Constraints and Capacities in Small Established Firms: The Role of Managerial Levers in the Innovation Process

Erika Lind*
Luleå University of Technology, 931 87 Skellefteå, Sweden.
E-mail: erika.lind@ltu.se

Anna Karlsson
Luleå University of Technology, 971 87 Luleå, Sweden.
E-mail anna.karlsson@sandvik.com

Anna Öhrwall Rönnbäck
Luleå University of Technology, 971 87 Luleå, Sweden.
E-mail anna.ohrwallronnback@ltu.se

* Corresponding author

Abstract: The importance of innovation for sustained competitiveness is well stated in the literature. However, most product innovation research has so far focused on large firms or small high tech, start-up or spin-off companies. This study investigates innovation process practices in small established firms through the use of five managerial levers considered to determine the process. Based on a case-study design involving eight small established firms with growth ambitions, the results show that the levers “mission, strategy and goal” and “organizational learning” are important throughout the process, and that the lever “resource allocation” is directed towards the later phases of the process. The levers “structure and systems”, as well as “organizational culture” are less emphasized. By developing and testing an analysis model based on the innovation process and managerial levers, this paper contributes with insights of innovation in established small firms valuable for further research.

Keywords: SME; Multiple Case study; Innovation phases; Resources; Liability of smallness

1 Introduction

Innovation is generally regarded in positive terms in society, as it contributes not only to future welfare but also to company growth, both in terms of employment and economy (Roth et al, 2011). In fact, exceptionally fast-growing companies tend to be more innovative (Rao and Coad, 2008) and firms that seek to grow ought to strengthen their capabilities to innovate (Harms et al. 2010). Efforts are consequentially made to improve
the innovation process (Howard et al, 2008). However, the view of innovation as a process – focusing on the ‘how’ in contrast to the ‘what’ – is under-developed in the literature, as Crossan and Apaydin (2010) found in their extensive review of the literature consolidating the state of academic research on innovation. In addition, most product innovation management research has so far focused mainly on larger firms – or has failed to distinguish between large and small firms (Moultrie et al, 2007). For small and medium-sized enterprises (SMEs) innovation research has to a high degree addressed the 3% extremely fast growing firms (often high tech, start-up, and spin-off companies) found in for example business incubators or science parks, while overlooking the other 97% (Brännback et al, 2014). This stream in the literature often takes the “liability of smallness” as its point of departure, i.e. that SMEs have limited financial resources, often lack a multidisciplinary competence base and infrastructure (Storey and Greene, 2010, Parida et al, 2012), all of which are assumed to constrain their ability to achieve innovation. However, if smaller companies can find ways to make efficient use of their advantages such as being less bureaucratic, more adaptive to change, and having more specialized knowledge (Storey and Greene, 2010) this may help to strengthen their capacity to innovate despite these challenges. At the same time, research on innovation processes in SMEs indicates that they do not apply models and activities that are considered successful in larger companies (Scozzi et al, 2005) and that the systematic and persistent R&D activities that generally are considered to increase effectiveness in larger companies are practically absent in SMEs (Hözl, 2009). Potential reasons for this lack of systematic innovation processes are that the cost of ad hoc development processes may be neglected at a small scale (Dubberly, 2004) and that the relative cost for innovation is higher for SMEs, also leading to higher risk (Löfqvist, 2014). Larger companies, in contrast, often need to address process improvements to remain competitive, and can afford a portfolio of innovation projects to spread the risk. As a result, imposing large firms’ practices on small firms is not likely to be fruitful if the unique characteristics of small firms’ are not taken into account (Berends et al, 2014).

Although *established* small enterprises historically have gained little attention in innovation and growth research (Löfqvist, 2014, Brännback et al, 2014), innovation and growth is of essence also for these firms. In contrast to high tech, start-up and spin-off companies, this is a group of companies that often do not rely on external venture capital in order to speed up the innovation process (Storey & Greene, 2010). As a result, small established companies often have limited slack in their organisations, and often need to conduct their product innovation processes at the same time as they keep daily operational processes running (Löfqvist, 2014, Brännback et al, 2014). The management of innovation processes in small established firms is therefore likely to differ from innovation management practices in larger companies as well as venture capital funded start-ups and high-tech firms. Consequently, more research attention should be paid to understand innovation processes in this category of SMEs.

According to Crossan and Apaydin (2010) managerial levers play direct and indirect roles in enabling innovation because they provide the necessary connection between leadership intentions and organizational results. Five managerial levers, that together enable core innovation processes, were identified: (1) mission, goals, and strategy; (2) structure and systems; (3) resource allocation; (4) organisational learning and knowledge management; and (5) organizational culture. In this paper we seek out to investigate how these managerial levers relate to practices in small established firms from an innovation process perspective. This is achieved through a multiple case study of eight small firms, all of which conduct product innovation activities, have growth ambitions and are established on their market since at least six years. The study is based on empirical data from multiple sources and was guided by the following research question: How do small established firms utilize managerial levers in their innovation process?
2 Theoretical Framework

In the following section key phases of the innovation process are presented before a background regarding innovation research in SMEs is provided. In the end of the section the five managerial levers (Crossan and Apaydin, 2010) are presented in further detail.

2.1 Key phases in the Process of Innovation

Since the character of the innovation process is changing from early to later stages, it can be beneficial to separate in constituting phases. There are consequently several models aiming to clarify key phases or components of the innovation process to be found in the literature (Björk, 2011, Dubberly, 2004). According to the much cited work by Kline and Rosenberg (1986:289): “A perceived market need will be filled only if the technical problems can be solved, and a perceived performance gain will be put into use only if there is a realizable market use”. This quote highlights a number of essential characteristics of the innovation process, regardless model. In this paper the innovation process is considered to consist of the following four phases: (1) Need finding, (2) Ideation, (3) Implementation, and (4) Commercialization. This separation is appropriate for two reasons: first, these phases represent a granularity appropriate for the analysis of the empirical data, and second, they pinpoint areas that generally are considered essential for any innovation process, regardless size of company or other provider. It should be noted that the identified phases are not necessarily executed in a sequential manner. In contrast, iterations and overlapping of the phases are often seen in practice (as the multitude of process illustrations in Dubberly (2004) show examples of). Here, the phases are described in more detail:

Need finding: The customers’ needs motivate them to seek benefits of a new product or offering (Danneels, 2002). If a new innovative solution fails to satisfy a need, the customers’ interest and their willingness to acquire the solution will most likely be low. Customer orientation, i.e. listening closely to customers to meet or even exceed their needs, has therefore been highlighted as key for successful product development during the past decade (Ericson, 2007).

Ideation: Ideas for satisfying a need are fundamental for innovation, highlighting the importance of idea generation and development. An idea does not have one source of origin, but is developed from many pieces of knowledge combined over time (Gish and Hansen, 2013), and interaction among individuals and their networks are considered to positively influence ideation (Kijkuit and Van den Ende, 2007). At the end of this phase there should be a solution proposal described by such characteristics that ‘the difference that matters’ compared to existing products or offerings is evident, i.e. a concept (Andreasen, 2011).

Implementation: Innovation only occurs when a creative idea or concept is put into practice (Levitt, 2002), as innovation entails “the practical implementation of an idea into a new device or process” (Schilling 2010:18). Implementation requires narrowing the set of alternatives from the ideation or conceptualization phase in order to for example, reach a reliable production (Ulrich and Eppinger, 2004). This requires, for physical products, embodiment and detailed design (Howard et al, 2008), as well as testing, refinement and production ramp-up activities (Ulrich and Eppinger, 2004).
Commercialization: Innovation also requires that a design is converted into value, which only can be achieved when the designed product has been introduced to a user (Redelinghuys, 2000), emphasizing in a business context, the importance of commercialization. Commercialization is concerned with making a process or product a commercial success (Crossan and Apaydin, 2010), something that is of great importance for innovation as it requires much time, effort and costs and therefore must be commercially viable (Jacoby and Rodrigues, 2007). Important in this phase is to consider how the new product or offer will be marketed as well as how the value will be delivered to the customer or user.

In the literature focusing on SMEs many obstacles and limitations for innovation are stressed (Scozzi et al, 2005). In the next section therefore, specific characteristics of SMEs influence the innovation process is further looked into.

2.2 Characteristics of SMEs and their relation to the innovation process

Despite the fact that SMEs are often acknowledged as an important source of innovation in society (Hörte et al, 2008), these companies seldom have as formalized or routinized processes as their larger counterparts, and when they have, this appear mainly in later stages (Berends et al, 2014). Traces of staged processes can be found also in small firms but the systematic R&D that are considered necessary for successful innovation in larger firms only exists occasionally in small firms (Bernstein and Singh, 2006; Leithold et al., 2016). That ownership and management often are intertwined in small firms (Nooteboom, 1994) – innovations are often developed based on ideas from the owner, who also defines the firm’s strategy – is considered beneficial for innovation (Scozzi et al, 2005). However, the reliance on a few customers, whom the owner often has close contact with (Storey and Greene, 2010), in combination with the need for a sustained steady cash flow makes product innovation depend on solving existing customers’ problems. That an innovation idea must be supported by existing customers for product innovation to occur (Löfqvist, 2014) result in a limited spread of risk (Nooteboom, 1994) and path dependencies which narrow the search for innovation (Eng et al, 2010). An occupation with operational tasks can also lead to lack of time for strategic thinking (Löfqvist, 2014). In fact, even though small firms might show interest in innovation, very few develop an innovation strategy or methods to monitor and control the process (Scozzi et al, 2005). Other factors considered to hinder innovation in smaller firms are for example their lack of power to influence the environment and scarce resources which means a high risk of failure (Nooteboom, 1993). In sum, these hinders for innovation suggest that small companies suffer from a “liability of smallness” when it comes to innovation. However, this does not mean that innovation processes in small firms can be dismissed as unplanned and chaotic but instead that other logics – compared to in the larger firm – seem to be needed to understand and explain these processes (Berends et al., 2014). For example, goal setting in smaller firms have been shown to be resource-driven, step-wise and open-ended, i.e. goals are set upon available resources which should be contrasted to the logic to select means to attain goals often found in larger firms (ibid.).
Managerial levers enabling innovation processes

The goal of the extensive literature review conducted by Crossan and Apaydin (2010) was to provide a practical tool that can be used by scholars and practitioners when analyzing innovation. The result became a multi-dimensional framework consisting of identified determinants and dimensions of innovation. In this paper the determinants relating to the organizational level – managerial levers – are considered particularly useful because they are founded in theories such as the resource-based view and dynamic capabilities. These theories have had a significant impact on mainstream management theory (Teece, 2014) and suggest that companies need to develop their ability to creatively utilize internal resources, via routines and capabilities, to ensure sustained competitive advantage (e.g. Teece et al, 1997; Helfat and Peteraf, 2003). As already mentioned, SMEs are subjected to the “liability of smallness”, i.e. compared to larger companies they generally have limited financial resource and time as well as smaller or non-existing R&D departments (Parida et al, 2012). Managerial levers used in a context in which such liabilities prevail likely differ from managerial levers in contexts where resources are more abundant (e.g. in larger companies and high tech, start-up and spin-off companies with external funding). Crossan and Apaydin (2010) identified five types of managerial levers that that provide the necessary support for innovation practices or help maintain innovation processes:

1) Mission, goal, strategy: The mission and strategy of establishes firms provide a direction for the organization to follow. An explicitly stated innovation strategy helps to match innovation goals with the strategic objectives of the firm and is therefore a primary managerial lever.

2) Resource allocation: Allocation of physical and financial resources in terms of absolute and relative R&D intensity, annual turnover of resources, differentiation of funding and slack resources (Gopalakrishnan and Damanpour, 1997) are also considered managerial levers.

3) Structure and system factors: These levers comprise for example organizational complexity and administrative intensity, specialization and centralization, formalization and the fit between organizational design and type of innovation.

4) Learning and knowledge management: A learning environment is created by providing support for experimentation, having tolerance for failures, adopting risk-taking norms, supporting the learning and development of employees and fostering the acceptance of diversity within the group. Also external linkages with universities and/or customers and the quality of these linkages support learning and knowledge management.

5) Organizational culture: Another important factor which enables innovation is the organizational culture including for example a clearly stated, attainable and valuable shared vision, promotion of autonomy, calculated risk taking and motivation and managerial control.

In this paper we aim to investigate how these managerial levers relate to practices in small established firms from an innovation process perspective.

3 Method
The following criteria, in line with recommendations for case studies by Eisenhardt (1989), were used when sampling case companies for this study. To secure a company interest for innovation, as well as business activities stable enough for an innovation
process to exist, established SMEs with growth ambitions were sampled. Moreover, the company should also clearly partake in an innovation process, i.e. in processes which transform customer needs into customer value. The company should also develop and/or produce physical products, in contrast to purely services. However, offerings could be of product-service system (PSS) character. Finally, the companies should have control over its innovation process, although this control does not need to have full coverage due to the fact that many manufacturing SMEs act as subcontractors. To secure accurate information concerning the sampling criteria, as well as access to the companies, all selected companies participate in an executive management R&D program established in 2011. The aim of this program is to boost company growth and firms from various industries take part and business leaders share experiences in groups of 6-8 companies. The groups are led by academics and business consultants and constitute a context that enables extensive access to key informants and information for participating researchers. See Table 1 for descriptive information of the sampled case companies.

Table 1 Descriptive information of case companies and their offers (official figures for turnover and number of employees 2015, other data collected 2011-2017).

<table>
<thead>
<tr>
<th>Company</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>A</strong></td>
<td>Develops manufactures and sells functional clothing for children. The distribution channel is internet retailing. Focus is the national market. Turnover 1.3 M€ and 6 employees.</td>
</tr>
<tr>
<td><strong>B</strong></td>
<td>Develops and sells submersibles used to carry out inspections and minor operations. The company operates in the global market. Turnover of 3.1 M€ and 14 employees.</td>
</tr>
<tr>
<td><strong>C</strong></td>
<td>Offers extrusion and molding of plastic products to the manufacturing industry. The company has national sales to global companies. Turnover of 3.9 M€ and 17 employees.</td>
</tr>
<tr>
<td><strong>D</strong></td>
<td>Manufactures metal parts on a contractual basis. The business also includes trading, service, maintenance and repairs of tools for plastic molding. The company has national sales to global companies. Turnover 3.3 M€ and 16 employees.</td>
</tr>
<tr>
<td><strong>E</strong></td>
<td>Delivers complete lubrication systems as well as equipment for handling lubrication and components for automatic and manual lubrication. Also offers installation at customer sites and testing of customer applications. International market. Turnover 4.5 M€ and 35 employees.</td>
</tr>
<tr>
<td><strong>F</strong></td>
<td>A technical consulting company that develops and manufactures ultrasonic flow meters. The company operates internationally, and performs tests of customer applications at own facilities as well as installations at customer sites. Turnover of 2.4 M€ and 9 employees</td>
</tr>
<tr>
<td><strong>G</strong></td>
<td>Develops, manufactures, and retails electronic forklifts and other special trucks. International market base. Turnover 4.8 M€ and 27 employees.</td>
</tr>
<tr>
<td><strong>H</strong></td>
<td>Develops and manufactures electric equipment and design, manufactures and installs vessel subsystems. The market is international. Turnover of 4.0 M€ and 28 employees.</td>
</tr>
</tbody>
</table>

All companies are owner-managed, although this was not a criterion. All are also small firms according to SME definition provided by the EU, i.e. less than 50 employees and turnover less than 10 M€. Notably the company selection stretches from micro-firm (one company, with less than 10 employees) up to small firms (the remaining 7 companies, with less than 50 employees).

The main data in this study consisted of rich case descriptions of each company. These case descriptions, in turn, were based on data collected through multiple methods (including company visits, interviews and workshops with business leaders and employees as well as data from web site, brochures, newspaper articles and financial
Data collection was done, both as a part of and besides the program, by two of the authors who also were involved in (led, participated or observed) workshop sessions where companies meet to discuss and share experiences concerning specific growth challenges. These two researchers therefore have in-depth knowledge of case data. Because such in-depth knowledge could lead to bias that could risk the validity of the research, the third author, who did not participate in the data collection, took the role of external analyst (as suggested by e.g. Creswell, 2009) in the writing of this paper.

Analysis of the data was performed through the following steps. First, extracts from the data concerning factors related to the innovation process were compiled in a spread-sheet together with meta-data regarding for example company and data source. In this process the extracts were also tagged according to the four innovation phases previously identified, i.e. whether they related to need finding, ideation, implementation or commercialization. Thereafter, each extract was provided with “labels” that reflected the meaning of the text. One data extract could result in multiple labels; in other words, the extracts were sometimes decomposed. This step was necessary to facilitate the identification of patterns in the data. Finally, each label was categorized according to the five managerial levers as identified by Crossan and Apaydin (2010). This categorization (into mission/goal/strategy, resource allocation, structure and system factors, organizational learning and knowledge management and organizational culture) was conducted by one of the authors and thereafter discussed with all authors to achieve consistency and reliability. All together these analysis steps allowed for the identification of managerial levers in each of the phases in the innovation process (see Figure 1).

4 Empirical Findings

The analysis of the empirical data enabled the identified five levers to be put in relation to the four phases of the innovation process (see Table 2). While the distribution of labels does not necessarily imply relative importance, they reflect which issues the company representatives have chosen to highlight. In the table, clusters made up of several labels are provided.
Table 2 The identified five managerial levers in relation to the four phases of the innovation process. The number of labels associated to each identified cluster is provided in brackets.

<table>
<thead>
<tr>
<th>Mission, goal, strategy:</th>
<th>Need finding</th>
<th>Ideation</th>
<th>Implementation</th>
<th>Commercialization</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Offering/created value (9)</td>
<td>Offering/customer demand (9)</td>
<td>Offering/developed for specific context (5)</td>
<td>Driver/reason for being/market need (8)</td>
</tr>
<tr>
<td></td>
<td>Driver/reason for being/market need (8)</td>
<td>Niche/core competences (2)</td>
<td>Niche/ influence customer processes (5)</td>
<td>Offering/business model (4)</td>
</tr>
<tr>
<td></td>
<td>Competitor awareness (18)</td>
<td></td>
<td></td>
<td>Strategic context attendance (11)</td>
</tr>
<tr>
<td></td>
<td>Strategic context attendance (4)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Resource allocation:</td>
<td>Restraints due to smallness (3)</td>
<td>Restraints due to smallness (5)</td>
<td>Restraints due to smallness (4)</td>
<td>Restraints due to smallness (4)</td>
</tr>
<tr>
<td></td>
<td>Based on unique resources (2)</td>
<td>Unique resources (12)</td>
<td>Prioritize resources for selling (9)</td>
<td>Benefits from networks (1)</td>
</tr>
<tr>
<td>Structure and system factors:</td>
<td>Part of system/customer system (4)</td>
<td>Importance of order and structure (9)</td>
<td>Part of customer and supplier system (4)</td>
<td>Sales channels (3)</td>
</tr>
<tr>
<td></td>
<td>E-commerce as sales channel (1)</td>
<td>Organizational structure (4)</td>
<td>Part of customer and supplier system (4)</td>
<td>Part of industrial system (3)</td>
</tr>
<tr>
<td>Learning and knowledge management:</td>
<td>Listening to customers (5)</td>
<td>Listening to customers (10)</td>
<td>Listening to customers (2)</td>
<td>Listening to customers (6)</td>
</tr>
<tr>
<td></td>
<td>Knowledge and experience (customer, market, industry) (5)</td>
<td>Knowledge and experience (customer, market, industry) (1)</td>
<td>Knowledge and experience (customer, market, industry) (2)</td>
<td>Knowledge and experience (customer, market, industry) (2)</td>
</tr>
<tr>
<td></td>
<td>Internal collaboration/sales and engineering (2)</td>
<td>Internal collaboration/sales and engineering (3)</td>
<td>Internal collaboration/sales and engineering (2)</td>
<td></td>
</tr>
<tr>
<td>Organizational culture:</td>
<td>Consensus throughout the company/customer satisfaction (1)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Values clarified/choice of manufacturer (1)</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>Continuous improvement (1)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Delivering on time (1)</td>
<td></td>
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</tbody>
</table>

The managerial lever Mission, strategy and goal dominates all phases, representing half of all labels. The representation is strongest in the Need Finding and Commercialization phases indicating a focus on market needs and company offerings. Also being aware of competitors and positioning in terms of entering specific niches are evident in these two phases. In the Implementation phase, a will to specialize can be seen related to
developing for specific contexts or entering smaller niches. Labels concerning choice of niche in relation to core competencies are also observed in the Ideation phase, however labels about niche in the Implementation phase describe a choice to influence customer processes. Moreover, in the implementation phase an aspiration to appear as a larger company was raised as a means to achieve credibility. An example is Company B that has chosen to have a clear branding of its products in order to make it look as a much bigger company.

Resource allocation is the second most frequent lever (in terms of number of labels), closely followed by Organizational Learning. The Resource allocation lever appears more in the Implementation and Commercialisation phases compared to the Need Finding and Ideation phases. Relating to implementation, the Resource allocation lever is on the one hand discussed in terms of unique assets, on the other hand in terms of restraints due to smallness. The Organizational learning lever clearly covers all phases and contains labels involving customers, and knowledge about their market, and industry at large. The case companies appear to be responsive to their current customer needs. This was evident in Company G: “Nothing is developed just for engineering excellence, but instead always for an explicit customer need”.

To be a part of customer and supplier systems is one aspect that shows within the Structure and Systems lever. Moreover, the few number of labels assessed as Organizational Culture are found in the implementation phase, indicating the influence of company values in different situations.

5 Discussion

The Mission, strategy and goal lever seems to be essential throughout all phases of the innovation process, in particular related to the company offering in relation to their context. One explanation can be found in previous research; ownership and management are often intertwined in owner-led SMEs (Nooteboom, 1994) with the consequence that ideas from the owner is often defines the strategy of the firm (ibid). This circumstance is considered beneficial for innovation (according to Scozzi et al, 2005), but can also limit search for radical innovations (Eng et al, 2010). To secure current position, financial resources and cash flow small firms tend to define themselves in relation to their market position (Storey and Greene, 2010, Löfqvist, 2014). In terms of goalsetting small firms has shown to take its starting point in available resources, rather than allocating means to attain goals (Berends et al 2014).

In this study it was observed that the companies emphasize the importance of listening to customers and their knowledge about customers, market and industry. This supports previous research showing that for product innovation to occur, the idea must be supported by existing customers (Löfqvist, 2014). While the ability to listen and learn from customers are considered an advantage from an innovation perspective, it might be important to differ new customers from existing, due to the risk of path-dependency that are considered to hinder innovation (Eng et al, 2010). On the other hand, the observed closeness to customers and suppliers in innovation work is, together with the internal collaboration between sales and engineering, is a stable base for successfully finding solutions that meet the needs on the market (Kline and Rosenberg, 1986).

The lever Resource allocation is interesting in relation to previous research discussing the “liability of smallness”. The restraints due to smallness indulges that the resources tend to be used mainly in connection to current customer activities and daily operations, supporting results from Löfqvist (2014), and Brännback et al (2014), stating that specific product innovation resources are rarely allocated. The results of this study show that Resource allocation does not appear at all in the Need Finding phase but starts to show up in Ideation to be further stressed in Implementation and Commercialization with
emphasis on unique resources, prioritization of selling and networking. As shown by previous research on innovation processes in small firms in the later stages there is often a need to allocate more resources and to stronger control these, which often results in more formal structures (Bernstein and Singh, 2006). This is in line with the results of the study performed: as well as Resource allocation, the lever of Structure and systems is observed in the later parts of the innovation process confirming that traces of formalized processes, considered necessary for success in large firms, do exist but occasionally. (Bernstein and Singh, 2006).

This study shows that the innovation process in four phases provided a relevant framework since extracts concerning factors relating to the process could be identified in all phases. Further, the results show that the process in the studied companies is characterized largely by Mission, goal, strategy, Resource allocation, Learning and knowledge management, and to a very limited extent by Structure and system factors and Organizational culture. These observations support the presumption that innovation models developed in large company context may not be applicable for SMEs but that their innovation processes cannot be dismissed as unplanned and chaotic but that other logics are needed to understand them (Berends et al, 2014). This study contributes to this understanding by attempting to answer the stated research question about how small established firms with growth ambitions utilize managerial levers in their innovation process: 1) The lever Mission, strategy and goal is used throughout the whole process. Self-awareness and connection to the firm’s raison d’être seem to be key in established SME’s innovation process. 2) The lever Organizational learning is applied to incorporate the customer(s) in all phases of innovation. Listening to customers is a notably important issue. 3) The Resource allocation lever is directed towards the later phases. However, further research is required to further explore these aspects and their relevance for practise and development of theory on innovation processes in small firms.

References


