

## Perspective

# Innovation with Limited Resources: Management Lessons from the German Mittelstand

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*German Mittelstand firms are globally recognized for their innovation, especially regarding product, process, and service innovation. So what can scholars and managers across the globe learn from the success story of German Mittelstand innovation? Drawing on information collected on innovative Mittelstand firms and extant knowledge on innovation, the resource-based view, and family firm research, the authors investigate how these highly innovative firms flourish and achieve high innovation performance despite the severe financial and human capital resource constraints they face as compared with larger corporations. The authors then present a model identifying and integrating six salient traits of such firms that allow them to efficiently orchestrate their resources to innovate and outcompete their competitors in the global market, enabling those firms to overcome their resource-related weaknesses and turn them into strengths. Specifically, these traits are: niche focus and customer collaboration, globalization strategy, preference for self-financing, long-run mindset, superior employee relations, and community embeddedness. The power of this Mittelstand approach takes full effect only when all six traits operate in an integrated fashion, and the proposed resource-based model serves as a starting point for a more holistic and comprehensive understanding of firm ability to innovate and successfully compete within a specific context. The article outlines the implications of the model of German Mittelstand innovation for research conducted in different fields including innovation, entrepreneurship, strategy, dynamic capabilities, ecosystems, and family business. Finally, the article proposes a future research agenda aimed at improving current understanding of the German Mittelstand “innovation strategy” and its transferability to other contexts, and outlines practical implications for owners and managers worldwide wanting to emulate the German Mittelstand innovation model.*

## Practitioner Points

The article:

- Identifies six key traits of Mittelstand firms that foster innovation despite potential resource constraints—traits that potentially may be emulated in contexts outside Germany.
- Offers insights on potential challenges in innovating and competing with limited resources.
- Provides policy makers both within and outside the European Union with strategies to enhance the

innovation potential of small- and medium-sized firms within their own countries.

- Provides a holistic and comprehensive understanding of the ability to innovate and successfully compete within a resource-constrained context.

**R**esources—defined as firm-specific physical, human, and organizational assets (Wernerfelt, 1984)—are at the core of firm strategies (Barney, 1991; Sirmon, Hitt, and Ireland, 2007). They can be tangible as well as intangible (Teece, Pisano, and Shuen, 1997) and enable companies to build valuable capabilities that lead to new or improved processes, products, or services, and ultimately provide competitive advantages over other organizations (Teece and Pisano, 1994). Given the scarcity of valuable resources, firms must find ways of acquiring and efficiently deploying such resources. While recent studies point to the importance of effective and efficient resource deployment to achieve innovation

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### BIOGRAPHICAL SKETCHES

Dr. Alfredo De Massis is full professor of Entrepreneurship and Family Business at the Free University of Bozen-Bolzano (Italy), where he leads the platform on Family Business Management, and co-director of family business research at Lancaster University Management School (UK). In September 2015, *Family Capital* ranked him among the world's top 25 star professors for family business. He serves as associate editor for *Family Business Review* and on the editorial boards of *Entrepreneurship Theory and Practice*, *Strategic Entrepreneurship Journal*, and *Journal of Family Business Strategy*. He also serves on the Academic Advisory Board of the Institute for Family Business (IFB) Research Foundation based in London and is the former Chairman of the European Leadership Council and Global Board Member of the Global STEP Project for Family Enterprising at Babson College, USA. Alfredo's research focuses on family business and innovation. His work has been published widely in leading academic and professional journals and he has been guest editor of 10 special issues in journals like *Strategic Management Journal*, *Entrepreneurship Theory and Practice*, *Journal of Product Innovation Management*, *Global Strategy Journal*, *California Management Review*, *International Journal of Management Reviews*, and *Small Business Economics*. His research has been featured in various media outlets including the *Financial Times* and *Harvard Business Review*.

Dr. David Audretsch is distinguished professor and Ameritech Chair of Economic at Indiana University, where he also serves as director of the Institute for Development Strategies. He is an honorary professor at the WHU—Otto Beisheim School of Management. He served as director of the Max Planck Institute of Economics in Jena between 2002 and 2009, and was at the Berlin Center for Social Science Research (WZB) between 1985 and 1997, where he served as research professor and acting director. His research focuses on the links between entrepreneurship, public policy, innovation, economic development, and global competitiveness.

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(Duran, Kammerlander, van Essen, and Zellweger, 2016; Sirmon, Hitt, Ireland, and Gilbert, 2011; Uhlaner, van Stel, Duplat, and Zhou, 2013; Van Burg, Podoyntsyna, Beck, and Lommelen, 2012), researchers still know little about how firms efficiently manage their resources to innovate and, in turn, successfully compete in today's global markets.

To shed further light on this issue, the authors investigate a specific context in which certain firms, not only survive but out-"innovate" and outcompete in the global market—the "German Mittelstand." The German Mittelstand comprises a subset of owner-managed small- and medium-sized enterprises (SMEs) in Germany that, like SMEs in all countries, are confronted with constraints in terms of accessing resources. However, the Mittelstand has been able to compensate for or overcome such resource constraints, which has, in turn, facilitated innovation and strong economic performance. Researchers estimate that there are roughly 1000 to 1500 Mittelstand firms in Germany (Venohr, 2015; Weissman, 2011). While constituting only 2% of all German firms with more than 50 employees in Germany (Statistisches Bundesamt, 2016), the Mittelstand firms provide a disproportionately high contribution to employment (15% of all German employees; Weissman, 2011), revenues (more than 30% of all revenues by German firms; Weissman, 2011), and exports (40% of all exports by German firms; Venohr, 2015).

While a growing literature has focused on innovation in the individual owner-managed and/or family-owned and -managed firm (De Massis, Frattini, and Lichenthaler, 2013; Nijssen, Hillebrand, de Jong, and Kemp, 2012; Sciascia, Nordqvist, Mazzola, and De Massis, 2015), scholars still lack an integrative, theory-based perspective that helps explain their ability to innovate in the face of constrained resources and guides future research in this area. To bridge this gap, the authors apply the resource-based view (Barney, 1991) together with knowledge of certain idiosyncrasies of highly innovative family firms and SMEs (Gómez-Mejía et al., 2007; Habbershon and Williams, 1999; Kammerlander, Sieger, Voordeckers, and Zellweger, 2015) to synthesize a "German Mittelstand innovation model" that might be usefully employed even outside Germany. The research starts with the question: *How are German Mittelstand firms able to compensate for their inherent resource constraints to achieve (product and process) innovation in global markets?*

This article proposes an overall ecosystem—six salient traits, that appear to contribute to success in innovation for the German Mittelstand. Besides

proposing an integrated model of Mittelstand innovation, the authors develop an agenda for future research with research implications in different fields, and also point out practical implications for owners and managers worldwide wanting to emulate the German Mittelstand innovation model.

## Theoretical Background and Methodology

### *German Mittelstand—Relevance, Innovation Excellence, and Resource Endowment*

The term “Mittelstand” is widely recognized as connoting a subset of private German enterprises internationally known for their quality and innovation. However, its overusage in the media has created some confusion about its meaning. This article uses the term Mittelstand to identify a German company that is generally small-to-medium in size, is controlled and owned by one family, is a global market player, and identifies itself as a Mittelstand firm. This definition, which combines qualitative and quantitative elements, is in line with the definition proposed by the Mittelstand-Institute at the Otto-Friedrich University in Bamberg, Germany (Becker, Staffel, and Ulrich, 2008) as well as prior academic Mittelstand publications (Berghoff, 2006; Block and Spiegel, 2011). The challenge but also the intriguing opportunity provided by the Mittelstand is that it reflects a qualitative spirit and orientation of firms and not simply a quantitative or legal definition. Just as not every small or medium-sized firm located within the geographic boundaries of Silicon Valley would be considered a “Silicon Valley” firm (e.g., small retail stores or fast-food restaurants), not all German SMEs fit the German Mittelstand label. Furthermore, it is not uncommon that some large German firms use the term to describe themselves as part of the Mittelstand, perhaps to distinguish themselves for their quality and innovation and to reflect their deep sense of pride in being part of Germany’s economic backbone (Make it in Germany, 2016).

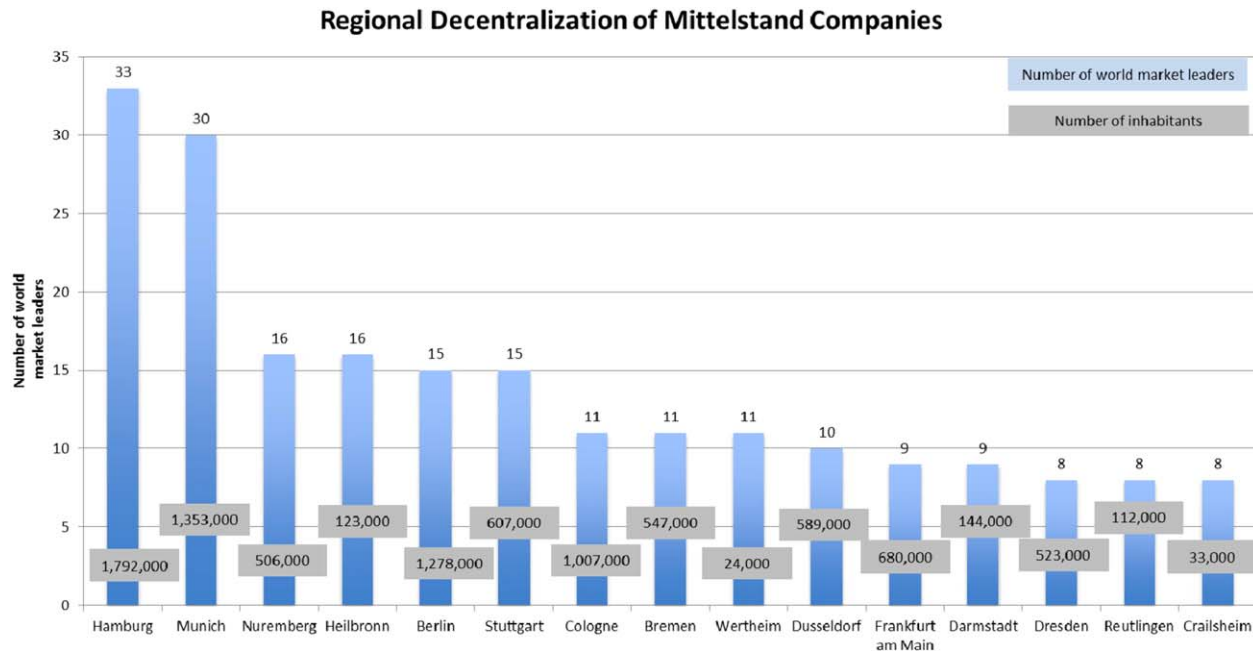
Mittelstand firms place strong emphasis on innovation. This typically happens through constant improvements of existing products and services. In 2010, the Mittelstand invested approximately €8.7 billion in research and development (European Commission, 2014a), representing one seventh of Germany’s total investments. The innovation investment intensity of German Mittelstand firms is twice as high their non-Mittelstand counterparts (Simon, 2007, p. 196). Germany’s Mittelstand also leads Europe with overall innovation, holding 499,525 patents, far more than other

European countries (DZ Bank, 2012). Furthermore, while innovative German non-Mittelstand firms such as Siemens and Bosch have, on average, less than 10 patent applications per 1000 employees, this ratio is above 30 for German Mittelstand firms (Simon, 2007, p. 200). Furthermore, in a cross-sectional study of German regions, Berlemann and Jahn (2016) find a positive relationship between the prevalence of Mittelstand firms (as a percentage of all firms) and patent activity in the region, pointing to the importance of the Mittelstand to the country’s innovativeness.

PWM, world-leading manufacturer of the price signs used by gas stations, illustrates the Mittelstand’s focus on innovation. Led by seventh-generation CEO Max Krawinkel, in recent decades PWM has mastered the art of innovation through small but significant steps. After 25 years of manufacturing electronic neon advertising systems, PWM was the first manufacturer in 1984 to create price signs for the gas station market that enabled electronic input of up-to-date price information. With just over one hundred employees, PWM boasts that it is the main supplier to around one-half of the world’s leading oil corporations (Buchanan, 2013). However, what it manufactures today obviously has little to do with the products it sold in its earliest generations, showing an ability not only to succeed with incremental innovation but also to reinvent in the long term.

Besides high levels of innovativeness, a common characteristic of Mittelstand firms is that they are owned and predominately managed by a controlling family (Decker and Günther, 2017). This combination of ownership and control perpetuated across generations manifests in idiosyncratic resources, strategies, and structure. A large proportion of Mittelstand firms have specific resources stemming from the firm’s “familiness” (Habbershon and Williams, 1999), reflecting the strong identification of family members with their firm (Berrone, Cruz, and Gómez-Mejía, 2012) leading to extraordinary efforts in developing the business. The owner-managers’ commitment to their firms is also reflected in the underlying common values (Salvato and Melin, 2008) engendering an exceptional quality-oriented management spirit.

Unlike SME counterparts throughout the world, Mittelstand firms are able to overcome the typical resource constraints that often inhibit innovation in SMEs—some being self-imposed, such as external financial equity, due to their choice of maintaining control (as family and/or entrepreneur), while others occur due to the inherent limitations of being a smaller firm in the world of global competition. Although one would imagine that such resource limitations (whether regarding financial or human capital) may hamper their



**Figure 1. Regional Decentralization of Mittelstand Firms.**

**Source:** Federal Ministry of Economic Affairs (Make it in Germany, 2016). [Color figure can be viewed at [wileyonlinelibrary.com](http://wileyonlinelibrary.com)]

ability to innovate, the Mittelstand firms overcome such limitations by making certain strategic and structural choices, as well as partnering with the ecosystem of the business environment.

Moreover, this article will argue that German Mittelstand firms are able to overcome potential lack of access to human resources due to their local embeddedness. Scholarly research provides compelling empirical evidence that innovative activity benefits from human capital and other resources gained by locating in densely populated urban areas (Glaeser and Gottlieb, 2009). Yet geographic decentralization of economic activities is characteristic of the German economy and is evident across regions. For example, global, market-leading Mittelstand firms as Weisser Spulenkörper, Meyer Werft GmbH, Berleburger Schaumstoffwerke, and Dachser are located in the smaller towns and villages of Neresheim (population, 8000), Papenburg, (population 35,000), Bad Berleburg (population 19,929), and Kempten (population 62,000), at least 100 km from such city centers as Stuttgart, Bremen, Cologne, and Munich, respectively. This is not exceptional as Figure 1 shows. As the reader will see, though, Mittelstand firms have developed employee strategies that more than offset these population limitations, and which also strengthen their ability to innovate and compete in the global marketplace.

Assessing Mittelstand firms from a resource-based perspective (Barney, 1991; Henard and McFadyen, 2012;

Kleinschmidt, De Brentani, and Salomo, 2007) reveals that although these firms can build on some valuable resources, they lack other key resources. For example, they typically lack financial resources due to their reluctance to use external capital providers and they are characterized by paucity of human resources; at the same time, they are endowed with a unique set of intangible resources such as owner-managers' strong identification with and commitment to the firm resulting in shared values (Habbershon and Williams, 1999). To be innovative and maintain competitive advantage, Mittelstand firms must overcome resource scarcity by finding ways of deploying and combining existing resources in a value-creating approach (Boyd, 2010; Eddleston, Kellermanns, and Sarathy, 2008; Sirmon et al., 2011). The authors will explore these strategies in greater detail after describing the methodological approach adopted.

### *Methodological Approach*

The insights of this article derive from a variety of sources. The authors started by systematically searching online databases and articles on Mittelstand.<sup>1</sup> They read all relevant articles (e.g., Audretsch and Elston, 1997;

<sup>1</sup>A search using EBSCO revealed 28 peer-reviewed, English journal articles whose abstracts contain the term "Mittelstand," many of them relating to disciplines such as supply chain management, tax regulation, or business history. Using Google Scholar, we identified 67 sources with "German Mittelstand" in the title; most, again, not being relevant for the topic under investigation.

Berleemann and Jahn, 2016; Kraft, Dowling, and Helm, 2012) building on them and other material that was identified in a rather unsystematic way, when writing this perspective article. Given the lack of an established scholarly literature dedicated to the Mittelstand, the authors also reviewed the family business and SME literatures in search for arguments that could support specific aspects of their theoretical examination.

Besides the scholarly literature, further insights for this article derive from in-depth discussions with around 35 Mittelstand owner-managers and employees in 20 firms, and an analysis of multiple secondary sources from the German and international press. Specifically, secondary data were collected from company websites and other secondary sources of data, such as financial and business reports, presentations, press releases, magazine articles, and analysts' overviews between 2014 and 2017. The interviews were directed to "extraordinary" examples (Siggelkow, 2007) of Mittelstand firms that seemed to be a suitable choice to illustrate and discuss the aspects under investigation. These firms were chosen precisely because their capacity to innovate with limited resources provides insights unavailable to most non-Mittelstand firms. The purpose here is not to report on an inductive study, but to use these examples as illustrations to clarify theoretical concepts and relationships and show how the various conceptual issues included in the resource deployment strategy of Mittelstand firms are actually applied (Siggelkow, 2007). Interviews were conducted between 2000 and 2016 with the owner-managers and other family and nonfamily employees engaged in strategy and innovation activities. For instance, among the interviewed individuals, there were CEOs, innovation managers, and heads of corporate communication. The research supporting the authors' arguments is also strongly informed by direct engagement by the authors in knowledge transfer and other research projects regarding competitiveness in the German Mittelstand context. The model developed in this article draws therefore on varied and multiple sources of information, integrating both scholarly and practical insights.

Data were analyzed using an iterative process, moving from data to theory and vice versa (Strauss and Corbin, 1998), which enabled the authors to refine the model, better clarify its theoretical foundations, and illustrate how theoretical concepts work in practice. Finally, to ensure the integrity of their data, the authors triangulated the multiple sources, independently read the data and information, and discussed their interpretations in face-to-face meetings to resolve potential misunderstandings and divergent views.

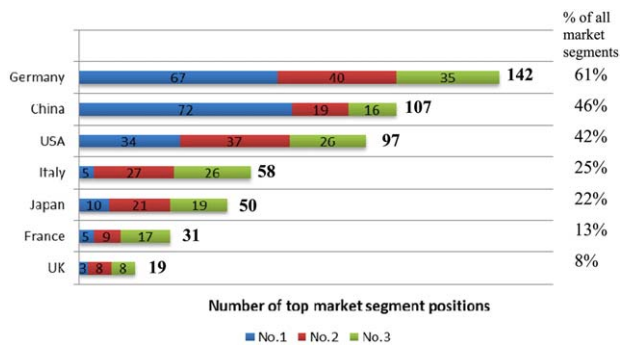
## Resource Deployment Strategy of German Mittelstand Firms

Compared to large corporations, SMEs are generally more resource constrained in their ability to develop and commercialize new products and services. Despite such resource constraints, some special characteristics of Mittelstand firms allow them to leverage their resources to innovate and to achieve competitive advantage, with respect to SMEs in other countries, and also against larger global competitors. Based on their observations, the authors identify six salient, mutually dependent traits that describe the strategy and structure of these firms. They help to explain how these firms compensate for their inherent resource constraints to achieve innovation and overall business success in global markets.

### *Niche Focus and Customer Collaboration*

How do Mittelstand firms innovate and even outcompete on a global scale despite their resource and growth constraints? One way is to focus on a specific niche (Simon, 2007), which enables them to dominate their narrowly defined market with regard to innovation while limiting investment requirements. This highly focused strategy enables them to develop the superlative expertise and remarkable efficiencies (Duran et al., 2016) that support their competitive advantage in relation to customized service (Miller and Le Breton-Miller, 2005) and ensures their high reliability and cost-competitiveness of innovations despite Germany's high labor costs and tax structure. This narrow focus entails the absence of complicated processes and product lines, and excessive financing needs. These organizations thus avoid additional financing sources but also circumvent internal complexities and superstructures, resulting in their highly effective and efficient resource orchestration (Sirmon et al., 2011). Examples range from manufacturing metal closures for sausages (Poly-Clip System serving 90% of the world's market), to hospital bed castors and wheels (Tente), and blowing bubbles (Pustefix, distributing in over 50 countries). Their laser-like niche focus and avoidance of diversification thus enables them to innovate persistently and stay ahead of potential competitors despite resource limitations.

One example of high levels of innovation in a narrowly defined niche is J.D. Neuhaus, led by Wilfried Neuhaus-Galladé, the seventh-generation family owner. A hoist manufacturer since its founding in 1745, J.D. Neuhaus retains its focus on hydraulic and pneumatic hoists and crane systems. But it also constantly adapts and improves



**Figure 2. Number of Market Leadership Positions across Market Segments.**

**Source:** Based on data from Deutsche Bank Markets Research, *Made in Germany Special Report* (Slomka et al., 2013). [Color figure can be viewed at [wileyonlinelibrary.com](#)]

its world-class products, making them suitable also for extreme operating conditions such as the North Pole.

Their niche focus also helps them to closely collaborate with their existing customers, which has been linked to innovation (Nijssen et al., 2012). Mittelstand firms often maintain close relationships with their existing customers to whom they provide ongoing innovative services and cutting-edge technologies (Muzyka, Breuninger, and Rossell, 1997), and are very protective of the resources and core competences underpinning the innovation in their niche. An example is Weisser Spulenkörper. Founded in 1922, it has 185 employees at its headquarters in Neresheim and 27 agencies worldwide. This global market-leading company produces bobbins, boxes, and insulation parts for magnets, motors, relays, sensors, and transformers. Its Neresheim facility comprises a modern, well-equipped production plant and an efficient tooling department. While focused on a relatively narrow range of products, the company supplies corporate customers in several industries including ICT, automotive, and health care. Their products are custom-designed to a particular customer's specific needs. Across Mittelstand firms, this focus on the customer as an important source of innovation is widespread (Duran et al., 2016), as these numbers show: 37% of employees in Mittelstand firms have direct contact with customers compared with only 7% in major German corporations (DZ Bank Group, 2012, p. 19). Ultimately, the niche focus and customer collaboration of Mittelstand firms and related product innovation is reflected in Germany's No. 1 ranking as the market leader across industry sectors globally (see Figure 2).

### *Globalization Strategy*

The obvious trade-off from niche strategies is imposed growth limitations within the national market. Although

Mittelstand firms often prefer organic and conservative growth strategies due to their unwillingness to access greater external financial resources, they are not satisfied with remaining small local players. Instead, they aim to find ways of outcompeting their competitors with their available resources to survive and succeed in the long term. Mittelstand firms typically do so by expanding internationally (Kraft et al., 2012), which helps keep their product portfolio focused and their resource requirements “controllable” while reducing market risk and increasing revenue. With their niche-focused globalization strategy, Mittelstand firms are thus able to maintain their position as innovative pioneers, in line with prior research that assumes globalization and innovation to be complementary for SMEs (Golovko and Valentini, 2011; Love and Roper, 2015).

Mittelstand firms are especially proactive in recognizing and exploiting global opportunities (Simon, 2007). Supporting this argument, German SMEs—and in particular Mittelstand firms—have been shown to lead in exports both within and outside the EU, surpassing the average in proportion to firms exporting within the EU (20% vs. 14% EU average for SMEs; European Commission, 2014a) and accounting for nearly 23% of all EU SME exports outside the EU, far ahead of second placed Italy (15.4%), third placed France (10.5%), and the UK in fourth place (9.5%).<sup>2</sup> These figures are remarkable given the strong price disadvantage of German goods in the world market due to high labor costs. Mittelstand firms compensate for such disadvantages by creating competitive advantages through product and process innovation, such as highly reliable delivery times, service orientation, customer knowledge, and product quality and attractiveness (Abel-Koch and Gerstenberger, 2014). Weisser Spulenkörper's sales are in line with these figures with roughly 20% of sales exported to over 20 countries. J.D. Neuhaus is another example, exporting its products to over 90 countries, with exports growing from 5% of its sales in 1981 to over 80% in 2015.

The tendency of Mittelstand firms to act on a global level is not limited to exports. A common pattern in many is their global expansion, often preferring to set up their own subsidiaries rather than to create joint ventures or to rely on trading partners. This is consistent with an underlying principle of maintaining control in the hands of the owner-managers, which this

<sup>2</sup>Since the status of a disproportionate number of German SMEs is unknown and many are not actually counted because they export indirectly via a larger firm, their impact is actually understated in these statistics, see Cernat, Norman-López, & Duch T-Figueroas (2014).

article explores in more detail in the next section, together with their general reluctance to open the firm's doors to outsiders (König, Kammerlander, and Enders, 2013).

Returning to the J.D. Neuhaus example, besides the 150 employees working at its headquarters in Germany, the firm has 65 employees working at locations in France, Singapore, the United States, and Great Britain. Faber-Castell, with its headquarters in Stein, near Nuremberg since 1761, is one of the world's oldest manufacturers of pens, pencils, and office supplies, manufacturing one sixth of the world's wood-cased pencils. Eighty percent of Faber-Castell's sales come from outside Germany. While some of the R&D, production, sales, and marketing activities are carried out at its headquarters, many other worldwide facilities are located in South America, India, China, and Indonesia. Another family-owned and managed Mittelstand firm, Elektrisola, founded in 1948 in North-West Germany (Eckenhagen) also has a worldwide network of factories, expanding operations first to Italy (early 1960s) and then to the United States (mid-1970s), Malaysia and Mexico (1990s), and China (2005).

In summary, the German Mittelstand views the pursuit of a global strategy as an effective means of building innovative and successful businesses and can do so with comparatively limited resources. Mittelstand firms seem more open to international markets compared to owner-managed SMEs in other countries, which are often reluctant to internationalize (Fernández and Nieto, 2005).

### *Preference for Self-Financing*

How can German Mittelstand firms persist with such strategies over extended periods of times, often decades? How can they keep their focus? This article proposes that such consistency is enabled by the financial structure of the Mittelstand firms, in particular their preference for self-financing. More specifically, this article proposes that, consistent with many owner-controlled firms worldwide (Chrisman, Chua, De Massis, Frattini, and Wright, 2015; De Massis, Kotlar, Chua, and Chrisman, 2014), Mittelstand firms lack not only the ability but also the willingness to seek external capital. Thus, they intentionally take a conservative approach to finance through a strategy of self-financing, which, in turn, strengthens their independence and enables them to pursue their preferred strategies. Empirical evidence shows that German

Mittelstand firms are even more likely to use internal funds compared to SMEs in other EU countries (36–42% in German Mittelstand firms [Redlefsen and Eiben, 2007; Simon, 2007] compared with 26% in EU SMEs, 22% in French SMEs, and 23% in Italian SMEs [Mori, 2013]). One reason for this conservative approach is the desire of family owner-managers to maintain control. When investments are required for innovation or new technologies, the family's personal wealth is often used to fund opportunities, since family members are not only reluctant to dilute their ownership shares but are also unwilling to increase debt levels as prior research on family firm financing has shown (Mishra and McConaughy, 1999).

Mittelstand firms, despite being attractive targets for external investors, prefer retaining their independence, and exhibit a clear preference for internal financing. Private equity deals in Silicon Valley are on average 11 times larger than in Germany (Bottscher, 2013), reflecting a preference for internal financing of Mittelstand firms. Promotion banks (German state funded banks that provide loans and equity) and bonds compensate for some of this shortfall when external funding is required for investments in new technologies and innovation.

Weisser Spulenkörper, the bobbin company mentioned earlier, provides a typical example for such internal financing preferences. As a family member of the firm stated in an interview with one author, their source of funding for expansion derives internally and consists mostly of family equity to retain independence and make it "self-sufficient." For example, as part of its production expansion, the recently built automated logistics and storage center ("Hochregallager") was entirely self-financed. Research on small and medium-sized family firms explains such financing preferences with the prevailing nonfinancial goal of family members to maintain ultimate control over their firm across generations (Chrisman, Chua, Pearson, and Barnett, 2012; Gómez-Mejía et al., 2007; Kotlar and De Massis, 2013).

One reason Mittelstand firms succeed despite the resource constraints caused by internal financing is their conservative attitude towards growth (Audretsch and Elston, 1997) combined with a focused and highly efficient approach. They may sacrifice opportunities, especially during periods of economic boom compared to more leveraged firms that grow inorganically through acquisitions (Caprio, Croci, and Del Giudice, 2011). However, this fiscal conservatism provides them with financial stability and continued independence in times of crisis. This conscious desire for stability and the willingness to forgo promising growth

opportunities is clearly expressed by Ulf Poppel, third-generation managing director of Berleburger Schaumstoffwerke (BSW), a 400-employee Mittelstand company that uses recycled rubber to produce synthetic surfaces for sports and athletics. He notes, “If we could decide between 5 percent growth between 2013 and 2014 and 100 percent security that 2014 would be exactly like this year, we would choose the security option” (Buchanan, 2013).

Deichmann, Europe’s largest shoe retailer, provides another illustrative example of this idiosyncratic financing and growth preference. Though technically speaking, it has probably well surpassed the “Mittelstand” category given its size (37,300 employees in 2016), the firm, founded in 1913, is still family-owned and managed by third-generation family member and chairman, Heinrich Otto Deichmann. Deichmann retains the Mittelstand values and commitment to family control. As noted on their website,<sup>3</sup> “an important part of Deichmann’s company history is *growth under its own steam* without stock market launch and external capital” (emphasis added). In sum, the preference for self-financing, despite introducing new resource constraints, also provides Mittelstand firms with the autonomy to make decisions independently of (family-external) shareholder pressure (Carney, 2005) and to choose the innovations in which they wish to invest, especially if investment may require a long time period to bear fruit. This fourth trait is explored next.

### *Long-Run Mindset*

Aside from the autonomy in pursuing their focused globalization strategy, another implication of the Mittelstand’s preference for internal financing is the ability to employ a long-term perspective. Scholars link the desire to follow long-term strategies rather than maximizing short-term profit to the typical owning families’ desire to continue control across generations (Chua, Chrisman, and Sharma, 1999) and to develop companies characterized by transgenerational entrepreneurship (Zellweger, Nason, and Nordqvist, 2012).

Ensuring the longevity of the business is much more important to the executives of Mittelstand firms than achieving short-term pay-offs. As Alexander Starnecker, a family member of Weisser Spulenkörper, explained to one author, he views five to ten years as an acceptable pay-off period for strategic decisions

such as purchasing a company, expensive machine, or building a new factory. This compares with a two-year timeframe for strategic decisions reported in a global survey of 1000 C-suite executives of listed firms.<sup>4</sup> Hans-Peter Fricke, third-generation owner and head of the Fricke Group, a larger Mittelstand firm specialized in agricultural technology, echoes this long-term view: “I would describe myself as a marathon runner rather than a sprinter. You just need stamina and you mustn’t make too many mistakes.” Fricke’s long-term orientation has paid off. It has evolved from an agricultural machinery dealer to an innovative service enterprise in the agricultural sector. With revenues of approximately 430 million euros in 2012, its revenue increased 10-fold over what it had been when Hans-Peter Fricke took over in 1989 (DZ Bank Group, 2012).

Some researchers argue that it is this *patient capital*, assets that Mittelstand and other family-owned and controlled firms will leave in the firm over a long period, that represents a valuable and scarce resource and competitive advantage over much larger firms saddled by a short-term mentality (Arregle, Hitt, Sermon, and Very, 2007; Sirmon and Hitt, 2003). This is reinforced and made more feasible by the longer tenure of the CEO in the firm, compared with CEOs from major German corporations (Simon, 2014). They can worry less about being replaced when short-term results are disappointing (Gómez-Mejía, Cruz, Berrone, and Castro, 2011). The desire to build a “legacy” (Jaskiewicz, Combs, and Rau, 2015) further motivates family-member CEOs to follow persistent investment approaches to innovation.

Faber-Castell also provides a good example illustrating the role of long-term orientation and patient capital in Mittelstand firms. Until recently it was led by the eighth-generation family owner, Anton Wolfgang von Faber-Castell. On their website,<sup>5</sup> he explained, “In order to achieve long-term success, you have to think in terms of the future. For me as a businessman it is extremely important not to make profit at the cost of future generations.”

Von Faber-Castell further underscored the connection with family heritage and the freedom it affords from short-term profit-seeking in a recent newsletter for employees and friends, “It is of course easier for traditional family businesses to think in terms of generations and to stay the course on projects whose rewards may only be reaped after setbacks and some

<sup>3</sup><https://corpsite.deichmann.com/en/business/our-growth>

<sup>5</sup><http://www.faber-castell.co.uk/company/our-global-commitment>

<sup>4</sup>2013 global survey of over 1,000 board members and C-suite executives conducted by McKinsey Associates and the Canada Pension Plan Investment Board (CPPIB), see Barton and Wiseman (2014).



decades later. I would have been fired three times over in an American company for this attitude, especially in the times when a company's shareholder value, i.e. its stock market value, was deemed more important than long-term considerations."<sup>6</sup> This difference in time horizon is underscored in results from the previously mentioned global survey of board members and C-suite executives: 79% report pressure to demonstrate strong financial performance in just two years or under, while 73% say they should use a longer time horizon. While this pressure also affects publicly listed family firms, as a recent study by Miller, Le Breton-Miller, and Lester (2013) reveals, Mittelstand firms, as the examples that have been examined show, are endowed with a long-run mindset that helps them overcome those challenges and pursue their strategy of continual product and process innovations.

The long-term orientation comes with the opportunity and willingness to include ethical and sustainability goals. Von Faber-Castell shared in a personal communication with the authors that he believes "the money should be earned in a 'decent' way (in German 'anständig,' which has a double meaning: financially and ethically responsible or proper). Nothing is less socially compatible than having to shut down a plant—long-term profitability is key." Faber-Castell's sustainable innovation projects are an excellent illustration of this commitment to a long-term vision that is ethically responsible. As the world's oldest single producer of wood-cased pencils, 95% of its 150,000 ton annual consumption of wood is Forest Service Council (FSC) certified. The company has been recognized for its efforts by the United Nations and the World Wildlife Fund (WWF). The program started over 30 years ago with the planting of millions of *pinus caribaea* seedlings on 10,000 hectares of Brazil's savannah, around 2000 km from the Amazon rainforest. This project now produces 20 cubic meters of wood every hour. To further protect the local ecosystem, Faber-Castell has set aside 2700 hectares to support the local habitats of animal and plant life (Faber-Castell, 2011). Such environmentally responsible behavior is often related to the salient goals and structures of family firms (Berrone, Cruz, Gómez-Mejía, and Larraza-Kintana, 2010).

In sum, while Mittelstand firms are typically limited by the resources available for investments, their patient capital allows them to invest with stamina (König

et al., 2013), leading to superior innovation and valuable competitive advantages in the global market.

### *Superior Employee Relations*

Their long-term orientation also enables Mittelstand firms to build long-term relationships with employees, which help these firms overcome what might otherwise be viewed as human capital resource constraints to innovation (Henard and McFadyen, 2012), especially in rural areas or smaller towns. Besides their long-term commitment to employment, successful Mittelstand firms are characterized by enhanced training, high involvement of employees in decision-making, and a flat hierarchy. These practices ensure the continuity in staffing needed to build and retain strong commitment of employees and tacit know-how (Sirmon and Hitt, 2003), a strategy that contributes to consistent and superior service and product quality delivered to customers, and enhanced ability to provide input into incremental improvements and more radical innovations.

In the 2008 to 2011 period, following the banking crisis, employment at large German corporations dropped by 2.4%, while increasing by 1.6% for Mittelstand firms (Federal Ministry of Economics and Technology, 2012), supporting the argument that the extent of downsizing is less in privately held SMEs, especially in difficult economic periods (Varum and Rocha, 2013). From 2008 to 2014, Germany led all EU countries with full economic recovery of SME employment that increased by 119% in this period (European Commission, 2014b), and such lower turnover was largely driven by Mittelstand firms (Syre, 2007). Other data suggest that the German Mittelstand has unusually high employment stability and Germany is 1 of 10 countries worldwide with the lowest employee turnover rate. Conversely, seven other EU countries including five of Germany's neighbors (Belgium, Denmark, Luxemburg, the Netherlands, and Switzerland) were among the top ten in employee turnover (Harjani, 2013). Such retention of employees is an indicator of job satisfaction and, over the long term, allows preserving the needed tacit knowledge associated with a firm's ability to innovate (Cavusgil, Calatone, and Zhou, 2003).

Mittelstand firms also express their *Wertschätzung* or "high esteem" toward their employees above and beyond merely letting them keep their jobs. For instance, Weisser Spulenkörper holds celebrations for

<sup>6</sup>From People Make Brands by Anton-Wolfgang von Faber-Castell, <http://www.faber-castell.com/press/newsletter-for-employees-and-friends>

long-standing employees, some of whom have been with the company for over 40 years. In a recent newsletter, von Faber-Castell stressed the importance of commitment to his employees by noting “The respect shown towards long-standing employees and efforts to keep them, even when the going gets tough, are the hallmarks of our family-owned business: the firm retains valuable expertise, thus ensuring its long-term stability and continuity.”<sup>7</sup> Such investments, however, should not be merely seen as “good corporate citizenship,” but also as a means to overcome resource constraints and building competitive advantage. Von Faber-Castell further noted: “Valuing long-term employees is not a one-way commitment. The employer’s efforts are highly appreciated and paid-back by a deep commitment of the employees towards the company and a high identification with the company’s goals and values. This is extremely important and helps to achieve long-term success of the company.” The aforementioned characteristics of Mittelstand firms and employee commitment are very much intertwined and mutually nurturing.

Von Faber-Castell substantiated his words with an employee policy consistent with this philosophy. In March 2000, Faber-Castell and the trade union IG Metall signed the Faber-Castell Social Charter, one of the most extensively defined documents to date, developed to enforce employment and working conditions recommended by the International Labour Organization (ILO) (Faber-Castell, 2011, p. 75). Through the charter, social, and labor standards are applied worldwide, covering eight specific elements including a ban on child labor; equal opportunity, and equal treatment regardless of race, religion, gender or ethnic background; safe and hygienic working conditions; fair pay; and humane working conditions. To ensure its enforcement, a formal auditing process has been introduced worldwide and is regularly verified by internal and external auditors. Managers and employees are also provided with regular training to ensure that all staff members know of their rights and fulfill their obligations as mandated in the charter. Von Faber-Castell further pointed out that this is based on mutual appreciation and the dialogue with the trade unions and the works council (on this and other matters) is done with “cooperation not confrontation.”

A study of New Zealand SMEs found a positive association between a highly trained workforce and innovation (Whittaker, Fath, and Fiedler, 2016).

Training and development is another important aspect of the management of employment relations characterizing Mittelstand firms. Potentially even more significant than the numbers is the extensive implementation of the concept of the fabled German apprenticeship system. Apprenticeship in Germany includes a combination of structured training in business and technical skills advanced in vocational school (CBI, 2011). Accounting for around 60% of total employment in Germany, the Mittelstand contributed 84.2% of apprentice positions or trainees in 2012 (Institut für Mittelstandsforschung, 2015). Even a relatively small firm such as Weisser Spulenkörper invests substantially in computer-aided design (CAD) training and in efficiency training essential for production. Meyer Werft GmbH, another Mittelstand firm founded in 1795, is world market leader in building cruise ships. Meyer Werft GmbH also sees staff training as a cornerstone of its strategy and employs around 300 apprentices.

A recent study of nearly 15,000 employees of Mittelstand firms across Germany provides further evidence that the majority treat their employees well: Nearly all employees (97%) found a sense of community and values that coincided with their own. A clear majority reported feeling neither over nor underworked (87%), being treated fairly (75%), and feeling highly regarded by their superior (66%) (Make it in Germany, 2016). Such findings are in line with scholarly arguments that firms characterized by independence, values, and a long-term orientation can create a sense of community (Miller and Le Breton-Miller, 2005) or even a “pseudo-family” amongst employees (Tan and Fock, 2001).

Mittelstand firms are also known for the high involvement of employees in decision-making and their flat hierarchy. A study conducted at the Cologne Institute for Economic Research found that 74% of Mittelstand firms report employee involvement in work processes compared to 59% of larger German firms, while 49% offer participation of all hierarchies in strategy meetings compared to 38% of larger German firms (Cologne Institute for Economic Research, 2015). Consistent with these findings, in his interview with one author, a former employee and member of the owning family, Alexander Starnecker, described the decision-making process that Weisser Spulenkörper followed for designing new parts to meet customer needs. People from different departments, including design, production, drawing, and marketing, work together under the watchful eye of the CEO. Together,

<sup>7</sup>From People Make Brands by Anton-Wolfgang von Faber-Castell.

they perfect each customer's design requirements, weighing the pros and cons of how to best meet the demands of each individual customer. Although officially several levels of hierarchy exist (CEO and management level, *Meister* [Master craftsman], shift leader, and employee), Weisser Spulenkörper employees openly communicate across the different levels. Because of this openness, employees feel deeply invested in the company. Notably, such emphasis on superior relationships with employees stands in contrast to many other owner-managed firms worldwide characterized by centralized decision-making, nepotistic decisions (Schulze, Lubatkin, and Dino, 2003), and a bifurcation bias, denoting the asymmetric treatment of family and non-family employees in a family firm (Verbeke and Kano, 2012).

These nurturing approaches and practices, which together represent a distinctive way of managing employment relations, are an essential source of competitive advantage that compensates for Mittelstand firms' human capital shortages and allows for identification of opportunities, commercialization, and implementation of innovations despite more limited resources than those faced by much larger global companies.

### *Community Embeddedness*

Besides their superior employee relations, also their embeddedness in local communities helps the Mittelstand firms to overcome their resource constraints and fosters their innovativeness. Scholarly work on SMEs and innovation has established an important link between external networks and innovation (Baker, Grinstein, and Harmancioglu, 2015; Uhlaner et al., 2013). Underscoring the importance of such networks, community embeddedness is the final trait of the Mittelstand innovation model that was examined. The Mittelstand's emphasis on long-term, trust-based relationships relates not only to employees but also the local community, which opens up access to further valuable resources. Due to their ownership structure and historical links to their mostly rural (or small town) communities, Mittelstand firms pay particular attention to forging ties with key stakeholders in the surrounding community. Across generations, they develop strong "connections," not only with suppliers and customers, as frequently highlighted in family firm and SME research (Ahn, Minshall, and Mortara, 2015; Colombo, Laursen, Magnusson, and Rossi-Lamastra,

2012; Nijssen et al., 2012), but also with research centers, schools, local governments, community banks, and other institutions.

For many Mittelstand firms, remaining in the same community provides the opportunity to develop and maintain their employee base, reinforcing the strategy of superior employee relations. For example, despite being the world's leading cruise ship builder, Meyer Werft GmbH has remained in Papenburg on the River Ems, where it was founded in 1795. Staying in Papenburg has allowed the company's management to develop and retain its staff over the long term (DZ Bank Group, 2012).

A second aspect of community embeddedness are the strong partnerships with local research centers and universities. The *Fraunhofer Gesellschaft* or Fraunhofer Society constitutes an important bridge between applied universities and industry-specific product and process improvements. Undertaking between 6000 and 8000 projects annually, the \$2.45 billion enterprise employs 22,000 people and includes over 60 research institutes in Germany besides institutes outside of Germany. Each institute is partnered with a German applied university. Roughly one-third of projects concern firms with fewer than 250 employees and 43% firms with fewer than 1000 employees (ASME, 2013), and recently, supported by the national "Mittelstand 4.0" program, competence centers dedicated to supporting Mittelstand firms in mastering digitalization were opened. For example, J.D. Neuhaus is a previous logistics client of the Fraunhofer Institute of Material Flow and Logistics in Dortmund, only 20 minutes from its headquarters. Weisser Spulenkörper has launched an R&D partnership with a local university of applied sciences, the Fachhochschule für Angewandtes Management—Campus Treuchtlingen, to develop new technologies and to provide highly trained workers. Faber-Castell has set up a local private academy of art and design studies with a bachelor's-degree program now offered in collaboration with Bad Sooden-Allendorf University of Applied Sciences.

A third aspect of community embeddedness is the close, long-lasting connection between the Mittelstand and the local banking system. Dating back to the mid-1800s, the network of 1,100 local cooperative banks remains closely connected to the Mittelstand. In contrast to the United States, where local banks serving the small business community have been in steady decline over the past several decades due to merging into larger national networks, Germany retains a strong local network of banking support providing not only

loans, but also advice, and through nationally backed promotional banks, even public equity support.

Finally, the values and culture of families that own a Mittelstand firm often translate into a higher sense of community involvement, not only in activities with the local chamber of commerce but also greater social responsibility towards the community, resulting in increased visibility and a better reputation in the surrounding community (Cruz, Larraza-Kintana, Garcés-Galdeano, and Berrone, 2014). As reported in a number of discussions with Mittelstand owner-managers, they invest in projects for children and young people, cultural and social projects, or other projects of social interest in the local community. Social relationships such as these help form the foundations of loyalty and unity that nurture firm operations in the long term and serve the firm well to innovate in both prosperous and difficult times.

Their long-term orientation enables Mittelstand firms to build mutual, trust-based relationships with various stakeholders, all potential providers of important resources, such as intellectual capital (research centers), human capital (universities), financial capital (local banks), and expert advice (various stakeholders). By drawing on these multiple resources and mutual giving and taking, Mittelstand firms can overcome the resource shortages caused by their small size, their reluctance to admit external sources, their rural or small town locations, and develop a unique innovation strategy based on their competitive advantages. Compelling empirical evidence (Berlemann and Jahn, 2016) provides a positive link between the extent of the Mittelstand in a region and the innovative performance of that region.

## Discussion

Their analysis of innovative Mittelstand firms has enabled the authors to identify six distinctive yet highly interdependent traits that allow such firms to efficiently orchestrate their resources to innovate and outcompete their competitors in the global market. Specifically, these traits are: niche focus and customer collaboration, globalization strategy, preference for self-financing, long-run mindset, superior employee relations, and community embeddedness. As the authors' analysis shows, the combination of these six traits enables those firms to overcome their resource-related weaknesses and turn them into strengths (see Figure 3).

As the numerous examples show, Mittelstand firms are cognizant of their paucity of financial and human resources (Lin, 2012) but also of their specific “familiness” (Habbershon and Williams, 1999) (see central box in Figure 3). By identifying a holistic strategy consisting mainly in internationalizing niche products and investing time and effort into building long-lasting ties (Miller and Le Breton-Miller, 2005), these firms can overcome their weaknesses and acquire an advantageous innovation position that leads to sustainable competitive advantages.

The power of this Mittelstand approach takes full effect only when all six traits operate in an integrated fashion. A long-term mindset supports developing superior employee relationships and community embeddedness. The model presented in this article also shows that a strategy that includes community embeddedness and superior employee relations

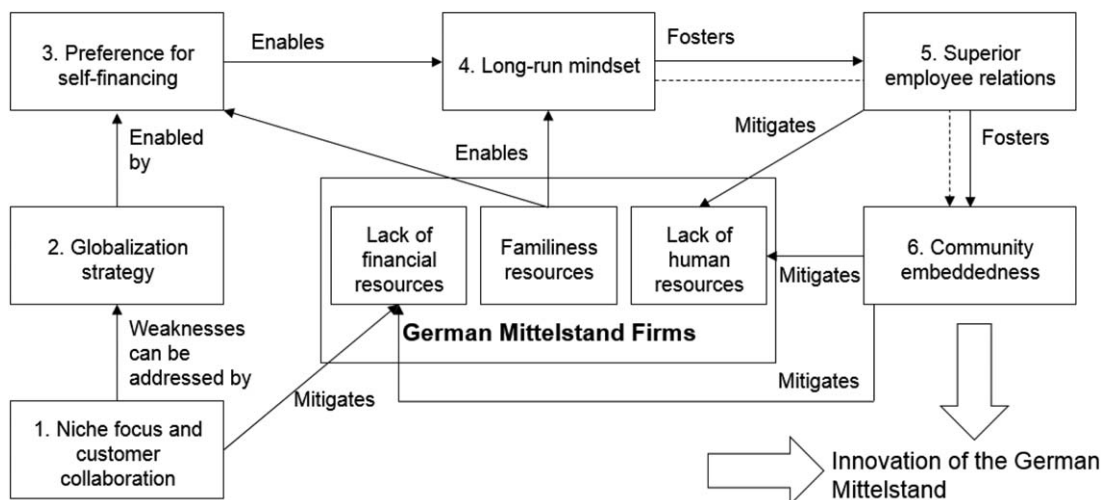


Figure 3. A Resource-Based Model of German Mittelstand Innovation

mitigates the effects of limited resources, enhancing the firm's ability to self-finance and fostering a long-term mindset. By keeping its product focus narrow, a Mittelstand firm can achieve an innovation position of global market leadership even with limited resources. According to recent calls (De Massis, Di Minin, and Frattini, 2015; Kammerlander et al., 2015) to study the strategies of family firms in a holistic way, the model presented here is integrative. By examining strategy execution (Chrisman, Chua, De Massis, Minola, and Vismara, 2016) in a successful type of firm, this study generates new insights into the relation between innovation leading to competitive advantage, resource endowment, and strategic goals (Foss and Lindenberg, 2013).

Although the German Mittelstand helped the authors to identify such patterns of success in resource-constrained contexts, the observed patterns are not necessarily bound to the German-specific context. Of course some of the traits identified are fostered by current German policies and government programs (banking for SMEs, links with research institutes, and local training institutions). However, one could imagine similar traits to develop elsewhere.

The outlined approach of Mittelstand firms is not only advantageous for the firms, their owners, and communities, but also for society as a whole. First, while high youth unemployment is a specter haunting much of Europe and other countries worldwide, threatening political and economic stability, and ranking amongst the most alarming and urgent problems facing Europe, youth unemployment in Germany sharply bucks this trend thanks to the Mittelstand (Fahrenschon, Kirchhoff, and Simmert, 2015). Although in late 2016 youth unemployment within the EU continued to hover at 18.8%, German youth unemployment has steadily dropped in the past decade from 15.6% in 2005 to 6.7% in November, 2016, the lowest level within the European Union.<sup>8</sup> Such differences are partly due to Germany's highly effective apprenticeship program and the employment opportunities offered in Germany by successful Mittelstand firms.

Second, while the decentralization of corporate headquarters across a country can generate disadvantages for firms, several advantages for society can ensue. By fostering strong ties and social linkages throughout their communities, Mittelstand firms thrive in accessing and absorbing local knowledge, skills and capabilities, and other local production factors that are

crucial in order to be innovative. This contrasts with the "brain drain" commonly witnessed in more isolated regions of other countries as entrepreneurs and job-seekers flock to larger cities and economic centers. By providing local jobs, the Mittelstand ensures a geographic balance and decentralization of decision-making and economic power. Given such positive impact on society, the German Mittelstand model could serve as a template for politicians in other countries concerned about the geographic concentration of economic wealth and decision-making power in the hands of a few, highly powerful regions and companies.

## Research Implications and Conclusion

The proposed resource-based model of German Mittelstand innovation serves as a starting point for a more holistic and comprehensive understanding of the ability to innovate and successfully compete within a specific context. The analysis suggests that scholars still need further theoretical development and specific studies on each building block of the model presented in Figure 3. These research gaps raise opportunities for future research that carry potentially important contributions to several literature streams, including innovation, entrepreneurship, strategy, family firms, ecosystems, and institutional theories. These research gaps, related questions for future research, and references to relevant literature are summarized in Table 1 for each building block of the model. The building blocks and related research gaps, noted in parentheses, include firm resources (RG1), the capabilities to deploy resources (RG2-RG6), the relationships between resources and capabilities (RG7-8), contextual factors (RG9), and performance outcomes (RG10-11). Each is now briefly discussed.

First, regarding resources, rather than viewing them individually, applying the resource-based model to the German Mittelstand implies an overall configuration that may explain their success in innovation. The most striking and compelling take-away is that the strong and sustained innovative and economic performance exhibited by the Mittelstand stems not from access to a sole resource but rather from participating in a highly effective context that bestows innovation and competitiveness in global markets. Any one aspect alone (whether it be a niche focus, globalization strategy, preference for self-financing, long-run mindset, superior employee relations, or community embeddedness),

<sup>8</sup><http://www.tradingeconomics.com/european-union/youth-unemployment-rate>

**Table 1. Implications of German Mittelstand and Directions for Future Research**

Building Blocks of the Model	Research Gaps	Research Questions	Relevant Literature
Resources	RG #1: Addressing different configurations of firm resources and the varying ways through which these may lead to competitive advantage and success	<p>RQ #1A: How can competitive advantage be achieved despite the lack of important resources? What are the implications for entrepreneurship theories (e.g., entrepreneurial bricolage, effectuation, resource orchestration)?</p> <p>RQ #1B: What other relevant resources (or lack thereof) exist besides familiness, human resources, and financial resources in different types of firms (e.g., widely held corporations, cooperative ventures, joint ventures, venture capital-backed firms, state-owned firms, new ventures) and how does the resource configuration of those firms look like? How do these different resource configurations contribute to replicate the success of the German Mittelstand model? How can the model be adapted to the resource configuration of such firms?</p> <p>RQ #1C: When and under what circumstances do firms leverage more on some types of resources versus others?</p> <p>RQ #1D: What are the mutual relationships among familiness, human capital, and financial capital? Can some of these resources be substitutes or complements?</p>	<p>Resource-based view (Alvarez and Barney, 2007; Barney, 1991, 2001; Foss, Klein, Kor, and Mahoney, 2008)</p> <p>Entrepreneurship and innovation literature (Baker and Nelson, 2005; Corbett, Covin, O'Connor, and Tucci, 2013; Sarasvathy, 2001; Stock, Zacharias, and Schnellbaecher, 2016; Van Burg et al., 2012; Williams and Wood, 2015; Zahra and Wright, 2011)</p>
Capabilities	<p>RG #2: Exploring the drivers of heterogeneity and variation of the capabilities for innovating with limited resources between Mittelstand and other firms and among different types of Mittelstand firms.</p> <p>RG #3: Extending the RBV model of German Mittelstand firms in the context of other types of innovation</p>	<p>RQ #2A: When and under what circumstances do firms rely more on some capabilities for innovating with limited resources rather than others?</p> <p>RQ #2B: What are the managerial, organizational, and interorganizational drivers of heterogeneity in the six capabilities for innovating with limited resources?</p> <p>RQ #2C: Do Mittelstand firms have superior capabilities as compared to other firms? How does the owner-managers' willingness (e.g., values, goals, objectives) and ability (e.g., power concentration, participative decision-making) relate to differences in the capabilities for innovating with limited resources between Mittelstand and other firms and heterogeneity among Mittelstand firms?</p> <p>RQ #2D: How do the capabilities for innovating with limited resources evolve over time? How do situational and temporal factors such as succession and generation influence the capabilities for innovating with limited resources over time?</p> <p>RQ #2E: How do different types and extent of control affect the capabilities for innovating with limited resources?</p> <p>RQ #3A: Does the resource-based model for innovating with limited resources benefit service, process, organizational, and/or business model innovation? What is the role played by different types of innovation? How do the challenges of the Mittelstand model differ for these different forms of innovation? Do family and nonfamily firms differ in the way they address these challenges?</p>	<p>Dynamic capabilities (Di Stefano, Peteraf, and Verona, 2014; Schilke, 2014; Teece, 2012)</p> <p>Transgenerational entrepreneurship (Chirico and Nordqvist, 2010; Sieger, Zellweger, Nason, and Clinton, 2011)</p> <p>Ability and willingness perspective (Chrisman, Chua, et al., 2015; De Massis et al., 2014)</p> <p>Family firm innovation (Chrisman, Chua, et al., 2015; De Massis, Kotlar, Frattini, Chrisman, and Nordqvist, 2016; Duran et al., 2016; Kotlar, Fang, De Massis, and Frattini, 2014; Kraiczy, Hack, and Kellermanns, 2015; Matzler, Veider, Hautz, and Stadler, 2015; Sciascia et al., 2015)</p>

**Table 1. Continued**

Building Blocks of the Model	Research Gaps	Research Questions	Relevant Literature
		<p>RQ #3B: How does the resource-based model for innovating with limited resources relate to different types of innovation (e.g., continuous/discontinuous, incremental/radical, supportive/disruptive, flexible/inflexible innovations)? Do the advantages of family firms in using past knowledge apply differently to different types of innovations?</p> <p>RQ #3C: How does the specific resource configuration of the German Mittelstand, in particular community embeddedness, affect collaborative (open) innovation and social entrepreneurship?</p> <p>RQ #3D: How will current trends such as globalization and digitalization interact with the resource-based model of the German Mittelstand? How sustainable are the competitive advantages derived by the German Mittelstand firms? Can community embeddedness and employee relations foster “technological lock-in”?</p>	<p>Disruptive innovation (Dosi, 1982; König et al., 2013; Parry and Kawakami, 2017)</p> <p>Open innovation (Chesbrough, 2006; Gianiodis, Ettlie, and Urbina, 2014; Randhawa, Wilden, and Hohbecker, 2016; West and Bogers, 2014)</p> <p>Social innovation (Alfred and Adam, 2009; Dacin, Dacin, and Matear, 2010; Rivera-Santos, Holt, Littlewood, and Kolk, 2015; Schweitzer, Rau, Gassmann, and van den Hende, 2015)</p>
	<p>RG #4: Better understanding the causal relationship between innovation and internationalization</p>	<p>RQ #4A: Are there mutual relationships between laser-like niche focus and globalization strategy? How do those two elements of the proposed resource-based model interact with each other?</p>	<p>Literature on innovation and internationalization (Cassiman and Golovko, 2011; Kafouros, Buckley, Sharp, and Wang, 2008; Onetti, Zucchella, Jones, and McDougall-Covin, 2012)</p> <p>Learning-by-exporting literature (Caleb, Yu, and Zhu, 2016; Salomon and Jin, 2010; Salomon and Shaver, 2005)</p>
	<p>RG #5: Exploring strategy execution aspects behind the resource-based model of Mittelstand and other firms</p>	<p>RQ #5A: What are the management processes by which the strategy behind the resource-based model for innovating with limited resources can be executed/implemented? How do Mittelstand and other firms identify decisions that must be made and tasks that must be completed to resolve issues and problems? How do they set objectives?</p> <p>RQ #5B: In what sequence are the decisions made and actions taken? Which of the elements—e.g., innovation vs. internationalization—occurs first?</p> <p>RQ #5C: How and to whom are decisions and tasks assigned or delegated? What are the accountabilities and deliverables demanded from organizational actors to implement the resource-based model for innovating with limited resources in Mittelstand and other firms?</p>	<p>Strategy execution (Amis, Slack, and Hinings, 2004; Chen and Aryee, 2007; Hitt, Ireland, and Hoskisson, 2012; Liguori, 2012; Romanelli and Tushman, 1994; Van de Ven, 1992)</p>
	<p>RG #6: Entrepreneurial finance</p>	<p>RQ #6A: How can firms that lack the willingness and ability to access the public equity market overcome their finance-related resource constraints?</p> <p>RQ #6B: What organizations are best suited to provide the resources—such as financial resources—mentioned in the resource-based model of the German Mittelstand? Should resources be provided by public or nonpublic organizations and what are the advantages and disadvantages associated with different options?</p>	<p>Entrepreneurial finance (Dushnitsky and Shapira, 2010; Fraser, Bhaumik, and Wright, 2015; Rassenfosse and Fischer, 2016; Wu, Si, and Wu, 2016)</p>

**Table 1. Continued**

Building Blocks of the Model	Research Gaps	Research Questions	Relevant Literature
Relationship between resources and capabilities	RG #7: Clarifying the mechanisms linking resources, capabilities, and success, in Mittelstand and other firms.	RQ #7A: How do the capabilities for innovating with limited resources relate the typical resources of German Mittelstand firms to firm success? Do family firms always have advantages in developing such links? What drives such potential heterogeneity? RQ #7B: At what levels (e.g., individual, group, inter-group, organization) do different capabilities for innovating with limited resources exist? How are different capabilities for innovating with limited resources developed and used across individual, group, inter-group, and organization levels?	Resource-based view and resource management and orchestration (Barney, 1991, 2001; Sirmon et al., 2007, 2008, 2011; Sirmon, Hitt, Arregle, and Campbell, 2010) Literature on family firm capabilities and evolution of capabilities (Duran et al., 2016; Eggers and Kaplan, 2013; Pearson, Carr, and Shaw, 2008)
Contextual factors	RG #8: Exploring the effects of meso-context, exo-context, and chrono-context on the resource-based model of German Mittelstand success and on its generalizability within and outside the Mittelstand setting	RQ #8A: Is German Mittelstand success more viable in certain industries, and if so, why? RQ #8B: How does the economic, social, political, legal, cultural, spatial and technological environment influence the viability of German Mittelstand success and its generalizability to other settings? RQ #8C: How does the chrono-context (e.g., global and national crises, stages of economic development) influence the viability of German Mittelstand success and its transferability to different settings? RQ #8D: How do organizational culture and values (e.g., collectivism vs. individualism) and structure (e.g., power distance) influence the viability of German Mittelstand success and its transferability to different settings? RQ #8E: How does the application of the resource-based model of German Mittelstand success differ in forms and significance among different types of firms (e.g., widely held corporations, cooperative ventures, joint ventures, venture capital-backed firms, state-owned firms, and start-ups)?	Institutional theory (Hofstede, 1984; Peng, Sun, Pinkham, and Chen, 2009; Wright, Chrisman, Chua, and Steier, 2014) Entrepreneurship and entrepreneurial ecosystems (Autio, Kenney, Mustar, Siegel, and Wright, 2014; Clarysse et al., 2014; Gawer and Cusumano, 2014)
Performance outcomes	RG #9: Understanding the effect of the resource-based model for innovating with limited resources on performance on different levels	RQ #9A: How does the resource-based model for innovating with limited resources affect performance at firm-, regional-, and society-level? What are the different performance implications at these different levels? How is performance at different levels related to each other? RQ #9B: What are the implications of the resource-based model for innovating with limited resources on <i>noneconomic</i> performance? How do the economic and noneconomic organizational goals of Mittelstand firms affect their success? RQ #9C: Are there other organizational outcomes of the resource-based model for innovating with limited resources? RQ #9D: How do firm outcomes influence the capabilities for innovating with limited resources (e.g., via influence on goals, governance, resources) through feedback loops?	Literature on resource-based view and noneconomic performance (Kammerlander and Ganter, 2015; McFarlin, 2008)



**Table 1. Continued**

Building Blocks of the Model	Research Gaps	Research Questions	Relevant Literature
	RG #10: Identifying optimum levels of capabilities behind the model for innovating with limited resources and its determinants, including differences between Mittelstand and other firms.	RQ #10A: Are some of the different capabilities for innovating with limited resources more important than others? What is the optimal weight of the different capabilities to maximize performance? Is there only one “optimum” resource configuration or multiple equilibria? RQ #10B; How must capabilities of the entrepreneurial ecosystem be matched with specific types of resources so the Mittelstand companies exhibit capability-ecosystem congruence? RQ #10C: To what extent should firms with limited resources adopt the Mittelstand model? Is there a too-much-of-a-good-thing effect that reduces the marginal benefits from adopting this model and/or triggers negative consequences for performance? To what extent does this optimum level differ between Mittelstand and other firms? How would the optimal levels of capabilities and resource deployment be in other ecosystems?	Ecosystems literature (Clarysse et al., 2014; Jones and Williams, 2000; Thompson, Hamilton, and Rust, 2005)

cannot guarantee success. In this sense, the striking success of the Mittelstand is reminiscent of the current interest in research on clusters, and spatial systems of innovation, with their emphasis on a broader context involving multiple partners, (entrepreneurial) ecosystems (Clarysse, Wright, Bruneel, and Mahajan, 2014), and factor inputs and institutions in shaping economic performance. The authors have raised certain research questions that may be linked to the entrepreneurship and strategy literatures. For instance, the effectuation and bricolage literature (Baker and Nelson, 2005; Sarasvathy, 2001) have suggested that success in small and start-up firms may in part not be despite but because of resource scarcity (Van Burg et al., 2012). The benefits of such scarcity are often overlooked in the resource-based view literature, and can be a useful direction for future research, not only for Mittelstand firms, but also in a wide variety of other contexts.

The second building block refers to the capabilities to deploy firm resources, defined as the traits that determine the firm’s ability to leverage their resources or to compensate for resource constraints in order to innovate and to achieve competitive advantage. Although this can cover a wide range of issues, various ownership characteristics (including both their willingness [values, goals, objectives] and ability [regarding power concentration and participative decision making]) may play a role in affecting the

capabilities through which firms face resource scarcity (Chrisman, Chua et al., 2015; Chrisman, Fang, Kotlar, and De Massis, 2015; De Massis et al., 2014). For instance, do the identified traits work equally well in family versus nonfamily firms or in firms with external private equity partners versus those owned purely by a group of (unrelated) owner-managers? Are there other ownership aspects essential to competitive advantage such as trust amongst the owners or their shared vision of the firm? (Uhlener, Matser, Berent-Braun, and Flören, 2015). Scholars lack a consolidated body of knowledge about how the capabilities for being innovative with limited resources evolve over time or how situational and temporal factors such as succession and generation may influence the capabilities for being innovative with limited resources. Here, the authors advocate drawing from the transgenerational entrepreneurship (e.g., Sieger et al., 2011) and the dynamic capabilities literature (e.g., Di Stefano et al., 2014; Teece, 2012) to shed further light on this gap.

The third building block addresses the relationship between resources and capabilities. The model of German Mittelstand innovation success shows that not only are the requisite capabilities essential to access and absorb key resources, but those capabilities must be congruent with the key resources to generate a competitive advantage. The resource-based view (Barney, 1991, 2001), and especially the literatures on

resource management (Sirmon et al., 2007, 2010) and resource orchestration (Sirmon et al., 2011), have shed some light on the processes through which organizational actors manage resources and affect a resource-based competitive advantage. Drawing on these literatures may be helpful in future research efforts aimed to better understand the relationships between firm resources and the capabilities for innovating with limited resources. While considerable strands of literature have emerged focusing on the role of accessing resources and on developing firm capabilities to integrate, build, and reconfigure such resources (Teece, 2012), an insight provided by the model of the German Mittelstand innovation is the need for congruence between firm capabilities and accessing key resources. Scholars' knowledge of the mechanisms linking resources, capabilities, and innovation success, in Mittelstand and other types of firms, is limited in several other respects. For instance, scholars do not know if owner-managed firms always have advantages in developing such links, what drives such potential heterogeneity nor how the capabilities for being innovative with limited resources are developed and used across individual, group, intergroup, and organization levels.

The fourth building block addresses wide-ranging contextual factors. Autio et al. (2014) present a framework of innovation and context which can cover institutional, temporal, industry, market, special, social/organizational, and governance aspects. Although the authors address community embeddedness as one unifying principle, Clarysse et al. (2014) show distinct differences in knowledge, business, and financial networks in clusters of innovative ventures—how they affect each other and innovation outputs in a sample of firms in Flanders. Their findings suggest that scholars must pull apart such aspects and understand more carefully how they interrelate with one another.

Finally, the building block of performance outcomes can be further developed by examining not only financial performance but also noneconomic outcomes. Again, it is important to examine the configuration of capabilities and resources, not just each individually, in predicting such outcomes for Mittelstand and other firms. Future research may focus on the performance implications of the resource-based model for being innovative with limited resources at different levels (firm-, regional-, and society-levels) and discover other organizational outcomes beyond economic and noneconomic performance. Future work drawing on the ecosystems literature (e.g., Clarysse et al., 2014; Jones and Williams, 2000; Thompson et al., 2005) may also

be helpful in future research endeavors aimed to identify optimum levels of capabilities behind the model for being innovative with limited resources and its determinants, including differences between Mittelstand and other types of firms. Indeed, the different capabilities may not be equally important; how the mutual importance of different capabilities varies in different settings, and how this affects success, is a relevant question for future research.

In conclusion, the model presented in this article informs current research on the resources and strategies of innovative Mittelstand firms while also providing important insights for innovators, entrepreneurs, decision-makers, and politicians around the globe. The authors hope that their study encourages researchers to analyze “innovation strategies” of other successful types of firms that at first sight would seem to suffer from severe resource constraints. They also hope that scholars will follow their lead in studying such strategies in a more holistic and comprehensive way than to date.

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