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Spurred or spurned? The effects of combined innovations and combined major obstacles on B2B SME capability generation and future focus

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1. Introduction

For firms to remain competitive, the implementation of the marketing concept—being more effective in generating customer value than competitors through gathering, disseminating, and responding to information about customers and competitors—must evolve in firms to include a focus on changing business models in addition to changing pricing models, resource reconfigurations in addition to new product configurations, and process activities in addition to product and service activities (see, e.g., Campbell, 2003; Hansen, McDonald, & Mitchell, 2013; Mason & Spring, 2011; Pauwels & Weiss, 2008). Achieving that evolution of the marketing concept requires the development of capabilities.

As stated by Hansen et al. (2013, p. 300), “organizations strive to gain complex bundles of intangible skills and knowledge, labeled ‘capabilities’ which enable firms to act upon tangible resources (assets) such as capital, labor, land, and materials.” An emphasis on capabilities generation has started to receive attention in the industrial and business marketing literature (e.g., Gebauer, 2011; Kohtamäki, Rabetino, & Möller, 2018; Paswan & Panda, 2020; Ritter, Wilkinson, & Johnston, 2004; Sheng, 2017; Weerawardena & Mavondo, 2011). However, much of this stream of research has been focusing on the context of larger, more established companies. Research is needed that examines these concepts in the vital sector comprised of less established smaller companies, commonly called small and medium enterprises.

Small to medium enterprise (SME) manufacturing companies play an important role in bolstering economies worldwide, but many SMEs struggle for success (e.g., Ali et al., 2020; Burns & Dewhurst, 2016). These entrepreneurial business-to-business (B2B) organizations

must continually strive to develop innovations to remain profitable and competitive with more established, larger companies. Additionally, governments must continually strive to figure out how to support them (Schneider & Veugelers, 2010). The pool of research about the effects of innovations on SME performance is growing; see recent discussions in Brink (2018), Casidy, Nyadzayo, and Mohan (2020), Ko and Liu (2019), Mazzucato (2018), Saridakis, Lai, Mohammed, and Hansen (2018), and Storey et al. (2016). These studies have generated an important finding: innovations are evident in processes as well as in products and services.

Indeed, research that focuses on a single type of innovation, most commonly product innovation, may provide an incomplete picture of the potential and dynamics of organizations. Service innovations, for example, can be very important for SMEs in competitive markets (Casidy et al., 2020; Chen, Tsou, & Ching, 2011; Heirati & Siahtiri, 2019; Markovic et al., 2020; Tsou, & Cheng, 2018; Ulaga & Loveland, 2014), and so are process innovations (Aliasghar, Rose, & Chetty, 2019; Chai et al., 2020). Some studies are beginning to examine the potential joint effects of pursuing different innovation types. For example, Saridakis, Idris, Hansen, and Dana (2019) examine the effects of product, service, and process innovations on SME exporting activity, finding that combinations of these can generate an impact on a firm's international activity that is stronger than that exerted by single types of innovation. With all of the research that has been published, some might ask if there is anything left worth investigating. We argue that there are *many* other important elements to examine in addition to exporting or current sales. For example, how do innovation combinations affect small business-to-business capabilities? Additionally, in the context of when financing the business and competition are each major hurdles—as prior research indicates commonly happens for SMEs—do they (a) spur or (b) spurn the activities and capabilities that might be associated with innovations or affect other important aspects of managing the B2B organization?

The purpose of this research article is to add insights into the B2B SME literature by focusing on the value associated with ambidexterity of customer facing (product and service) and process innovations in two sets of comparisons. The first is the ambidexterity comparison of B2B SMEs that have introduced customer facing innovations versus B2B SMEs that have introduced customer facing innovations and *also* have introduced process innovations, as these two groups compare to B2B SMEs that have not introduced any innovations. It addresses the question: *is there anything to be gained related to the firm's capabilities by the ambidextrous creation of process innovations in addition to creating customer facing innovations for the B2B SMEs?* We argue that by engaging in both (a) customer facing innovation (usually focused on effectiveness) and (b) process innovation (usually focused on efficiency or adaptability), firms

can increase the ability to acquire more knowledge and information. This, in turn, improves their learning ability, thereby enhancing their capability generation to develop and launch new products/services. It will also increase their ability to develop business plans and strategy. We also argue that firms that are engaged in both customer facing and process focused innovations increase their future focus on developing and launching new products/services and investing in premises and machinery.

Boyd and Goldenberg (2013) propose that many successful innovations share certain patterns or templates without realizing it, which all involve looking at everything in the closed system; this could entail examining the market offering and the processes used to create it. Building on Boyd and Goldenberg's proposal (2013), Garund and Prabhu (2021) outline how extant research taken together indicates that resource constraints lead to mixed outcomes among entrepreneurs and SMEs regarding innovation success. Using a sample of high tech focused on R&D, Garund and Prabhu (2021) propose that the dual focus on "outcomes and efficiencies" is crucial to innovation success. Drawing on that concept of dual focus on outcomes and efficiencies, we introduce the following logic: process innovations are focused on efficiency (costs, adaptability), while customer facing product and service innovations are focused on outcomes (effectiveness, profit). Thus, the dual focus on process innovations and customer facing innovations should result in increased success of future customer facing innovations. This research adds insights to the growing stream of industrial and business marketing research on organizational learning theory (e.g., Hult, Hurley, & Knight, 2004; Kumar & Misra, 2020; Strobl, Bauer, & Degischer, 2022; Tsou & Cheng, 2018; Yang & Tsai, 2019). We argue that engaging ambidextrously in both external and internal focused innovations allows the firm to increase their learning, which enhances their absorptive capacity and capability generation. This adds a new context to the idea within organizational learning theory which suggests that firms that are exposed to different conditions can strengthen their creativity and innovative activities by acquiring a diverse set of knowledge (Puthusserry et al., 2020). We argue that when firms engage in different innovative activities (e.g., customer facing products/services and inward facing processes, simultaneously), this involvement allows "firms to acquire a more diverse and richer set of knowledge and key information—through double loop learning, which is translated into increased levels of innovation" (Idris, Saridakis, & Khan, 2022, p. 1).

Additionally, within organizational learning theory, it is theorized that "activities" combine with "context" to create "knowledge" (Argote & Miron-Spektor, 2011). We advance insight on that premise by examining the context of significant hurdles; in particular, it

examines if there are differences in the innovation to capabilities connection between B2B SMEs that indicate that financing and/or competition are significant hurdles versus B2B SMEs that indicate that neither element is a significant hurdle. The impact of obstacles on a firm's innovation has been widely researched in previous literature, specifically in the innovation literature (e.g., Aghion & Howitt, 1992; Bloom, Draca, & Van Reenan, 2011; Bloom & Van Reenen, 2007; de-Oliveira & Rodil-Marzábal, 2019; Hashmi, 2013; Mancusi & Vezzulli, 2010). We shift the focus from examining the impact of obstacles *on* innovation to the combinatory impact of the presence of obstacles combined *with* innovation on firm current capability generation and on firm future focus. We suggest that such an examination is valuable because it is important to understand, given their limited resources and their size, if small firms, when faced with obstacles and hurdles, can overcome the adversity and constraints they face. Here, we address the capabilities question: *do finance hurdles and competition hurdles spurn or spur the B2B SMEs along a set of capabilities we believe are related to innovation and future company focus?* Our results show that even though firms indicate that there exist some obstacles and challenges (such as finance and competition), these obstacles spur small firms' future focus to develop and launch new products and services. This builds on previous studies, which showed that "smaller firms, even though they perceive the obstacles more strongly, are capable of overcoming them" (de-Oliveira & Rodil-Marzábal, 2019, p. 312). This can be linked to the organizational learning theory, and it can be suggested that learning from experience will enable firms to overcome the challenges and obstacles they face (D'este, Rentocchini, & Vega-Jurado, 2012). We examine these research gaps using a dataset containing responses from over a thousand manufacturing/industrial SMEs located across England, Wales, Scotland, and Northern Ireland.

The rest of this article proceeds as follows: First, we review the literature and logically derive the theorized relationships between manufacturing engagement in different innovation types and then different major hurdles. Then we describe the data and present the statistical modeling used to analyze the data. Afterward, we discuss the empirical analysis and results. We outline implications, limitations, and future research. And in the final section, we present our concluding remarks.

2. Conceptual Background

We draw on organizational learning theory (Cyert & March, 1963; Huber, 1991; Sinkula, 1994) in outlining the logic for the hypotheses. Organizational learning is a process whereby a

company learns through interactions with its environments. Huber (1991, p. 88) outlines five sources/sub-processes of knowledge acquisition:

“(1) drawing on knowledge available at the organization's birth, (2) learning from experience, (3) learning by observing other organizations, (4) grafting on to itself components that possess knowledge needed but not possessed by the organization, and (5) noticing or searching for information about the organization's environment and performance.”

Our focus in this research is on the second of five sources in the quoted list: “learning from experience.” We focus on the possibility of learning from experience (being associated with future capabilities in the firm) comparing firms that engage in no innovation to firms that engage in customer focused innovation (product and service innovations) and to firms that engage in both process innovation and customer focused innovation. This is a new area for organizational learning theory research. Within the behavioral school of thought on organizational learning theory, one of the seven “learning orientations” is labeled “product-process focus,” in which “focus [is] on what the organization produces versus how it develops and delivers its products/services” (Nevis, DiBella, & Gould, 1995, p.8). As summarized in DiBella, Nevis, and Gould (1996, p. 361) the “product-process focus refers to a preference for the accumulation of knowledge related to product and service outcomes versus a preference to invest in knowledge about basic processes that support products.” Chiva and Alegre (2005, p. 98) state that the product-process focus “aims to determine whether the company prefers to accrue and orientate knowledge within the product itself, or rather within the process of its creation.” Within this stream of research, we call attention to the assumed contrast of product/service versus processes in innovation. However, according to Brix and Jakobsen (2015, p. 98), “This myopic ‘product/process’ focus is no longer enough for organizations to create new radical breakthroughs in the market(s).” *Put simply, it is limiting to believe that a firm must focus on just product/service innovations or on just process innovations. We believe it is possible for even smaller firms to engage in both types of innovation. And we believe that when they engage in both types of benefits there are more benefits, as outlined in the next subsection.*

2.1. Adding Process Innovation to Customer Facing Innovation Focus in SMEs

As mentioned earlier, product and service innovation are both customer facing innovations. The intuitive idea that SMEs that introduce product innovations and collaborate with external sources should be more likely to experience product sales growth has received important validation in several studies (e.g., Cassiman, Golovko, & Martínez-Ros, 2010; Lewandowska, Szmura-Tyc, & Gołębiowski, 2016; Lim, Sharkey, & Heinrichs, 2006; Raymond, Bergeron, & Croteau, 2013). For example, a stream of studies finds that innovations in SMEs often focus on product development to improve their performance (Cooper, 1993; Oke et al., 2007; Storey, 1994) and develop new-to-market products, which can assist SMEs to compete with larger rivals (Mosey, 2005). Furthermore, the Service Dominant Logic view suggests that service innovations are increasingly likely to happen in manufacturing firms, as we have progressed into more of a service-centered orientation society (Vargo & Lusch, 2004, 2016; see also Casidy et al., 2020; Ulaga & Loveland, 2014). Service innovations in industrial and manufacturing companies would more likely be related to auxiliary services (i.e., peripheral to manufacturing) that help differentiate the manufactured products in the competitive choice set of options available to buyers. Several studies have begun to examine that idea, finding support that service innovations improved the sales performance and customer loyalty of the manufacturing companies (see Casidy et al., 2020; Chen et al., 2011; Eggert, Thiesbrummel, & Deutscher, 2015; Heirati & Siahtiri, 2019; Markovic et al., 2020; Woo, Kim, & Wang, 2021).

However, process innovations, in contrast to customer facing product and service innovations, serve a different purpose in organizations. For example, product and service innovations are typically focused on increasing revenues (effectiveness focus), whereas process innovations are typically focused on decreasing costs (efficiency focus)—see, e.g., Hunt and Duhan (2002), and Wittmann, Hunt, and Arnett (2009). Product and service innovations are usually given to customers in the form of an improved market offering, whereas process innovations stay in the organization (Aliasghar et al., 2019; Chai et al., 2020). As pointed out by Argote and Miron-Spektor (2011), some of a company's knowledge might flow out to customers and competitors. They describe the example of a medical devices company introducing a new product to the market that competitors might “reverse engineer” and thus be able to imitate. However, one benefit of process innovation is that, because it remains within the organization, there is less spilling into competitors.

Previous studies propose that customer facing and process innovation might be intertwined. For example, it has been suggested that when firms are involved in introducing a process innovation to reduce their cost, product designs should be adapted and updated

(Hullova, Trott & Simms, 2016). Kotabe and Murray (1990) find that combining both types of innovation enables firms to reduce costs and increase returns. One of the interlinks between customer facing and process innovation can be explained from the product life cycle theory in its third stage, where the motivation of firms to engage in innovation is to reduce costs and increase the quality of products (Idris, Saridakis, & Khan, 2022).

Focusing on the differences that each innovation generates, the question arises, are there any differences that occur when SME manufacturing firms pursue only customer facing innovations versus if they pursue of customer facing innovation in combination with process innovations (how the firm offers what it offers)?¹ Organizational learning theory research often proposes that firms *choose* between product/service focus and process focus in innovation activities. Process innovation assists firms to strengthen their competitive advantages by reducing the cost of production and improving the adaptability of production systems, thereby increasing productivity and improving efficiency (Lefebvre, Lefebvre, & Collin, 1991; Raymond et al., 2013; Reichstein & Salter, 2006). Gunday, Ulusoy, Kilik, and Alpkhan (2011) separate the effects of product innovation and process innovation activities on firm financial performance. They find that product innovation mediates the association between marketing/process innovation and the outcome of firm performance; however, there is no significant direct relationship found between product innovation and firm financial performance. Similarly, but in the SME context, Wolff and Pett (2006) also distinguish between product innovation and process innovation, finding that product innovation appears to have a stronger effect on firm performance than process innovation. Firms, however, might decide to combine engaging in both process innovations and product innovations in order to increase their competitiveness over their rivals.

Tsou and Cheng (2018) propose that there is a benefit in drawing on organizational learning theory when examining B2B innovation. According to organizational learning theory, firms can embed new information to better improve their operations (Slater & Narver, 1995; Jones & Macpherson, 2006). According to Jiménez-Jiménez, Sanz Valle and Hernandez-Espallardo (2008), organizational learning is an important predecessor for creating innovation that leads to improved capabilities. Combining these learning-based resources leads to resource specialization, which can generate *unique capabilities* that can lead, in turn, to competitive advantage and impact financial performance (Hansen et al., 2013, Newbert, 2007). Capabilities

¹ We thank an anonymous reviewer for their thoughts on these ideas related to the important distinction between process innovations and product and service innovations.

are defined as “complex bundles of intangible skills and knowledge...which enable the firms to act upon tangible resources (assets) such as capital, labor, land, and material. The specialized, interconnected combinations of capabilities and assets are termed competences (Hansen et al., 2013, p. 300). Pulling these mentioned concepts together, we believe that through the combination of externally focused benefits previously expounded for product/service innovations, and the internal benefits of process innovations, there are synergies that result in increased capability generation in the organization related to innovation creation and business plan/strategy development. The tri-fold innovation creation can result in improved future fiscal growth and focus on operational assets that can support innovation.

In more detail, first, we posit that as to increased capabilities in the SME, those SMEs that engage in process innovation *in addition to* product and service innovation are better able to create and maintain a capability in their capacity to create innovations versus SMEs that do not engage in any innovations as compared to SMEs that do not engage in any innovations. Our view is supported by the current MSI 2020-2022 research priority #6 on innovation, NPD, and commercialization which states: “Adapting to disruption and sustaining profitable growth will require companies to innovate new *product* and *service* offerings and efficient *processes* for bringing these to existing and new markets” (MSI 2020, p. 12, emphasis added). Organizational learning theory proposes three general reasons that some companies face lower barriers to adopting new innovations, with one of the general reasons being that, because some companies have less to learn than other companies, they face fewer barriers and fewer challenges in learning (e.g., Attewell, 1992; Fichman & Kemerer, 1997). Drawing on that reasoning, we propose that through a better understanding of processes via process innovation, organizations have less to learn and are thus better able to come up with additional product and service innovations than companies that do not engage in process innovation; insights regarding production can lead to insights regarding what can be produced. Stated formally, we hypothesize:

Hypothesis 1. The combination of SMEs engaging in both internal facing (process) innovation and customer facing (product and service) innovation results in increased *capability generation* to develop future new products or services (over SMEs that do not engage in innovation).

Second, we propose that engaging in process innovation and product/service innovation helps improve the B2B SME’s capacity to implement business models and strategy. Business models are becoming increasingly important over the last few decades (Massa, Tucci, & Afuah,

2017). A business model identifies how an organization, such as an SME, can create and capture value (Zott, Amit, & Massa, 2011). According to Johnson, Christensen, and Kagermann (2008), a business model is defined as the combination of four elements: a customer value proposition, a profit formula, key resources, and key processes that describe how value is delivered to the customer and to the company. A business plan contains the business model, and the business plan also includes how the business model interacts with the financial plan (Honig & Karlsson, 2004; Snihur & Wiklund, 2019; Snihur & Zott, 2020). Given that “a well-structured and a well thought out business plan is still the backbone of any company that is going to be successful in any medium” (Wilson & Abel, 2002, p. 93), SMEs should benefit from being able to design business plans.

Prior studies draw on organizational learning theory in outlining ways in which business model innovation might come about through cognition and action (Andries, Debackere, & Van Looy, 2013; Berends et al., 2016; Wei, Yi, & Guo, 2014). Creating product innovations and service innovations could help the SME to understand how to *create* even more value in the future. On the other hand, creating process innovations could help the SME understand how to better *capture* even more value through operational effectiveness in the future. Indeed, “key processes” is one of the four elements of a business model. Thus, the act of creating process innovations should help the SME better understand its key processes. The organizational learning that comes with that understanding could translate into more flexible business models. McDonald and Eisenhardt (2020, p. 485) propose that a business model “is likely to emerge from a creative process.” Together, the product and service innovations and the process innovations help the SME understand both value creation and value capture. Thus, when the combination of innovation occurs, the SME could create the capability generation to better implement business plans and strategy over time. Stated formally, we hypothesize:

Hypothesis 2. The combination of SMEs engaging in both internal facing (process) innovation and customer facing (product and service) innovation results in increased *capability generation* of implementing a business plan and strategy (over SMEs that do not engage in innovation).

Third, we posit that engaging in process innovation in addition to customer facing innovation could increase B2B SMEs future focus (i.e., intentions) to develop even more new products and services. According to Akaka and Vargo (2014), technology is an operant resource, and operant resources are skills and knowledge resources (Madhavaram & Hunt, 2008). Thus, process innovations, which by definition are focused on improving the technology

available in the SME, should improve skills and knowledge. This skill and knowledge resource, when combined with the skill and knowledge from product and service innovations, might perhaps provide novel insights in accordance with organizational learning theory. In short,

Hypothesis 3. The combination of SMEs engaging in both internal facing (process) innovation and customer facing (product and service) innovation results in greater future focus on new products or services (over SMEs that do not engage in innovation).

Fourth, introducing process innovations, in addition to customer facing innovations, might result in the SME focusing its scarce resources on operational capabilities from facilities and machinery to support additional efficiencies in the future. B2B SMEs are typically more constrained than larger organizations when it comes to physical infrastructure, such as facilities and machinery (Chowdhury, Islamm, & Alam, 2013; Hasnan et al., 2014; Nugent & Yhee, 2002). During the creation of process innovations within the last few years, the organization becomes more aware of the possibilities related to its physical infrastructure, including machinery and facilities. With this increased awareness, organizational learning occurs, and we believe the manufacturing B2B SME is more likely to adopt a focus on improving the facilities and machinery in the near future. Stated formally, we hypothesize:

Hypothesis 4. The combination of SMEs engaging in both internal facing (process) innovation and customer facing (product and service) innovation results in greater *future focus* on improving facilities and machinery (over SMEs that do not engage in innovation).

2.2. *SME Hurdles and the Spurring or Spurning of Capabilities and Future Focus*

Argote and Miron-Spektor (2011) provide a good review of the organizational learning theory topic, outlining advances from the 1991 *Organizational Science* special issue on the topic up to the time of their research article in 2011. They propose that “experience interacts with context to create knowledge” (Argote & Miron-Spektor, 2011, p. 1123), as visualized in their Figure 1. Sometimes there can be obstacles that create context. Huber (1991) outlines four obstacles to learning that have been investigated in other studies: imperfect sensing by employees, distorting of feedback related to taken actions, lack of access across business units to information, drawing incorrect connections between actions and outcomes, misjudgments on the importance of certain competences over other competences (see Table 1 in Huber, 1991). Argote and Miron-Spektor (2011) review several other studies that have looked at other

dimensions of context, such as specialist vs generalist, organizational structure, social network development, shared identity across organizational units, power differences in the organization, emotional drivers, and motivation sources. They state there is a need for additional, future research to focus on other characterizations of context in organizations and how they might affect organizational learning.

Indeed, although previous research shows that barriers and obstacles have an impact on firms' propensity and/or intensity to innovate regardless of the direction of the impact (Aghion & Howitt, 1992; Bloom, Draca, & Van Reenan, 2011; Bloom & Van Reenen, 2007; de-Oliveira & Rodil-Marzábal, 2019; Hashmi, 2013; Mancusi & Vezzulli, 2010), research has not examined the impact of these obstacles and barriers on firms' capability generation related to new products or strategy nor on future focus. We advance research in this area by focusing on the context of major financing hurdles and major competition hurdles; what happens when B2B SMEs are facing major obstacles in either (a) financing or (b) competition? Do these major obstacles spur the B2B SMEs to overcome them through a focus on collaboration, coproduction, and a focus on physical infrastructure such as machinery and facilities that can help future innovations or focusing on other capabilities related to business success? Or do they spurn them away from that path because of the costs of innovation are harder to bear when financing is more of an obstacle and the uncertainty of success is more uncertain when competition is intensified? Based on the mixed findings of prior research (e.g., Rammer, Czarnitzki, & Spielkamp, 2009; Staniewski, Nowacki, & Awruk, 2016; Tether, 2002), we propose a number of different potential effects.

We first outline possible effects related to situations of major financing hurdles on innovation. It has been commonly theorized that collaborations might be limited in many SMEs because the SME normally has greater financial restrictions and higher costs of capital versus larger organizations (Rammer et al., 2009; Tether, 2002). As a result, it is predicted that SMEs might implement the least innovative solutions (Staniewski et al., 2016). Savignac (2006) shows that when financial barriers exist as a major constraint, the probability for French manufacturing firms to engage in innovation is significantly reduced. He concludes that the "likelihood that a firm will implement innovative projects is significantly reduced by the existence of financing constraints. This reduction is estimated to amount to 22.3% everything else being equal" (Savignac, 2006, p. 22). As stated by Cassar (2004, p. 261), "financial capital is one of the necessary resources required for enterprises to form and subsequently operate." To summarize, we believe that when financing is a major hurdle, the SMEs are more likely to focus on exploiting their current market offerings than to take on the risks associated with

focusing on innovation capabilities. Thus, we hypothesize the context will result in a “spurred” effect:

Hypothesis 5a. The presence of SME major financing hurdles negatively impacts innovation related capabilities generation.

Gawer & Cusumano (2014) propose that access to external financing is positively associated with firms' ability to experiment with and develop new business models. However, when SMEs face financing constraints, they may focus on short-term profitability (e.g., Brilius, 2010), thus ignoring long-term opportunities to focus on developing new business models. That choice is counter-productive since business models in business plans help companies earn larger profits (Zott et al., 2011). But this short-term performance focus due to financing constraints could lead to a lack of investment in learning and development functions and activities (Teece & Chesbrough, 1996) and reduction in research and development (R&D) (Mancusi and Vezzulli, 2010), which are both critical for developing new business models. Some evidence of this outlined relationship already exists. Mancusi and Vezzulli (2010) find that the capability of Italian manufacturing firms to be involved in R&D activities—a component of business model—is significantly reduced due to financial obstacles. Andries et al., 2013, p. 302) report “Our case studies show that founders and employees are not always capable or willing to do so and that investors are reluctant to finance such changes. The ventures’ organizational rigidities and financing problems reduce the possibility of exploring new business models.” Drawing on those findings, we argue for a spurred effect. Stated formally, we propose:

Hypothesis 5b. The presence of SME major financing hurdles negatively impacts business model related capabilities generation.

We argue that the presence of major financing hurdles for smaller-sized manufacturing firms might actually positively impact their future focus on innovation. When these companies are faced with financing hurdles, they might look for outside investors or partners to fund their innovative projects, leading to new collaborations and partnerships that can spur innovations; examples include the pharmaceutical companies described by Munos and Chin (2011). Furthermore, when funding is limited, the SMEs might be forced to come up with new, innovative products that can be developed more cheaply or efficiently than traditional

offerings, such as the example of the hospitals described by Le Ber and Branzei (2010). The major financing hurdles might push the SMEs to adopt a more entrepreneurial culture in which customer facing innovation is valued and encouraged in order to find new ways to generate revenue and growth (Dheer & Salamzadeh, 2022). Thus, while financing hurdles may present short-term challenges for smaller manufacturing firms, they may ultimately lead to a greater focus on innovation and long-term success. Thus, we hypothesize a spurred effect:

Hypothesis 5c. The presence of SME major financing hurdles positively impacts the future focus of SMEs on innovation.

Prior studies suggest that a lack of access to financial resources can impact firms' ability to invest in manufacturing plants or machinery (e.g., Bloom & Van Reenen, 2007). However, to improve financing, organizations must demonstrate to lending institutions that the SME's future has growth and growth potential. Future growth evidence could take the form of future focus on machinery/facilities (improvements in process), drawing on the research results that investment in facility and machinery is positively associated with SME future fiscal returns (e.g., De Long & Summers, 1992; Martinez-Cillero, Lawless, & O'Toole, 2023; Škare & Sinković, 2013). Thus, we theorize a spurred effect:

Hypothesis 5d. The presence of SME major financing hurdles positively impacts the future focus of SMEs on facility/machinery investment.

Intense competition in the marketplace has been found to reduce firms' ability to innovate (Aghion & Howitt, 1992). The negative effect can be explained by the logic that when firms introduce new innovations, they aim to generate more profits. However, increased competition in the marketplace usually leads to reduced profits and thereby reductions in intention to innovate (Hashmi, 2013). Additionally, it has been predicted that when SMEs are under more intense competition, they might allocate less focus to innovation due to their desire to protect their existing business from competitors. And as they focus on protecting the existing business, they might become less open to changing the business model. Thus, we hypothesize a spurned effect:

Hypothesis 6a. The presence of SME major competition hurdles negatively impacts the innovation related capabilities generation.

We argue that major competition hurdles can negatively impact firms' business model capabilities generation. The presence of competition might limit a firm's ability to invest in research and development, access new markets, or differentiate its products from competitors, which are all critical for generating business model-related capabilities (Johnson et al., 2008; Zott et al., 2011). Additionally, major competition could lead to price wars, reduced profit margins, and lower revenues, making it difficult for firms to invest in the development of new capabilities (Krämer, Jung, & Burgartz, 2016). Business model capabilities are a "part of a firm's dynamic capabilities" (Cavalcante, Kesting, & Ulhøi, 2011, p. 1337). While firms that are able to develop and maintain dynamic capabilities are better positioned to succeed in dynamic and competitive environments (Eisenhardt and Martin, 2000; Teece, Pisano, & Shuen, 1997), intense competition itself can create a "hostile business environment" that makes it difficult for firms to develop and maintain dynamic capabilities, (Aragón-Correa & Sharma, 2003). Thus, we hypothesize a spurned effect:

Hypothesis 6b. The presence of SME major competition hurdles negatively impacts the business model related capabilities generation.

However, at the same time that the organizations focus on protection of existing business, they might also look to the future on how to neutralize or "leapfrog" that competition later on through future effectiveness gains in profits (i.e., product/service innovation) and efficiency gains in facility/machinery (process innovation); see Hunt (2013) and Hunt and Madhavaram (2020) for more discussion on leapfrogging competition. Drawing on that logic, we hypothesize a spurred effect:

Hypothesis 6c. The presence of SME major competition hurdles positively impacts the future focus of SMEs on innovation.

We argue that major competition hurdles can result in manufacturing SMEs focusing on future development of facility machinery. For example, intense competition might encourage the businesses to make cost-efficient investments in facility machinery that can help them to operate more efficiently and compete more effectively. As mentioned earlier, competition often results in races toward leapfrogging each other toward radical innovation (Hunt, 2013; Hunt &

Madhavaram, 2020). And radical innovations often require new machinery or machinery upgrades. Thus:

Hypothesis 6d. The context of SME major competition hurdles positively impacts the future focus of SMEs on facility/machinery investment.

3. Data and Method

3.1. Sample

Data from 1,405 manufacturing SMEs was obtained from the “UK Longitudinal Small Business Survey” carried out in 2015. SMEs were identified using the Inter Departmental Business Register (IDBR); decisions regarding the sample process and survey were performed by the Department for Business, Innovation and Skills (BIS, 2016). This field survey database has been used in a large number of recent entrepreneurial-focused research studies looking at a variety of topics (e.g., Antcliff, Lupton, & Atkinson, 2021; Brown, Liñares-Zegarra, & Wilson, 2022; Calabrese, Degl’Innocenti, & Zhou, 2020; Henley & Song, 2020; Idris & Saridakis, 2018; Idris, Saridakis, & Khan, 2022; Saridakis, Idris, & Hansen, 2021; Saridakis, Idris, Hansen, & Dana, 2019; Saridakis, Lai, Torres, & Mohammed, 2017). As indicated in the BIS report, “all interviews were conducted with owner/proprietors, Managing Directors or other senior directors in UK-based enterprises” (BIS, 2016, p. 1). There is only one interview per company included in the database (i.e., each entry in the database is a separate SME company). The response rate of the IDBR survey was 19%. Firm size of the 1,405 manufacturing companies in the SME manufacturing sample had a distribution of solo (no employees) = 12.8%, micro (1-9 employees) = 22.8%, small (10-49 employees) = 36.7%, and medium (50,249 employees) = 27.8%. The average current annual turnover (sales revenue) was £5,023,967 British pounds (i.e., \$6,936,993 current US dollars equivalent). Approximately 84.1% of the SMEs operated using one site location, with another 10.4% using two sites, 3.3% using three sites, 2.1% using four to 10 sites, and less than 0.1% using more than 10 sites. As to company leadership, 30.1% had one working owner/partner, 33.1% had two owners/partners, and 23.4% had three to five working owners/partners, with the other percentage scattered across higher numbers. As to the age of the SMEs, 8.2% were zero to five years old, 9.2% were six to 10 years old, 15.8% were 11 to 20 years old, and 66.8% were over 20 years old. Approximately 79.5% of the SMEs were private limited companies limited by shares (LTD), 9.7% were sole proprietorships, and the remaining small percentage were spread across several other legal statuses. As to the geography of the manufacturing SME sample,

84% were located in England, 6.5% were in Scotland, 4.1% were in Wales, and 4.6% were in Northern Ireland.

3.2. *Measurement*

Every variable is measured using single-item survey question scores from the “UK Longitudinal Small Business Survey.” The two different outcomes of organizational capabilities and future business focus were measured as follows: Regarding *capability generation*, the respondents were asked by the British government, “On a scale of 1 to 5 where 1 is very poor for doing these, and 5 is very strong, how capable is your business at _____?” evaluating “people management,” “developing and implementing a business plan and strategy,” “developing and introducing new products and services,” “accessing external finance,” and “operational improvement, e.g., adopting industry best practice” (BIS, 2016, p. 36). Given the scope of our hypotheses, we focus on the survey answers related to “developing and introducing new products and services” and “developing and implementing a business plan and strategy.” We examined *future focus* using the survey questions: “Does your business plan to do any of the following over the next three years? (randomized the order of asking) (1) Increase the skills of the workforce, (2) Increase the leadership capability of managers, (3) Capital investment (in premises, machinery, etc.), (4) Develop and launch new products/services, (5) Introduce new working practices” (Y/N) (BIS, 2016, p. 92) for which we have recoded yes = 1 and no = 0. Again, given the scope and focus of our hypotheses, we focus on answers to the questions on “capital investment (in premises, machinery, etc.)” and “develop and launch new products/services.”

Thus, capability generation and future focus are each measured using a single item, given the BIS survey conducted by the UK government only contains one question on each of those topics. We note that this can be a limitation. Multi-item measures have become the status quo in survey-based academic research because they are often preferred in analysis due to higher reliability (i.e., stability in scores), more resistance to errors in reading the statements (such as not picking up on negatives), and better representing complex constructs. Fortunately, simple or narrow constructs can be well estimated using a single scale item (Allen, Iliescu, and Greiff, 2022; Bürisch, 1997; Cheah et al. 2018; Matthews, Pineault, and Hong, 2022; Spector, 2022; Wanous et al., 1997). Thus, research on topics such as turnover intention (e.g., Andel et al., 2019; Chang and Lyons, 2012), net promoter score (Baehre et al., 2022), or self-esteem (Brailovskaia and Margraf, 2020) normally use single scale items to model the simple constructs. New product capability generation, business plan capability generation, and the

future focus on developing and launching new products or on investment in premises and machinery topics are also narrow constructs. Thus, using the described single measure (on a strongly disagree 1 / 7 strongly agree) should capture the construct (content validity). And because each is positively framed (no negatives in the word choice), it is unlikely that there will be errors in understanding the statement. However, we note it would be beneficial for future research to validate the results using other data sources that provide multiple scale items.

The four independent variables (product and service innovation, process innovation, and major obstacles of competition in the market or of obtaining finance) were measured as follows: Regarding *product innovation*, they were asked: “Has your business introduced any new or significantly improved goods in the last three years? This excludes the resale of goods purchased from other businesses, or changes of a solely aesthetic nature.” (Y/N) (BIS, 2016, p. 71). Regarding *service innovation*, they were asked: “Has your business introduced any new or significantly improved services in the last three years?” (Y/N) (BIS, 2016, p. 71). Regarding *process innovation*, they were asked: “Has your business introduced any new or significantly improved processes for producing or supplying goods or services in the last three years?” (Y/N) (BIS, 2016, p. 71). We have coded each of these variables as yes = 1, no = 0. Given the focus of the first four hypotheses of comparing if there is a benefit to engaging in process and customer facing innovation versus just customer facing innovation, we created two new indicator variables to use as the independent variables in the regression modeling. The first variable is the customer facing innovation only group, which measures if the company engaged in product or service innovation (yes = 1, no = 0). The second variable is the group that engaged in both customer facing innovation and process innovation (yes = 1, no = 0). Using both variables permits inquiry into if also engaging in process innovation has a benefit beyond just engaging in customer facing innovation.

Regarding the context of *major obstacles*, respondents were asked: “I’d like to ask you now some questions about issues, obstacles or difficulties that your business might face in achieving your business objectives. Which of the following would you say are major obstacles to the success of your business in general? Randomized answers = Competition in the market? Obtaining finance?” (Y/N) (BIS, 2016, p. 37), which we have recorded as yes = 1, no = 0.

We included several control variables from the BIS survey that proxy other sources of knowledge creation according to organizational learning theory. They are the age of the business (in years), the number of business sites (count), if the business is still family owned (Y/N), if the business exports any goods or services (Y/N), if there is any off-the-job training (Y/N), and if there is any on-the-job training (Y/N). Sinkula (1994, p. 36) points out that

“organizational learning, like individual learning, is a function of age and experience.” Thus, we control for these factors using the age of the business, the number of sites, and if the SME business is involved in exporting as representations of different aspects of gaining experience. As mentioned in Huber’s quote (1991, p. 88) at the beginning of the conceptual section, one of the other five sources/sub-processes of knowledge acquisition is “drawing on knowledge available at the organization's birth.” We include the control variable on if the business is still family owned to represent some of the knowledge from the “birth” of the organization, as that knowledge likely decreases when the business ownership transfers from the founder’s family to professional management leaders. We included the control variable regarding capability for people management to control for other organizational learning related to knowledge sharing in organizations. Last, prior research finds that SME managers often do not possess the types of training and education that are normally associated with innovativeness (Romano, 1990), resulting in difficulties in the ability to translate customer knowledge into new products and services (e.g., Gruner & Homburg, 2000, Sethi, Smith, & Park, 2001). Thus, we include control variables to account for the level of off-the-job training and on-the-job training. Table 1 presents the correlation matrix for the variables used in the empirical model.

<< Insert Table 1 about here >>

4. Results

4.1. Sample Statistics

Of the 1,229 manufacturing SME companies in our dataset, 458 engaged in no innovations, 288 engaged in customer facing innovations but not process innovations, 122 engaged in process innovations but not customer facing innovations, and 361 engaged in both customer facing innovations and process innovation (during the prior three years).

Before investigating data related to the testing of the hypotheses, we first examined to what extent the customer facing innovation group is similar or different from the group of companies that engaged in both customer facing and process innovation when it comes to several firm demographics: age, number of employees, number of site locations, business sector focus, if the business is a family owned, and if it has a global focus (exporting percent of recent past sales). We find the two groups are comparable across all these major dimensions. The data indicate no significant difference (chi-square $\chi^2 = .279$, $df = 3$, $p = .96$) when examining the distribution of the age of the business between the customer focused innovation firms (0 to 5 years = 8.3%, 6 to 10 years = 9.1%, 11 to 20 years = 17.4%, more than 20 years = 65.2%) and

the customer plus internally focused innovation firms (0-5 years = 9.0%, 6 to 10 years = 9.5%, 11 to 20 years = 15.8%, more than 20 years = 65.8%). Likewise, the data indicate no significant difference (chi-square $\chi^2 = 4.65$, $df = 3$, $p = .20$) when examining the number of employees working at the business between the customer focused innovation firms (no employees = 11.5%, micro: 1 to 9 employees = 20.2%, small: 10 to 49 employees = 24.0%, medium: 50 to 249 employees = 34.4%) and the customer plus internally focused innovation firms (no employees = 9.9%, micro: 1 to 9 employees = 14.0%, small: 10 to 49 employees = 41.4%, medium: 50 to 249 employees = 34.7%). Third, the data also indicates no significant difference (chi-square $\chi^2 = 10.74$, $df = 7$, $p = .15$) when examining the number of site locations of the business between the customer focused innovation firms (1 site = 80.2%, 2 sites = 12.6%, 3 sites = 3.2%, 4 sites = 1.2%, 5 sites = 0.8%, 6 sites = 1.2%, 7 sites = 0.8%, 8 or more sites = 0%) and the customer plus internally focused innovation firms (1 site = 86.0%, 2 sites = 6.8%, 3 sites = 4.1%, 4 sites = 1.8%, 5 sites = 0.9%, 6 sites = 0%, 7 sites = 0%, 8 or more sites = 0.5%). Fourth, the data indicates no significant difference (chi-square $\chi^2 = 0.39$, $df = 2$, $p = .82$) when examining if the business is family owned between the customer focused innovation firms (family owned = 60.5%) and the customer plus internally focused innovation firms (family owned = 60.4%). Thus, it is unlikely that any discovered differences between the two groups as compared to the baseline group are due to differences in the company demographics.

4.2. Analysis of Hypotheses on Innovation Combinations and Capabilities and Focus

We conducted regression analysis of the sample. The results shown in Table 2 indicate that there is a statistically significant additive effect for engaging in process innovation and customer facing innovation beyond the effect of engaging in only customer facing innovation for hypotheses 1 to 4 controlling for several other sources of knowledge generation. As to hypothesis 1, that there is a benefit in the capability generation for developing and introducing customer facing innovations for SMEs to engage in process innovation in combination with customer facing innovations, the OLS regression analysis indicates a significant additive difference ($\beta=0.26$, $SE=0.094$, $p=0.005$) regarding how capable the business is regarding developing and introducing new products or services. As to hypothesis 2, that there is a benefit in the capability generation for developing a business plan and strategy for SMEs to engage in process innovation in combination with customer facing innovations, the OLS regression analysis indicates a significant additive difference ($\beta=0.21$, $SE=0.08$, $p=0.009$) regarding how capable the business is regarding developing and implementing a business plan and strategy. Again, it appears that engagement in introducing both new process innovations in addition to

customer facing innovations has an effect on the SMEs' capabilities. The binary logistic regression results for the binary outcome (1= yes, 0 = no) of future focus centered on developing and launching new products and services over the next three years ($\beta=1.52$, $SE=0.24$, $p<0.001$). The binary logistic regression results also support an additive effect related to hypothesis 4, that there is an increase in planned future focus centered on capital investment in facility machinery and premises over the next three years ($\beta=0.47$, $SE=0.21$, $p=0.02$). The customer facing and process innovation group have a much higher percentage of B2B SMEs who intend to focus the SME's resources on infrastructure improvements in machinery and facilities over the next three years versus both the control group of no innovations.

<< Insert Table 2 about here >>

As seen in Table 3, the majority of the investigated interaction term multiplicative effects related to H1 to H4 are not statistically significant.² Unfortunately, because the innovation dummy variables reduce the amount of available data, the estimator's breakdown point necessarily deteriorates given the sample distribution of the four quadrants of no innovation, customer facing innovation only, process innovation only, and customers facing and process innovation combination. This is evident in the interaction coefficients' VIF scores being above 4. The data does support an interaction effect for future capital investment, but again the VIF score is above 4. Future related research should utilize interval scales if possible so the interaction term has more variance.

<< Insert Table 3 about here >>

As this research is focused on SMEs, we next broke the analysis down one step further, to investigate if the innovation combinations effect might be different for the 'S' (small firms) versus the 'M' (medium firms) in the SMEs dataset. Examining the data, 353 SMEs reported having less than 10 employees (micro businesses), 538 reported 10 to 49 employees (small businesses), and 322 reported 50-249 employees (medium businesses). Thus, we divided the dataset into three groups (micro, small, medium) to elaborate on the SME aspect more in the paper. We ran ANOVA using Tukey analysis to compare the multiple comparisons between

² We thank an anonymous reviewer for suggesting that we examine and include the interaction models from Table 3 in addition to the Table 2 focused on additive effects to provide more insight into the research question and hypotheses.

(1) no innovation, (2) customer facing innovation, (3) process innovation, and (4) the combination of customer facing AND process innovation firms on the four different dependent variables. Neither the group 2 customer facing only innovation nor the group 3 process only innovation groups are statistically different when it comes to the dependent variables over the group 1 firms that engaged in no innovation. But the group 4 (interaction) combination of customer facing and process innovation firms is statistically significant versus the group 1 control group of no innovation the majority of the time. See Table 4. Thus, while regression does not pick up an amplification effect of the multiplication of the two dummy variables, we do see that the combination does make a difference on the level of the dependent variables that is not present looking at just their main effects. Last, we note that examining the dependent variable group average values by firm size reveals an interesting finding; the largest effect size difference most often occurs in the micro-sized firms. See Table 4.

<< Insert Table 4 about here >>

4.3. Analysis of the context effects of major hurdles in financing and competition

In this section, we outline the results of analysis related to the research question comparison of the B2B SMEs based on the context of financing or competition being major obstacles to the success of the business in general according to the interviewed SME leaders. We compare the two hurdles side by side, looking at the effects on the four outcomes shown in Table 2. First, when it comes to impact on innovation capability generation, the “financing is a major obstacle” is not statistically significant ($\beta = 0.07$, $SE = 0.07$, $p > 0.10$); thus, we do not find support for H5a. In contrast, “competition as a major obstacle” is statistically significant ($\beta = -0.19$, $SE = 0.06$, $p < 0.01$), supporting H6a that it negatively spurns the capability generation.

When it comes to business model capability generation, we find that both “financing is a major obstacle” ($\beta = -0.14$, $SE = 0.05$, $p < 0.01$) and “competition is a major obstacle” ($\beta = -0.05$, $SE = 0.005$, $p < 0.01$) are statistically significant, supporting H5b and H6b. Both appear to spurn the capability generation.

When it comes to the future focus over the next three years to develop and launch new products and services, we find that both “financing is a major obstacle” ($\beta = 0.65$, $SE = 0.19$, $p < 0.01$) and “competition is a major obstacle” ($\beta = 0.37$, $SE = 0.13$, $p < 0.01$) are statistically significant; they do support H5c and H6c that the contexts appear to spur more focus on developing innovations. When it comes to the future focus over the next three years to make a capital investment in facilities and machinery, we find that both “financing is a major obstacle”

($\beta=0.24$, $SE=0.18$, $p>0.10$) and “competition is a major obstacle” ($\beta=0.12$, $SE=0.13$, $p>0.10$) are not statistically significant; they do not support H5d and H6d. In summary, we find mixed results regarding the hypotheses related to the effects of major financing and competition hurdles.

To provide even more detail into the observed effects, the sample breakout counts are as follows: (a) 39.8% of the SMEs indicated financing and competition are both *not* major obstacles, (b) 8% indicated financing is a major obstacle, (c) 42.8% indicated competition is a major struggle, and (d) 9.4% indicated that both financing and competition are major struggles. To overview, we found an answer to the research question that the combination of financing and competition obstacles has a different level of impact (versus just financing major obstacle or just competition major obstacle) for several capabilities in comparison to the B2B SMEs that did not view either as major obstacles on several dimensions. There were a few situations, however, where it seems that one or the other element individual plays a larger role in the impact, with competition more often being the driver of the differences.

5. Discussion

By combining organizational learning theory and ambidexterity theory, this study explores whether financial and competitive pressures influence business model and future product innovation differently and how this influence is simultaneously impacted by the ambidextrous focus on both process innovation and product/service innovation. The increased ambidexterity that comes from engaging in process (internally focused) and product/service innovation (external customer focused) under the different pressures advances the existing research organizational learning theory. The results indicate that engaging in process innovation, in addition to customer facing innovation, is associated with SMEs improvement in capability generation and is related to future new products and business model strategy. Previous studies argue that organizational learning allows firms to generate and enhance their capabilities, which can lead to innovation and improved performance (e.g., Baker & Sinkula, 1999; Jiménez-Jiménez & Sanz-Valle, 2011). The process of organizational learning, which involves the acquisition and use of knowledge, has been argued to be an important predecessor of generating ideas, thereby introducing innovation. Organizational learning has been found to have an impact on firms' capabilities to foster and introduce effective and efficient innovation (Argote, McEvily, & Reagans, 2003; Calantone, Cavusgil, & Zhao, 2002; Jiménez-Jiménez et al., 2008; Hurley & Hult, 1998; Jiménez-Jiménez & Sanz-Valle, 2011). However, recent

research warns that “as organizations acquire experience, their performance typically improves at a decreasing rate” (Argote, Lee, and Park, 2021, p. 5399).

While previous research investigates the effect of innovation on firm capabilities, it fails to consider the different effects that can be generated when firms introduce different types of innovation, simultaneously. The results of this research have shown that when B2B SMEs introduce a combination of effectiveness (product/service) and efficiency (process) innovations, they acquire, disseminate, and use knowledge (see Argote et al., 2003), which enhances their capability generations. Our results show a new manner (for organizational learning theory) in which firms that are engaged in simultaneous activities can have a greater ability to acquire and generate knowledge and learning; the double loop will ultimately enhance their innovative activities (e.g., using new process innovation, to improve or create future product innovation). As mentioned earlier in this research, the “product-process focus” is one of the seven “learning orientations” in the behavioral school of thought on organizational learning theory. The product process focus adopts a ‘versus’ mentality. The analysis of the data from the BIS survey indicates that a number of SME manufacturing firms engaged in both types of innovations (approximately 29%). Moreover, that group of SMEs, on average, is the only group that statistically outperforms the no-innovation SME group on the four dependent variables.

Moreover, this research also sheds new light on the impact of major obstacles related to financing or competition. As indicated in the results, there are gains for B2B SMEs engaging in process innovations in addition to engaging in both product and service innovations. Not only does the additional engagement in process innovations appear to help their future product and service innovations (*H1*), but it appears to help their capabilities related to business plan/model and strategy (*H2*). It also results in an increased focus on capital investment in the physical infrastructure of the SME (*H4*). At the same time, it appears that when competition and financing are major obstacles to the success of the business, these obstacles often have different levels of impact on the capabilities and future focus across the B2B SME organizations. More specifically, the results show that, even though firms indicate that there exist some obstacles and challenges (such as finance and competition), these obstacles spur small firms’ future focus to develop and launch new products and services. This is in line with previous studies which showed that for “smaller firms, even though they perceive the obstacles more strongly, are capable of overcoming them” (de-Oliveira & Rodil-Marzábal, 2019, p. 312). This can be linked to organizational learning theory; it can be suggested that the learning from experience enables firms to overcome the challenges and obstacles they face (D'este et al.,

2012). As shown in the analysis, researchers and practitioners should not assume that either of these common major obstacles result in the same impacts on SMEs.

5.1. *Managerial Implications*

A takeaway for decision makers is that engaging in just product and service innovations does not result in a statistically significant increase in the SMEs' capabilities or future focus versus not engaging in innovations. Only when process innovations are added to the mix (in addition to product/service innovations) do decision makers see an improvement in the level of the SME innovation and business model capabilities and an increase in the future focus on innovation and investing in facilities and machinery. For this to happen, owner-managers of SMEs should identify and support activities that result in process innovation. One way of doing that is by focusing on internal collaborations across functions/departments. However, because manufacturers who face major obstacles in competition appear to experience decreases in these capabilities, they should also seek collaborations with suppliers, customers, R&D institutes, universities, and/or governments to overcome the decreases.

To the extent that it is simply difficult for SMEs to compete, training resources could be made available to SMEs to help them learn how to become more competitive. Managers should note that the effects of on-the-job and off-the-job training were mixed in this research (see Table 2). Additionally, in those situations, we call attention to the significant positive effect of collaboration with external participants demonstrated in prior research. Where managerial policies are in place that reduce or hamper information sharing between SMEs and their suppliers, customers, or external R&D agents, this will likely diminish the ability of organizations to translate innovation resources into capabilities that lead to innovation.

Managers must be prepared to address challenges that might include differences between the time horizon for the innovation cycle versus the expected break-even on the investment in facilities and machinery. See Di Fiore and Vetter (2016) for additional insights on this challenge. Another challenge might be when the capabilities that come through the combination of innovations become entrenched, and even forgotten, over time, or the resource specialization arising from the innovation can lead to resource lock-in. See Hansen et al. (2013) for an additional description of this challenge.

5.2. *Limitations and Future Research*

The BLS dataset has the advantages of “study[ing] the actual population in the actual context, integrating into what is already taking place. . . [it is] representative of the target population,

and they allow for measuring actual behavior” (Viglia, Zaefarian, & Ulqinaku, 2021, p. 195). However, there are limitations to this study that present opportunities for additional insights. First, the dataset is a cross-sectional panel of SME business-to-business manufacturing organizations. While it is a very large sample that has fair external validity, according to prior research that uses the BIS survey of SMEs in the UK, it would be valuable to look at the effects over time, as well as experimental designs that manipulate the adoption of certain activities, to see if there are other processes, activities, or cultural attitudes driving or contributing to both the independent and dependent variables in the models. Additionally, other measurement scales should be used that provide even greater insight and more flexibility in the analysis. Business leaders were asked in the BIS survey whether or not they did certain things and whether or not certain outcomes happened. As a result, it places some limitations on what types of hypotheses can be investigated and what types of methods can be used. Also, as mentioned in the measurement section, while single items can be used to measure elements that are simpler, narrow constructs, it would be very beneficial for future research to use multi-item measures to validate the concepts of capability generation and future focus. Furthermore, interval or ratio scales for innovation would permit better insight into the possibility of moderation or mediation. We tested an interaction score of the customer facing (0/1) and process innovations (0/1) in the regression models, and it was not statistically significant. The current dataset is consistent with the idea that there are additive, but not multiplicative, effects for engaging in process innovation and customer facing innovation. We wonder if the same would happen if different scales (that were metric) were used instead of dichotomous scales.

As to future research, there are many opportunities beyond the scope of this single study. It is likely that there are many other capabilities in B2B SMEs that innovation focus and major obstacles might be associated with that future research should examine. For example, do major financing obstacles or major competition obstacles impact SMEs capabilities or focus on the skills of their workforce, on the leadership capability of their managers, on operational effectiveness, or on accessing external finance sources, etc.? Second, to what extent might all of the observed findings be bounded or influenced by the industry context of the SMEs? A detailed examination comparing the nuances and potential differences across SIC subsectors would be beneficial. Furthermore, we believe it would be beneficial for research to explore the contrast of SME innovations that are new to the company versus new to the industry/market. Also, to what extent are other capabilities affected by engaging in different innovations? Indeed, more precise scale measurement of dynamic capabilities is needed.

SMEs often have limited R&D budgets (Ali et al., 2020). One way of overcoming those difficulties is to seek out other individuals to compensate. Within B2B markets, there have been shifts over the last few decades toward evolving transactions from suppliers and to customers from transactional-based business relationships to collaboration-based, coproduction-based, and co-creation-based relationships (Hansen, 2009). And with that shift, there has been significant research focused on supplier/buyer collaborations and the benefits of external R&D collaborations on sales (Cao & Zhang, 2011; Chang, 2017). A stream of research looks at different effects of including different types of external collaborations (e.g., Kolk & Lenfant, 2015; Statsenko & de Zubielqui, 2020). Moreover, many industrial and B2B firms are adopting the SD-Logic aim of co-creation in buyer-seller relationships and with other relational partners or even competitors, which involves collaboration or coopetition (see, e.g., Hansen, 2009; Holmqvist et al., 2020; Pattinson, Nicholson, & Lindgreen, 2018; Vargo, Akaka, & Wieland, 2020; Vargo & Lusch, 2008, 2016; Walter, Ritter, & Gemünden, 2001). It would be very beneficial for future research to examine the relationship between business relationship focus (transaction, collaboration, coproduction, or cocreation) and the concepts discussed in this research. Similar to the call by Lyons and Brennan (2019) for more research that advances the understanding of service value, we call for more research that advances understanding of process value.

6. Implications and Conclusions

Innovation in SMEs is an important topic within the industrial and business-to-business space (e.g., Casidy et al, 2020, Chen et al., 2011). As stated in a recent Confederation of British Industry (CBI) report, “innovation is changing. . . The *policy, funding and regulatory environment must now rapidly evolve to keep pace*” (CBI, 2019). We draw attention to the need to examine how policy could assist B2B SMEs who are facing major obstacles in funding or competition. Without action, countries can fall behind in the global innovation race.

The results of this research indicate that manufacturing SMEs that undertake both process innovation and customer facing (product and service) innovation can develop stronger capabilities related to future innovation and to business model and strategy implementation. At the same time, financing and/or competition hurdles can impact those same capabilities and future focus. In such instances, governments and policy makers should encourage manufacturing SMEs to collaborate with the appropriate external partners, identification of which will be driven by the SME’s innovative strategy. This collaboration would allow SMEs

to obtain the external knowledge and specific resources beneficial to their growth and performance, especially when facing major obstacles related to financing or competition.

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Table 1. Correlation of Variables.

	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.
1. Capability Generation: New Products or Services	1.00													
2. Capability Generation: Business Plan and Strategy	.431***	1.00												
3. Future Focus: Developing and Launching New Products/Services	.107***	.069**	1.00											
4. Future Focus: Investment in Premises and Machinery	.098***	.283***	.255***	1.00										
5. Innovation: Product & Service & No Process	0.035	.059**	-0.033	.098***	1.00									
6. Innovation: Product & Service & Yes Process	.084***	.155***	.117***	.199***	-.094***	1.00								
7. Context: Financing is Major Obstacle	-.089***	0.007	0.001	.078***	0.052*	0.004	1.00							
8. Context: Competition is Major Obstacle	-0.047	-.094***	.084***	.125***	0.009	-0.026	0.017	1.00						
9. Control: Age of Business	-0.019	-.077***	0.015	-0.049	-.078***	0.019	-.161***	.055**	1.00					
10. Control: Number of Sites	0.033	0.006	.092***	.089***	-0.013	0.008	0.001	.069***	.065**	1.00				
11. Control: Family-Owned Business	.094***	0.046	.071***	.084***	-0.008	-0.045*	-.072***	.114***	-0.022	.091***	1.00			
12. Control: Exports Goods or Services	-0.005	-.069**	-.138***	-.273***	-0.014	-.078***	0.020	-.146***	-.142***	-.096***	-.190***	1.00		
13. Control: People Management	.451***	.244***	-0.050*	-0.025	0.048	0.008	-0.040	-.118***	-.067**	-0.002	0.004	.134**	1.00	
14. Control: Off the Job Training	-0.048*	-0.029	-.250***	-.213***	0.039	-.085***	.066**	-.101***	-0.032	-.104***	-.113***	.181**	.077***	1.00
15. Control: On the Job Training	-.070**	-.081***	-.265***	-.219***	0.018	-.098***	0.051*	-.063**	-.071**	-.121***	-.102***	.173**	.067**	.460***

Note: * p < 0.10, ** p < 0.05, ***, p < 0.01

Table 2. Additive Effect of Innovation Combinations and Context on Capabilities and Future Focus.

Outcome	Capability Generation: New Products or Services	Capability Generation: Business Plan and Strategy	Future Focus: Developing and Launching New Products/Services	Future Focus: Investment in Premises and Machinery
Intercept	3.2 (0.28)***	1.85 (0.25)***	3.57 (0.70) ***	3.11 (0.68) ***
H1 to H4: Customer Facing Innovations Only	0.23 (0.12)*	0.17 (0.11) ^{ns}	1.39 (0.39) ***	-0.03 (0.30) ^{ns}
H1 to H4: Customer Facing and Process Innovations	0.42 (0.08)***	0.19 (0.07) ***	1.52 (0.24) ***	0.47 (0.21) **
H5a to H5d: Financing is Major Obstacle	0.07 (0.07) ^{ns}	-0.14 (0.05)**	0.65 (0.19) ***	0.24 (0.18) ^{ns}
H6a to H6: Competition is Major Obstacle	-0.19 (0.06)***	-0.05 (0.005) ^{ns}	0.37 (0.13) ***	0.12 (0.13) ^{ns}
Control: Age of Business	-0.03 (0.02) ^{ns}	-0.007 (0.02) ^{ns}	-0.14 (0.05) ***	-0.003(0.05) ^{ns}
Control: Number of Sites	-0.01 (0.04) ^{ns}	0.02 (0.04) ^{ns}	0.14 (0.11) ^{ns}	0.06 (0.11) ^{ns}
Control: Family-Owned Business	0.08 (0.05) ^{ns}	0.12 (0.05)***	0.11 (0.13) ^{ns}	-0.02 (0.13) ^{ns}
Control: Exports Goods or Services	-0.09 (0.06) ^{ns}	-0.02 (0.05) ^{ns}	-0.95 (0.14) ***	-0.14 (0.14) ^{ns}
Control: People Management	0.28 (.03)***	0.53 (.03)***	0.07(0.08) ^{ns}	-0.05(.08) ^{ns}
Control: Off-the-Job Training	0.002 (0.06) ^{ns}	-0.08(0.05) ^{ns}	-0.53 (0.14) ***	-0.68 (0.14)***
Control: On-the-Job Training	-0.17 (0.06)***	-0.13(0.06) ^{ns}	-0.58 (0.15) ***	-0.78 (0.14)***
F Statistic (significance)	13.1***	32.4***	233.0 ^a ***	121.8 ^a ***
Adjusted R Square	0.10	0.22	0.17 ^b	0.10 ^b

Note: Std Error in parentheses. Significance indicated by * p-value < 0.10, ** p-value < 0.05, *** p-value < 0.01, ns = not significant. OLS regression is used for the two 5-point scale capabilities dependent variables. Logistic regression is used for the two binary (Yes=1, No=0) future focus dependent variables. ^a Likelihood ratio chi-square test. ^b Cox and Snell R Square. Variance inflation factor (VIF) values of the IVs in the four models are all between 1.02 and 1.30, indicative that multicollinearity is not problematic.

Table 3. Multiplicative Effects on Capabilities and Future Focus.

Outcome	Capability Generation: New Products or Services	Capability Generation: Business Plan and Strategy	Future Focus: Developing and Launching New Products/Services	Future Focus: Investment in Premises and Machinery
Intercept	2.64 (0.25)***	1.67 (0.22)***	-0.83 (0.67) ^{ns}	-0.40 (0.63) ^{ns}
H1 to H4: Customer Facing Innovation	0.40 (0.08)***	0.19 (0.07)***	1.59 (0.20)***	0.67 (0.19)***
H1 to H4: Process Innovations	-0.06 (0.11) ^{ns} VIF 3.3	0.11 (0.09) ^{ns} VIF 3.1	0.76 (0.24)***	0.97 (0.27)***
H1 to H4: Customer Facing x Process	0.12 (0.13) ^{ns} VIF 4.5	-0.12 (0.11) ^{ns} VIF 4.3	-0.44 (0.33) ^{ns} VIF 4.3	-0.58 (0.34)* VIF 4.3
H5a to H5d: Financing is Major Obstacle	0.08 (0.08)	-0.189 (0.07)***	0.76 (0.23)***	0.16 (0.20) ^{ns}
H6a to H6: Competition is Major Obstacle	-0.15 (0.06)**	-0.03 (0.05) ^{ns}	0.37 (0.15)**	0.17 (0.15) ^{ns}
Control: Age of Business	-0.03 (0.02)	-0.02 (0.02) ^{ns}	-0.13 (0.06)**	-0.01 (0.06) ^{ns}
Control: Number of Sites	-0.02 (0.04)	-0.01 (0.04) ^{ns}	0.22 (0.13)**	0.11 (0.12) ^{ns}
Control: Family-Owned Business	-0.08 (0.06)	-0.17 (0.05)***	-0.24 (0.16)*	-0.003 (0.15) ^{ns}
Control: Exports Goods or Services	0.07 (0.06)	0.01 (0.05) ^{ns}	0.90 (0.16) ^{ns}	-0.07 (0.15) ^{ns}
Control: People Management	0.31 (0.04)***	0.55 (0.03)***	0.05 (0.09)***	-0.03 (0.09) ^{ns}
Control: Off the Job Training	-0.01 (0.07)	0.10 (0.06) ^{ns}	0.47 (0.16) ^{ns}	0.54 (0.16)***
Control: On the Job Training	0.11 (0.07)*	0.04 (0.06) ^{ns}	0.30 (0.17)***	0.73 (0.73) ***
F Statistic (significance)	14.1***	31.6***	293.3 ^b (p < 0.001)	127.5 ^b (p < 0.001)
Adjusted R Square	0.14	0.26	0.24 ^c	0.11 ^c

Note: Std Error in parentheses. Significance indicated by * p-value < 0.10, ** p-value < 0.05, *** p-value < 0.01, ns = not significant. ^a Logistic regression is used for the two future focus dependent variables because they are binary (Yes=1, No=0) scales in the BIS survey. ^b Likelihood ratio chi-square test. ^c Cox and Snell R Square. Variance inflation factor (VIF) values of the process innovation and interaction term are above 2.5, indicating the potential for collinearity problems between the multiplied interaction and the innovation variables, likely due to the binary (0/1) scaling.

Table 4. Comparing the main versus interaction innovation groups by firm size (micro, small, medium)

Dependent Variable	Interaction Group Comparison ¹	Micro Firms			Small Firms			Medium Firms		
		Diff	SE	P-Value	Diff	SE	P-Value	Diff	SE	P-Value
Business Plan Capabilities	Group 1. No Innovation	0.20	0.14	0.52	0.25	0.10	0.06*	0.30	0.13	0.08*
	Group 2. Customer Facing	0.05	0.16	0.99	0.18	0.11	0.39	-0.06	0.13	0.97
	Group 3. Process	0.17	0.24	0.90	0.06	0.15	0.98	-0.09	0.16	0.94
New Product Capabilities	Group 1. No Innovation	0.80*	0.14	<0.001**	0.47*	0.10	<0.001***	0.54*	0.13	<0.001***
	Group 2. Customer Facing	0.21	0.16	0.59	0.06	0.12	0.96	0.09	0.13	0.89
	Group 3. Process	0.35	0.24	0.47	0.29	0.16	0.30	0.85*	0.17	<0.001***
Future Capital Investment	Group 1. No Innovation	0.32*	0.06	<0.001***	0.28*	0.05	<0.001	0.17*	0.05	<0.001***
	Group 2. Customer Facing	0.17	0.07	0.09*	0.08	0.05	0.46	0.09	0.05	0.39
	Group 3. Process	0.11	0.11	0.71	0.07	0.07	0.72	-0.04	0.07	0.93
Future New Products Launches	Group 1. No Innovation	0.60*	0.06	<0.001***	0.44*	0.05	<0.001	0.39*	0.06	<0.001***
	Group 2. Customer Facing	0.08	0.07	0.61	0.05	0.05	0.79	-0.01	0.06	1.00
	Group 3. Process	0.40*	0.10	<0.001***	0.23*	0.07	0.007***	0.17	0.07	0.10*

Note: Diff = mean difference for dependent variable. SE = standard error. All mean difference comparisons are to the group 4 interaction group (engaged in customer facing AND process innovation). All other comparisons not shown in the table between groups 1, 2, and 3 are not significant. Significance indicated by *p-value < 0.10, **p-value < 0.05, ***p-value < 0.01. The results are consistent with the idea that engaging ambidextrously in both external and internal focused innovations allows the firm to increase learning which results in improved capabilities and future focus. The differences are more pronounced for micro- versus small- or medium-sized firms. The one exception is the case of business plan capabilities, where the differences are not significant for micro firms.