with profitability. The negative association between ERP complexity and profitability also indicates support for Hypothesis 2. Finally, the interaction of growth and perceived ERP complexity on profitability indicates support for Hypothesis 3. The interaction plot in Figure 2 provides further elaboration.

**Insert Figure 2**

The interaction plot in Figure 2 shows that high growth firms, compared to low growth firms, have higher profitability if their ERP complexity is perceived to be low. In contrast, if the perceived ERP complexity is high, high growth firms, compared to low growth firms, have lower profitability.
Thus, the interaction plot reveals that the perceived ERP complexity does not modify the magnitude of the growth-profitability relationship as hypothesized, but changes the direction of the relationship. Growth is beneficial for profitability only with low perceived ERP complexity. In this way, Hypothesis 1 is only supported under conditions of low ERP complexity. Similarly, low perceived ERP complexity is beneficial for profitability only under conditions of a certain low level of growth.

Discussion

Summary

In this study, we investigated the relationship between growth and profitability, taking into account that prior studies provide different answers depending on whether they are related to the market perspective or the resource perspective (e.g. Markman and Gartner, 2002; Senderovitz et al. 2016). The discussion in this area has primarily concerned the explanatory power of the individual effect of either the market or the resource perspective. We argued that both the market and the resource perspective are in play simultaneously, and that firm characteristics matter for the explanatory power of each of the two perspectives. Specifically, we found that for young SMEs, characterized by liability of newness and liability of smallness (March and Shapira, 1992; Wennberg et al., 2016), growth is profitable in the short run if the ERP complexity is low. In contrast, growth is unproductive for profitability in the short run if the ERP complexity is high. Thus, whether growth increases or decreases the profitability of young SMEs, depends on the ERP complexity in the firms.

Contributions

Our study makes three overall contributions. First, our study contributes to the ongoing debate on the growth-profitability relation in the entrepreneurship literature (Markman and Gartner 2002; Davidsson et al. 2009; Senderovitz et al. 2016). Does an increase in sales, market share and employees generate profitability as claimed by the market perspective, or does the increased cost
eliminate this gain by influencing profitability in a negative way, as claimed by the resource perspective? Our study provides a conditioned answer.

The liabilities to which young SMEs are subjected, provide a demand for legitimacy, growth and a short-term focus. In respect of how these three focus areas affect young SMEs, we argued and showed that growth benefits outweigh the disadvantages of growth; however, only under conditions where ERP complexity is low. In this way, low ERP complexity becomes a necessary condition in order for young SMEs to obtain the various advantages normally associated with growth, including economies of scale (Besanko and Wu, 2013; Teece, 2012), being able to set industry standards (Lieberman and Montgomery, 1987; Zammuto et al., 2007), first mover advantages (Lechner and Gudmundsson, 2012; Lieberman and Montgomery, 1987), controlling distribution channels (Zahra and Garvis, 2000), and better possibilities to fit market needs (Porter, 1985). More broadly, this suggests that the organizational procedures, ERP systems, and other types of formalizing are necessary in order for young SMEs to grow profitably.

Second, the study contributes to the debate on use of ERP systems in SMEs (Bock and Kim, 2002; Buonanno et al., 2005). Most ERP system research focuses on large enterprises, and this research cannot be fully transferred to SMEs, since the two represent fundamentally different environments (Buonanno et al., 2005; Mabert et al., 2003). Whilst large firms are usually highly dependent on ERP systems, this is the case to a lesser degree for SMEs. This is partly explained by the limited number of employees in SMEs who are located close to each other, thus making it easier to share information and comprehend the organization. Furthermore, smaller firms have less need for the documenting and sharing of information, since fewer persons are involved in their business processes. The fact that the focus of the present survey is not only on SMEs, but young SMEs, may intensify the difference in relation to the impacts of ERP systems. More specifically, younger SMEs may not profit from having ERP systems to the same degree as older SMEs, since a certain amount of organizational saturation is needed to be able to profit from such systems. Although a young company may not be growing in the traditionally understood manner i.e. market shares, employees
or revenue, its organizational procedures are growing, and it takes time for a new organization to identify their ‘best practices’ and disseminate them across the organization. As long as business processes are maturing, and therefore are less standardized, it is harder to profit from the use of ERP systems, which demand a high degree of standardization of business processes.

Our findings are in compliance with the above distinctions between old established firms and young SMEs. However, we not only found that young SMEs may be less dependent on ERP systems, but also found that these might be counterproductive for young SMEs’ productivity in periods of stability (low growth), because time, energy and resources are taken away from the market and the customers. In periods of low growth, young SMEs are better off focusing their scarce time and resources on attracting customers, building their market position and positioning the firm (Porter, 1985), rather than building the organization internally (Barney, 1991). When the SMEs eventually experience a certain level of growth, then building the organization through ERP systems (that are not complex) becomes a necessary condition in order to profit from the growth.

Thus, it is important to have ERP systems that are aligned with the organizational situation, e.g. level and pace of growth. This should be seen in relation to the fact that, although many problems in relation to ERP implementation have been reported during recent decades, there currently seems to be a consensus, that when properly implemented, ERP systems can and do provide a number of tangible and intangible operational and strategic benefits for both large enterprises and SMEs (Raymond and Uwizeyemungu, 2007; Hitt et al., 2007; Ruivo et al., 2012; Ruivo et al., 2015). However, our study indicates some concerns related to this general optimism concerning the benefits of ERP systems; they are only worth implementing if SMEs are experiencing or planning to experience a period of growth, or alternatively are experiencing a period of change (Miller and Shamsie, 1996).

Third, our study contributes to the debate on how entrepreneurs and young SMEs obtain sustainable competitive advantages; a question that has normally been answered from two perspectives i.e. from a market perspective and a resource perspective. These two perspectives have
been perceived as competing explanations (Markman and Gartner, 2003; Davidsson et al. 2009; Senderovitz et al. 2016). However, we show, that instead of being competing explanations, they are complementary explanations. They are contingent upon each other; they are each other’s conditions. Young SMEs cannot grow and be profitable without simultaneously developing their organization. However, SMEs cannot be profitable if they spend all their resources developing their organization in periods of low growth, where they instead should focus on attracting (new and more) customers.

**Directions for future research**

It is relevant to continue to investigate the use of ERP systems in SMEs due to the fact that technological development continuously produces new opportunities and challenges for firms in general, and because of the increased focus on ERP systems designed for the SME segment, which is receiving more attention (Zach et al., 2012).

Furthermore, our study calls for future studies to incorporate both market and resource perspectives in their theorizing of performance of entrepreneurial firms and SMEs. The argument that the market perspective and the resource perspective can be looked upon as a combined mechanism opens the door for future investigation of the relationship between growth and profitability, where the focus could be much more on the balance of the two perspectives instead of unanimously focusing on the perspective that suits the findings. For example, there is a need to better understand at which point SME’s become mature enough for ERP systems and capabilities to become profitable. Another area concerns identifying the extent of growth at which ERP capabilities become profitable.

Our finding that ERP systems are not particularly important and might even be damaging for young SMEs, unless they are in a growth phase are, as mentioned earlier, in contrast to most existing ERP related literature focused on large firms (Loh and Koh 2004; Muscatello and Small 2006). Thus, the paper indicates that other approaches to ERP system investments are needed when the focus is on young SMEs. Hereby, the paper provides an important point of departure for future research that deals with ERP system investments in start-up companies. 
Implication for practice

Young SMEs need to think about how and when they utilize resources so they are not blindly led into believing that ERP systems are always the road to profitability. It seems that it is important to find the right balance between the complexity of the system and the organization in which it is placed. The pressure many young SMEs experience in the continuous struggle to find the right balance between utilizing resources in ERP systems will continue. This article highlights that time and resources invested in ERP systems will have the largest impact for SMEs that have a growth strategy, while other SMEs need to carefully consider whether ERP system investments really would be beneficial.

Conclusion

We found that whether growth increases or reduces the profitability of young SMEs depends on the level of ERP complexity within the firms. Specifically, we found that growth is profitable in the short run for young SMEs if the ERP complexity is low; while in contrast, growth is unproductive for profitability in the short run if the ERP complexity is high. In this way, our results support the idea that the market perspective and resource perspective provide complementary explanations rather than competing explanations. They are contingent on each other; they are each other’s conditions. Young SMEs cannot grow in a profitable way without simultaneously developing their organization. Meanwhile, SMEs cannot be profitable if they spend all their resources developing their organization in periods of low growth.
References


Hunton, J. E., Lippincott, B., & Reck, J. L. (2003). Enterprise resource planning systems:


** Table 1  
Means, Standard Deviations, Pearson Correlations & Cronbach alpha

<table>
<thead>
<tr>
<th>Variable</th>
<th>Mean</th>
<th>S. D.</th>
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<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
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<td>Return on invested capital</td>
<td>6.468</td>
<td>56.305</td>
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<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Growth</td>
<td>0.000</td>
<td>0.800</td>
<td>**</td>
<td>1.8</td>
<td>1</td>
<td>0.80</td>
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<td></td>
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<tr>
<td>ERP complexity</td>
<td>0.000</td>
<td>0.800</td>
<td>**</td>
<td>0.16</td>
<td>-0.07</td>
<td>1.00</td>
<td>0.86</td>
<td></td>
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<td>Number of employees</td>
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<td></td>
<td>-0.06</td>
<td>0.11</td>
<td>-0.01</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number of months since start up</td>
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<td>27.198</td>
<td></td>
<td>0.07</td>
<td>-0.12</td>
<td>0.04</td>
<td>-0.01</td>
<td>1.00</td>
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<tr>
<td>ER IP Use</td>
<td>0.000</td>
<td>0.298</td>
<td></td>
<td>-0.03</td>
<td>0.16</td>
<td>0.03</td>
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<td>Manufacturing</td>
<td>0.257</td>
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<td>-0.02</td>
<td>-0.07</td>
<td>0.06</td>
<td>-0.02</td>
<td></td>
<td>1.00</td>
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<tr>
<td>Retail</td>
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<td>0.416</td>
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<td>0.05</td>
<td>0.15</td>
<td>-0.08</td>
<td>0.07</td>
<td>0.09</td>
<td>0.25</td>
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<tr>
<td>Service</td>
<td>0.302</td>
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<td></td>
<td>0.01</td>
<td>0.13</td>
<td>0.03</td>
<td>0.01</td>
<td>0.16</td>
<td>0.40</td>
<td>0.35</td>
<td>1.00</td>
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<tr>
<td>Transportation and public utilities</td>
<td>0.142</td>
<td>0.499</td>
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<td>-0.08</td>
<td>-0.04</td>
<td>-0.01</td>
<td>-0.02</td>
<td>0.10</td>
<td>0.26</td>
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<td>0.27</td>
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<td>Financial</td>
<td>0.038</td>
<td>0.191</td>
<td></td>
<td>0.08</td>
<td>0.10</td>
<td>0.02</td>
<td>0.01</td>
<td>0.03</td>
<td>0.13</td>
<td>0.11</td>
<td>0.13</td>
<td>-0.08</td>
<td>1.00</td>
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</table>

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

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

Estimates of linear Regression Models for performance standardized beta

<table>
<thead>
<tr>
<th></th>
<th>Model 1</th>
<th>Model 2</th>
<th>Model 3</th>
<th>Model 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of employees</td>
<td>-0.049</td>
<td>-0.069</td>
<td>-0.070</td>
<td>-0.065</td>
</tr>
<tr>
<td>Number of months since startup</td>
<td>0.057 †</td>
<td>0.081 †</td>
<td>0.084 *</td>
<td>0.099 *</td>
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<tr>
<td>ERP Use</td>
<td>0.046</td>
<td>0.060</td>
<td>0.052</td>
<td>0.054</td>
</tr>
<tr>
<td>Industry (reference is service)</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Manufacturing</td>
<td>-0.015</td>
<td>-0.003</td>
<td>0.017</td>
<td>0.007</td>
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<tr>
<td>Retail</td>
<td>0.035</td>
<td>0.025</td>
<td>0.041</td>
<td>0.023</td>
</tr>
<tr>
<td>Transportation and public utilities</td>
<td>-0.068</td>
<td>-0.059</td>
<td>-0.052</td>
<td>-0.058</td>
</tr>
<tr>
<td>Financial</td>
<td>0.050</td>
<td>0.030</td>
<td>0.040</td>
<td>0.051</td>
</tr>
<tr>
<td>Growth</td>
<td></td>
<td>0.197 ***</td>
<td>0.185 ***</td>
<td>0.202 ***</td>
</tr>
<tr>
<td>ERP complexity</td>
<td></td>
<td></td>
<td>-0.150 ***</td>
<td>-0.065 †</td>
</tr>
<tr>
<td>Growth * ERP complexity</td>
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<td></td>
<td></td>
<td>-0.370 ***</td>
</tr>
<tr>
<td>N respondents</td>
<td>451</td>
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<td>451</td>
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<tr>
<td>R Square</td>
<td>0.020</td>
<td>0.057</td>
<td>0.079</td>
<td>0.208</td>
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<td>R square change</td>
<td>0.020</td>
<td>0.037</td>
<td>0.022</td>
<td>0.129</td>
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</table>

† p < .10
* p < .05
** p < .01
*** p < .001.

The significance levels are reported as two-tailed tests for control variables and as one-tailed tests for independent variables.