



Market orientation and servitization in family-owned horticultural enterprises

Item Type	Article (Version of Record)
UoW Affiliated Authors	Engelke, Christian, Bell, Robin and Haq, Muhibul
Full Citation	Engelke, Christian, Bell, Robin and Haq, Muhibul (2026) Market orientation and servitization in family-owned horticultural enterprises. <i>Canadian Journal of Administrative Sciences</i> , 43 (1). pp. 1-15. ISSN 1936-4490
DOI/ISBN/ISSN	https://doi.org/10.1002/cjas.70053
Journal/Publisher	Canadian Journal of Administrative Sciences Wiley
Rights/Publisher Set Statement	© 2026 The Author(s). <i>Canadian Journal of Administrative Sciences / Revue Canadienne des Sciences de l'Administration</i> published by John Wiley & Sons Ltd on behalf of ASAC., This is an open access article under the terms of the Creative Commons Attribution License, https://creativecommons.org/licenses/by/4.0/
License	CC BY 4.0
Link	https://onlinelibrary.wiley.com/doi/10.1002/cjas.70053

For more information, please contact wrapteam@worc.ac.uk

RESEARCH ARTICLE OPEN ACCESS

Market Orientation and Servitization in Family-Owned Horticultural Enterprises

Christian Engelke^{1,2} | Robin Bell² | Muhibul Haq² ¹Fachhochschule des Mittelstands, Bielefeld, Germany | ²Worcester Business School, University of Worcester, Worcester, UK**Correspondence:** Muhibul Haq (m.haq@worc.ac.uk)**Received:** 31 July 2025 | **Revised:** 1 February 2026 | **Accepted:** 24 February 2026**Keywords:** family business | horticulture | market orientation | performance | servitization

ABSTRACT

This research examines how the dimensions of market orientation and servitization influence business performance in German family-owned horticultural SMEs. The research finds that customer orientation and interfunctional coordination positively impact performance, whereas competitor orientation has a negative effect. Although servitization is shown to enhance performance directly, its moderating role in the relationship between market orientation dimensions and business performance is limited and, in one case, detrimental, highlighting a servitization paradox. These findings challenge assumptions about universal benefits of market orientation, underscoring the unique dynamics of family businesses. This study offers strategic insights for enhancing performance and longevity in a sector facing structural changes and contributes to the literature on market orientation and servitization in underexplored family business contexts.

1 | Introduction

Family businesses are ubiquitous around the world and critical to the economic prosperity of many countries (Kudlats et al. 2019). They are the cornerstone of the global economy, contributing to employment and GDP in both developed and developing nations (De Massis et al. 2018). Family businesses are the most common type of businesses globally (Hennart et al. 2019), and they generate over 70% of global GDP (Family Firm Institute 2017). Their significance goes beyond economic contribution, as they are frequently characterized by a longer-term focus, strong community relationships and a dedication to values such as trust and stewardship (Ali et al. 2025; Miller and Le Breton-Miller 2005). In contrast to nonfamily businesses, family businesses often emphasize nonfinancial objectives, including identity, legacy and the preservation of socioemotional wealth and familial control (Gómez-Mejía et al. 2007). This behaviour can lead to a reduced focus on financial calculative criteria and an emphasis on ensuring socioemotional wealth (Miller and Le Breton-Miller 2014). By not focusing on short-term profit maximization, family businesses can have a

longer-term goal, which has been linked to economic stability, particularly during financial downturns (Amann and Jausaud 2012). This long-term orientation can help to support stable employment and nurture entrepreneurial ecosystems through embeddedness in local communities (Basco 2015). However, the long-term orientation and preservation of socioemotional wealth can lead family businesses to be risk-averse and resistant to change (Bammens et al. 2011; Gómez-Mejía et al. 2007), leading to a slow reaction to market dynamics, including changing customer demands (Chrisman et al. 2015). Moreover, over time, a conservative attitude can hinder innovation, limit growth potential, lead to a loss of relevance and erode competitive advantage within family businesses (De Massis et al. 2015; Miller et al. 2008), potentially compromising their longevity.

Extant research shows that a robust market orientation, which involves behaviours focusing on customer needs, monitoring competitors and coordinating internal efforts (Narver and Slater 1990), has the potential to mitigate some of these challenges and has been found to be positively related to business

This is an open access article under the terms of the [Creative Commons Attribution](https://creativecommons.org/licenses/by/4.0/) License, which permits use, distribution and reproduction in any medium, provided the original work is properly cited.

© 2026 The Author(s). Canadian Journal of Administrative Sciences / Revue Canadienne des Sciences de l'Administration published by John Wiley & Sons Ltd on behalf of ASAC.

performance (Filatotchev et al. 2017; Cano et al. 2004). However, despite the potential for market orientation to support sustainable profitability and longevity, research into the influence of market orientation in family businesses remains scarce (Martín-Santana et al. 2020).

Extant research also shows that servitization, the addition of services to core product offerings to create customer value, has become increasingly important as businesses shift from goods-centric to service-centric models (Raddats et al. 2019). Moreover, servitization positively influences business performance (W. Wang et al. 2018) and can contribute to survival and longevity (W. Wang and Guedes 2024). Therefore, servitization is an important growth strategy (Barrett et al. 2015) that is increasingly integrated within business models (Mina et al. 2014). However, little is known about servitization in family businesses (Rondi et al. 2021), despite the important implications that ownership has on this process (Guedes et al. 2022).

Germany is well known for its “Mittelstand,” predominantly family-owned and managed small and medium-sized enterprises (SMEs), which account for around 95% of all businesses and form the backbone of the German economy (Gabriel and Bitsch 2019; Roscher 2015). The horticulture sector in Germany is strongly characterized by the Mittelstand (Gabriel and Bitsch 2019; BMEL (Federal Ministry of Food and Agriculture) 2021). These businesses have often been passed down through generations and are highly embedded in, and focused on, serving local and regional economies such as small businesses elsewhere (Haq et al. 2024b). This localization has led businesses to be predominantly small, rarely being known beyond their localities (Haq, Johanson, Davies, Ng and Dana 2024a), not substantially changing over their longevity (Ng and Keasey 2010) and having the family interwoven within the business (Bell and Pham 2020; Wortman 1994). However, the horticultural industry has seen a significant move away from manufacturing to services, requiring the family businesses within the industry to embrace change and innovate to remain relevant within the market (Engelke 2017). Against this backdrop, 23.9% of registered businesses in the sector shut down between 2010 and 2017 (IT-Dienstleistungen 2017), questioning and challenging the longevity of family businesses within the horticulture sector.

Focusing on family-owned horticultural SMEs, this research aims to identify the relationship between the market orientation concepts of customer orientation, competitor orientation and interfunctional coordination (Narver and Slater 1990) and business performance. The research also investigates the moderating and direct role that servitization plays in business performance. In doing so, this research addresses the scarcity of research considering market orientation in the context of family business (Martín-Santana et al. 2020) and addresses calls for further research into the role that servitization plays in family business (Rondi et al. 2021). This research responds to the gap (mentioned above) by integrating the concepts of market orientation and servitization within the family business context to examine their interaction and impact on profitability. Addressing this lacuna offers insights into the challenges family businesses are facing to succeed, enhance performance and

sustain longevity. This research thus contributes to the limited understanding of how family businesses can survive and thrive in challenging environments (Suddaby et al. 2023).

2 | Theoretical Background and Hypothesis Development

2.1 | Market Orientation and Family Horticultural Businesses

A strong market orientation provides the information and knowledge that organizations require to continue to be successful in challenging and dynamic markets (Correia et al. 2021). The information and knowledge acquired through effective market orientation serve as inputs for actions that enable a business to satisfy customers' needs and support effective market exploration (Monferrer et al. 2015; Qiu 2008). Narver and Slater (1990) developed a market orientation model from a cultural perspective, which considers market orientation as being built from the three dimensions of customer orientation, competitor orientation and interfunctional coordination. These dimensions combine marketing activities from a strategic perspective (Gotteland et al. 2020) and represent central market requirements (Bhattarai et al. 2019).

Family businesses display varying levels of market orientation (Reuber and Fischer 2011) but are often more inward-looking, with internal capabilities and family dynamics playing a central role in their success (Neneh and Welsh 2025; Welsh and Kaciak 2019). Although greater consideration of customers and competitors could strengthen performance, developing a robust market orientation can be challenging, as these businesses are typically small, family-owned enterprises where day-to-day operations take precedence over longer-term strategic considerations (Haq et al. 2024a; Dibrell et al. 2014). They highlight that limited formalized planning systems within family businesses can limit their ability to proactively adapt to changing market conditions and therefore maintain an effective market orientation. This approach can be compounded by myopic management within family businesses, which limits strategic foresight and the ability to orient to meet customer needs, compete with competitors and coordinate functions (Baishya et al. 2025; Baumgart et al. 2024; Czakon et al. 2023). Family businesses can suffer from limited capacity to coordinate operations and resources across departments (Hauser et al. 2020), which has the potential to result in missed opportunities for future business development and growth (Zehnder and Schwarz 2025). Additionally, as family businesses can be more focused on preserving socioeconomic wealth than on short-term financial gains, tensions can exist between tradition and market adaptation, hindering a willingness to adopt a market orientation (Beck and Kenning 2015; Kallmuenzer et al. 2018). Such challenges and tensions have led to many family businesses not lasting to the third generation (Le Breton–Miller and Miller 2013; Pham et al. 2019).

The link between market orientation and business performance has been well studied. For example, a meta-analysis by Cano et al. (2004), which reviewed 53 studies, found that the link

between market orientation and business performance is positive and consistent worldwide. Research has sought to determine the factors that influence the relationship between market orientation and business performance. Two such factors that have been identified to influence this relationship are company size and industry type (Kajalo and Lindblom 2015; Liao et al. 2011). Despite these findings highlighting the link between market orientation and business performance, research into the effects of market orientation in family businesses remains scarce (Martín-Santana et al. 2020). This sentiment has been echoed by Kinias et al. (2023), who, based on a systematic review of the family business marketing literature, called for further research into market orientation in the context of family business.

Potential exists for market orientation to enable German family-owned horticulture businesses to align production with emerging trends such as consumer demand for local, organic or sustainable products (Tarashkar et al. 2025); help manage and align production with seasonal and volatile markets; and facilitate greater engagement with diverse marketing channels, including direct-to-consumer sales and regional branding initiatives (Dirksmeyer et al. 2022). It is, therefore, hypothesized that the three dimensions of market orientation highlighted by Narver and Slater (1990) are linked to business performance:

H1. *Customer orientation is positively related to the business performance of German family-owned horticultural SMEs.*

H2. *Competitor orientation is positively related to the business performance of German family-owned horticultural SMEs.*

H3. *Interfunctional coordination is positively related to the business performance of German family-owned horticultural SMEs.*

2.2 | Servitization and Family Horticultural Businesses

Services make up the bulk of GDP in developed countries, and conventional manufacturing and production businesses are increasingly integrating services into their offerings, which may generate longer-term customer engagement and connections, thereby increasing revenue (Rigtering et al. 2014; Vargo and Lusch 2008). Introducing and developing services is a “sustainable way to grow a business and fight off pressure that companies are facing with the commoditization of products” (Chesbrough 2011, 13). This sustainability aspect has resulted in increasing levels of servitization (Favoretto et al. 2022; Raddats et al. 2019), whereby companies consciously develop their services within their businesses to add value (Kamp and Parry 2017). Traditional production and manufacturing businesses increasingly seek to engage in the process of servitization to incorporate additional services within their business models (Mina et al. 2014). Servitization commonly leads to services being offered that are related to supporting and building on the physical product offered by the business (Wassmus 2014). The shift from selling products to selling product-service bundles involves organizational change but can support the navigation

of turbulent markets through diversification (Vendrell-Herrero et al. 2014).

Servitization generally affects business performance positively (Bustinza et al. 2015; Gebauer et al. 2011). However, although generally corroborating this conclusion, W. Wang et al. (2018) discovered through a meta-analysis of 41 empirical studies that servitization’s effect on performance is nonlinear and influenced by industry and regional context. This implies that modest degrees of servitization provide the optimal balance of risk and benefit (W. Wang et al. 2018). Bortoluzzi et al. (2022) highlighted a “servitization paradox,” whereby performing servitization might hurt performance if not supported by organizational competencies, digital maturity and strategy alignment. Additionally, recent research shows that smaller, locally oriented businesses struggle with adaptation to servitization and find servitization less profitable (Myrthianos et al. 2014; Valtakoski and Witell 2018). Despite the growth in research into servitization, there have been requests for further research into how it might be used as a strategic concept (Kowalkowski et al. 2017), which is important, as the management of a company’s portfolio exerts a considerable influence on the entire business (Aas et al. 2017).

Little is known about servitization in family businesses (Rondi et al. 2021), although it has been proposed that family business dynamics can both support and hinder servitization (Guedes et al. 2022). As a focus on preserving socioeconomic wealth and legacy carries implications for the way resources are allocated, risk is managed, and strategic choices are made (Carney et al. 2015), it can result in an unwillingness to innovate and develop new services (Duran et al. 2016; Guedes et al. 2022). However, family businesses may be well positioned to engage in servitization, as it offers the opportunity to leverage socioeconomic wealth (Guedes et al. 2022) and exercise greater strategic and tactical control (Berrone et al. 2012). Despite these potential benefits, Guedes et al. (2022) found that Portuguese manufacturing family businesses exhibit lower levels of servitization compared to nonfamily businesses. Research on servitization has hitherto primarily focused on manufacturing (Xing et al. 2023). However, it has relevance in agriculture and horticulture, where there is a gradual move from selling products to offering outcome-based services and direct service provision (Vidickienė et al. 2023). This shift has led to an increase in bundling a physical product and an associated service together (Wirtz and Kowalkowski 2022). For example, firms may offer the design and installation of green and living installations, ongoing landscaping provision and guidance, and training programmes alongside their products. Servitization in horticulture and agriculture remains underexplored (Vidickienė et al. 2023), compounded by a lack of understanding of servitization within family businesses (Rondi et al. 2021). That said, although little is known about the role of servitization in family businesses (Rondi et al. 2021), servitization has been found generally to have a positive effect on business performance (W. Wang et al. 2018). It is, therefore, hypothesized:

H4. *Servitization is positively related to the business performance of German family-owned horticultural SMEs.*

2.3 | The Linkage Between Market Orientation and Servitization

The ability of a business to innovate and develop new services to augment its offering is based on its ability to integrate varied competencies and know-how, including market orientation (Doloreux et al. 2025). Market orientation entails gathering, sharing and acting on market data with a strong consumer emphasis (Kohli and Jaworski 1990). These attributes of market orientation can be used to support the identification of services that can be introduced to augment existing offerings (Vendrell-Herrero et al. 2014). This approach makes market orientation and servitization closely linked strategies that can mutually reinforce one another in driving business performance. Market orientation has been found as an enabler of servitization because businesses with higher levels of market orientation are more likely to embrace and deliver servitization (Story et al. 2017). Kindström et al. (2013) argue that businesses adopting servitization need to deeply understand customer needs to design appropriate service offerings, making market orientation a critical enabler. Combining market orientation with servitization has also been shown to result in successful services. For example, Ulaga and Reinartz (2011) found that businesses that use customer insights derived from a strong market orientation are more likely to develop successful hybrid product and service offerings, which are central to servitization. Moreover, market orientation enhances the success of servitization strategies by aligning service design with customer preferences, thereby improving customer satisfaction and loyalty (Raddats et al. 2019), which are important aspects of business survival and sustainable success (Haq et al. 2021). Ruiz-Alba et al. (2018) found that the impact of services on business performance hinges on high levels of customer co-creation of services. When customers actively co-create services, the positive effects of servitization are significantly stronger.

That said, extant evidence regarding the impact of servitization on overall business performance is conflicting. Some researchers have argued that servitization does not consistently enhance the pathway between market orientation and profitability and can even reduce performance under certain conditions. For example, a meta-analysis by Brax et al. (2021) revealed that the impact of servitization on business performance varies by implementation and context, with negative or nonlinear outcomes frequently observed. Similarly, using panel data from Chinese sporting goods manufacturers, Lu et al. (2024) found that higher levels of servitization can suppress corporate performance, reinforcing the view that servitization may mediate or moderate market-orientation effects in nonpositive ways. In family businesses, servitization is adopted less frequently and often delivers weaker, or even negative, performance outcomes (Guedes et al. 2022), which could suggest that the profitability benefits of market orientation routed through servitization are attenuated.

Although previous research has connected market orientation and servitization, Davcik and Sharma (2016) have called for further investigation into the influence of market orientation and servitization in contexts outside of manufacturing, which has been the focus of most studies. Given previous findings suggesting

that market orientation supports effective servitization in manufacturing (Xing et al. 2023), which, in turn, leads to improved business performance, we extend this proposition outside of manufacturing and into family businesses by proposing:

H5. *Servitization has a positive moderating effect on the relationship between customer orientation and business performance within German family-owned horticultural SMEs.*

H6. *Servitization has a positive moderating effect on the relationship between competitor orientation and business performance within German family-owned horticultural SMEs.*

H7. *Servitization has a positive moderating effect on the relationship between interfunctional coordination and business performance within German family-owned horticultural SMEs.*

Figure 1 illustrates the conceptual model for this research. Through testing the impact of the market orientation dimensions on business performance within family-owned horticultural SMEs (Hypotheses 1–3), we address the scarcity of research exploring the impact of market orientation in family businesses (Martín-Santana et al. 2020). Through testing the effect that servitization has on the business performance of family-owned horticultural SMEs (Hypothesis 4), we highlight insights into whether servitization offers a viable strategy to support longevity for these businesses. Furthermore, we investigate the moderating role that servitization plays in this relationship (Hypotheses 5–7; see Table 1), addressing calls for further research into the role that servitization can play in family businesses (Rondi et al. 2021). Servitization and market orientation have been posited as being able to support sustainable business performance (Chesbrough 2011; Martín-Santana et al. 2020) (see Figure 1). This research extends these concepts into family businesses in horticulture, an industry under existential pressure, to see what impact they have on family business performance, supporting family business longevity.

3 | Methodology

3.1 | Data Collection and Sample

Data were collected using a cross-sectional design, with a structured questionnaire administered via a web-based online survey (Thietart 2007). These data allowed for the exploration of relationships between the variables and the testing of the proposed hypotheses (Evans and Rooney 2013). The questionnaire was embedded in the LimeSurvey's professional open-source software, an advanced online survey system for creating quality online surveys.

The sample included family-owned German horticultural SMEs. The choice was taken to focus on family-owned SMEs, which are defined in Germany as having less than 250 workers, an annual turnover not surpassing 50 million euros or a balance sheet total not exceeding 43 million euros (Statistisches Bundesamt 2025). This decision was taken as it has been found that

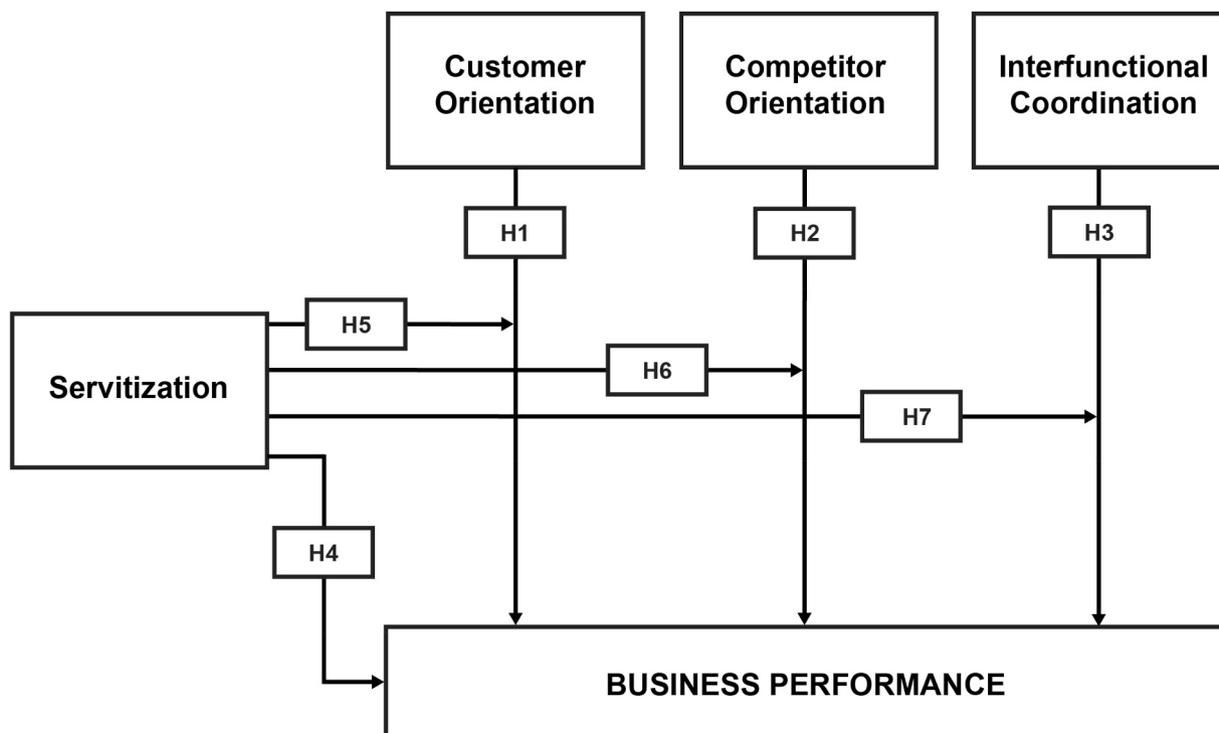


FIGURE 1 | Research model and hypotheses.

TABLE 1 | Hypothesis testing summary.

Hypothesis		Outcome
H1	Customer orientation is positively related to the business performance of German family-owned horticultural SMEs.	Accepted
H2	Competitor orientation is positively related to the business performance of German family-owned horticultural SMEs.	Rejected
H3	Interfunctional coordination is positively related to the business performance of German family-owned horticultural SMEs.	Accepted
H4	Servitization is positively related to the business performance of German family-owned horticultural SMEs.	Accepted
H5	Servitization has a positive moderating effect on the relationship between customer orientation and business performance within German family-owned horticultural SMEs.	Rejected
H6	Servitization has a positive moderating effect on the relationship between competitor orientation and business performance within German family-owned horticultural SMEs.	Rejected
H7	Servitization has a positive moderating effect on the relationship between interfunctional coordination and business performance within German family-owned horticultural SMEs.	Rejected

SMEs frequently diverge from large enterprises in their capacities, organizational structures and strategic planning (Bozer et al. 2017). The latest agricultural structure survey in Germany reports 5300 horticultural holdings (BMEL Statistik (Federal Ministry of Food and Agriculture) 2023), but does not disaggregate this figure by ownership, making the application of probability sampling challenging (Thietart 2007). The sampling criteria were to recruit family-owned SMEs that are engaged directly in a horticultural enterprise and have been established for a minimum of 2 years. Email contacts of the selected SMEs

were sourced from a professional directory of German horticultural companies that agreed to support the study. Emails were sent to respondents requesting their voluntary participation in the survey. A total of 244 responses were received, of which 222 were valid and fully completed. A G*Power analysis for a linear multiple regression with four predictors ($f^2 = 0.10$, $\alpha = 0.05$, power = 0.95) indicated that a minimum sample size of 177 was required (Cohen 1988; Faul et al. 2009). Our final sample of 222 complete responses exceeded this requirement, ensuring sufficient statistical power for the analysis.

3.2 | Questionnaire Development and Scales

We collected company and demographic information to confirm that respondents met the sample selection criteria. The questionnaire comprised sections collecting data on each business's market orientation dimensions, servitization and business performance based on previously validated scales by Narver and Slater (1990). The independent variables for this research are the three dimensions of market orientation: customer orientation, competitor orientation and interfunctional coordination. These concepts were measured using Narver and Slater's (1990) market orientation scales, which are widely accepted and acknowledged. The dependent variable, business performance, was measured through a combination of subjective and objective items, as recommended by Schachter (2010), as this provides a multifaceted examination of performance. Servitization was measured through scales developed by Gronum et al. (2016), which detail service growth in terms of the number of services offered over the previous 5-year period. All scales used were translated into German from English through a process of backtranslation and operationalized for the German context to ensure conceptual equivalency (Bhalla and Lin 1987). The data collected were downloaded from the online survey and transferred to SPSS 26 and AMOS for statistical analysis.

3.3 | Preliminary Data Analysis

The first step of the statistical analysis involved data screening to check reliability and validity. Data screening was performed to ensure a rigorous quantitative data analysis (Watson 2015). Prior to conducting hypothesis testing with structural equation modelling (SEM), we undertook an exploratory factor analysis, employing principal components analysis as the designated factoring method. The initial exploratory factor analysis was followed by validation of the proposed structural model through confirmatory factor analysis and SEM. These two methods enabled hypothesis testing, as advocated by Marsh et al. (2020), and are frequently employed in the context of SEM. Convergent and discriminant validity were assessed through average variance extracted (AVE) and composite reliability (CR) values, which are shown in Table 2. Convergent validity was initially tested by the loadings of the items on their respective factors, as shown in Table 2. All values met the established thresholds, except for the AVE for competitor orientation, which fell below

the recommended 0.50 level (Fornell and Larcker 1981). However, its composite reliability (CR), which is considered a more accurate measure of reliability, exceeded the acceptable benchmark (> 0.60), indicating acceptable internal consistency (Lam 2012; Bagozzi and Yi 1988). Although the AVE was below the recommended threshold, Fornell and Larcker (1981) note that reliability and variance extracted capture distinct aspects of measurement quality, and subsequent SEM research suggests that acceptable reliability may justify retaining constructs for hypothesis testing despite weaker convergent validity (Hair et al. 2014; Malhotra and Dash 2011). This multicriteria approach to assessing measurement quality, rather than reliance on AVE alone, is consistent with recent methodological guidance in business and management research (Guenther et al. 2023).

To assess the potential for common method bias, Harman's single-factor test was applied (Harman 1967; Zhang et al. 2024). The purpose of this test is to ascertain whether most of the variance can be explained by a single factor. This purpose is achieved by entering all the principal concepts into a principal components analysis (Amin et al. 2016). Consequently, a reliable set of variables will consistently load on the same factor. The maximum threshold is 50% (Podsakoff et al. 2003). The results indicate a percentage of 29.42%, suggesting the absence of any significant common method bias. The following section details the results and hypothesis testing.

4 | Results

4.1 | Model Tests

To test the hypotheses, covariance-based structural modelling was selected, with the statistical software tool AMOS being used for data analysis. This method estimates structural model parameters based on confirmatory factor analysis, discriminant analysis and multiple regressions (Q. Wang et al. 2016). In addition to revealing the direct link between the dimensions of market orientation and servitization and business performance, the indirect influence of servitization on the relationship between the dimensions of market orientation and business performance can be determined (Namazi and Namazi 2016). Table 3 presents two models. Model 1 illustrates the direct effects of the dimensions of market orientation on business

TABLE 2 | Convergent and discriminant validity.

	CR	AVE	MaxR (H)	Interfunctional coordination	Competitor orientation	Customer orientation	Servitization	Business performance
Customer orientation	0.73	0.50	0.75	0.61	0.61	0.69		
Competitor orientation	0.67	0.41	0.69	0.51	0.64			
Interfunctional coordination	0.90	0.53	0.91	0.73				
Servitization	0.86	0.67	0.91	-0.21	-0.02	-0.33	0.82	
Business performance	0.88	0.56	0.89	0.50	0.17	0.44	-0.56	0.75

TABLE 3 | Path coefficients (β -values) after bootstrapping. Model 1 = direct effects, Model 2 = moderated interaction effects.

Hypothesis	Independent variable (x interaction)	Model 1	CR	Model 2	CR
H1	Customer orientation	0.289 (0.075)**	3.85	0.292 (0.074)**	3.95
H2	Competitor orientation	-0.233 (0.060)**	-3.88	n/s	
H3	Interfunctional coordination	0.284 (0.059)**	4.81	n/s	
H4	Servitization	0.130 (0.043)**	3.02	0.614 (0.196)**	3.13
H5	Customer orientation \times servitization	n/s		n/s	
H6	Competitor orientation \times servitization	n/s		n/s	
H7	Interfunctional coordination \times servitization			-0.507 (0.185)**	-2.74

Note: Models 1 (2); SMC (R^2): Business performance 0.598 (0.633); model fits 1, 2: CMIN/df = 1.619 (0.695); $p > 0.151$ (0.820); GFI = 0.991 (0.994).

* $p < 0.05$.

** $p < 0.01$.

*** $p < 0.001$.

performance (Hypotheses 1–3) and the relationship between servitization and business performance (Hypothesis 4). Model 2 demonstrates the interaction terms and the indirect moderating effects of servitization on the relationship between the market orientation dimensions and business performance (Hypotheses 5–7). The impact of the moderating interaction term of servitization is evident in Model 2.

Both models exhibited an optimal fit. The values indicate a robust fit and a high degree of reliability, with the models found to be almost saturated (Field 2017). All intercorrelations were less than the threshold of 0.9, indicating that there was no issue with multicollinearity (Tabachnick and Fidell 2018), and hence the models were reliable. In Model 1, 59.8% of the variance in business performance was explained by the four variables and 40.2% by the error term e_2 . In Model 2, the squared multiple correlations (R^2) for business performance were explained by 63.3% of all variables. A comparison of the R^2 values of Models 1 and 2 reveals an enhancement of +3.5% in business performance (see Table 3). Consequently, in the presence of interaction terms, the total explanation of variance could be enhanced, which is principally positive (Najafi-Tavani et al. 2016).

4.2 | Hypothesis Testing

4.2.1 | The Direct Effects of Market Orientation Dimensions and Servitization on Business Performance

The hypotheses were subjected to empirical scrutiny by examining the path coefficients. A Bollen–Stine bootstrap yielded a p -value of 0.198, exceeding the 0.05 threshold and indicating acceptable model fit under potential non-normality. The critical ratios for the regression weights exceeded 1.96, confirming that all structural paths were statistically significant at the 0.05 level. However, although the relationships between the market orientation dimensions of customer orientation and interfunctional coordination and business performance were found to be positive, the relationship between competitor orientation and business performance was found to be negative. Therefore, Hypotheses 1 and 3 are accepted, whereas Hypothesis 2 is rejected. The relationship between servitization and business performance was found to be both positive and significant. Therefore, Hypothesis 4 is accepted.

4.2.2 | The Indirect Effects of Servitization on the Relationship Between Market Orientation Dimensions and Business Performance

The path coefficients demonstrated that the only significant independent variable in Model 2 was customer orientation. The correlation coefficient for business performance was determined to be $\beta = 0.292$, $p = 0.006$ and $\alpha = 0.01$. The critical ratios and β -values increased, becoming significant, in contrast to Model 1 (e.g., customer orientation–business performance = β 0.289 (3.816) to 0.292 (4.034)). In this context, the moderating effect of servitization increased significantly from 0.130 (3.033) in Model 1 to 0.614 (3.088) in Model 2. The ascent of these latent variables illustrated strong, significant moderating effects on performance. Conversely, the remaining items remained unaffected. This attracted significant attention when the interaction term, interfunctional coordination, was considered. In Model 1, the direct effect of interfunctional coordination had a β -value of 0.284 (4.551). However, with the interaction terms, these values changed to -0.507 (-2.576, $p = 0.007$, $\alpha = 0.01$), indicating a negative effect. The research found that servitization had a significant effect in moderating the relationship between interfunctional coordination and business performance; however, as the relationship was negative, the hypothesis is rejected. The models produced for customer orientation and competitor orientation demonstrated that servitization did not have a moderating effect, so Hypotheses 5 and 6 are rejected. The effects are presented in Figure 2.

Although Hypothesis 7 is rejected due to a negative relationship, the results revealed a significant negative moderating effect of servitization on the relationship between interfunctional coordination and business performance. To aid visualization, the findings were plotted in Excel using a simple slope test (Dawson 2014). As all variables in the models were continuously scaled, the effect of the relationships could be measured through the slopes of the regression lines. Figure 3 presents the plotting model of the moderating effect of servitization on interfunctional coordination and business performance.

The plotting model indicates an increase in both linear slopes in the presence of servitization and that the effect was more apparent with elevated values of servitization. Consequently, higher business performance was more pronounced when there

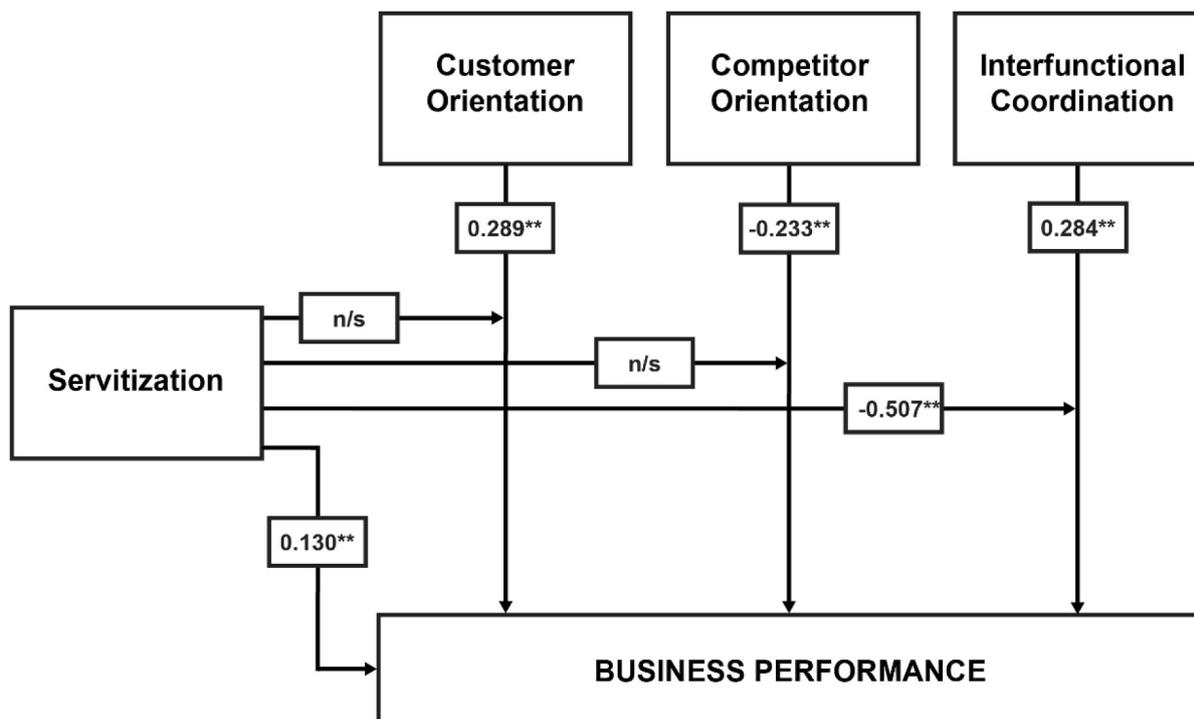


FIGURE 2 | Results of the direct and indirect effects on business performance. Confidence interval = 95%.

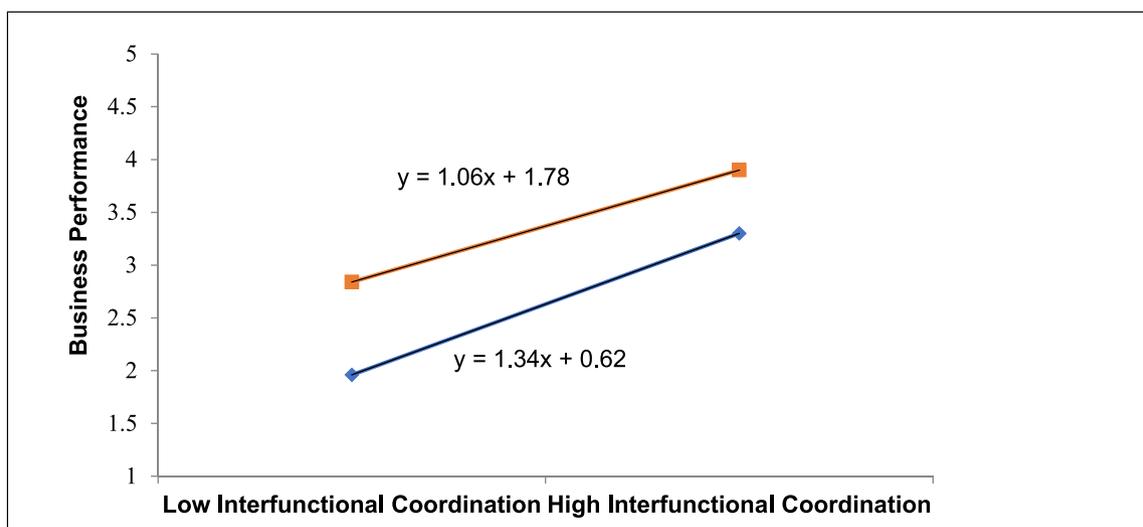


FIGURE 3 | Plotting model with servitization as a moderator of the relationship between interfunctional coordination and business performance (bootstrapped). Moderators: blue line = low servitization, red line = high servitization.

were lower levels of servitization present. Therefore, the presence of servitization had a negative effect on the positive relationship between interfunctional coordination and business performance, but only at a higher performance level.

4.3 | Summary of Findings

This research shows that customer orientation and interfunctional coordination are positively associated with business performance in family-owned German horticultural SMEs, whereas competitor orientation has a negative effect. These findings

suggest that performance is strengthened by focusing on customer needs and cross-functional collaboration but weakened when excessive attention is given to competitor activity. In addition, servitization was found to have a direct positive effect on business performance. However, its moderating effect is limited: It does not significantly influence the relationships between customer or competitor orientation and performance, and at high levels, it negatively moderates the link between interfunctional coordination and performance. This reversal relationship indicates that excessive servitization can offset the benefits of strong internal cooperation, ultimately reducing business performance (see Table 1).

5 | Discussion and Conclusion

Previous studies have suggested that business size and industry shape the relationship between market orientation and business performance (Kajalo and Lindblom 2015; Liao et al. 2011). Although some of the literature has suggested that market orientation enhances business performance (Cano et al. 2004; Liao et al. 2011), this research has shown that the effects of market orientation on business performance are not uniform across all dimensions. Specifically, the findings indicate that for family-owned horticultural SMEs, competitor orientation can have a detrimental effect on performance, whereas customer orientation and interfunctional coordination provide clear benefits. These findings suggest that the dynamics of market orientation in small family businesses are shaped by their structural characteristics and resource limitations, which make some dimensions supportive of performance and others counterproductive. Small family businesses often face resource constraints (Haq, Johanson, Davies, Ng and Dana 2024b) that force them to prioritize day-to-day operations (Haq, Johanson, Davies, Ng and Dana 2024a). In such contexts, shifting focus to competitor activities can be counterproductive, as these businesses may lack the flexibility or resources to imitate competitors effectively or overcome first-mover advantages (Sirmon and Hitt 2003; Zellweger et al. 2012). Family businesses are also less inclined to make large strategic pivots in response to competitors' actions (Zellweger et al. 2012), often prioritizing tradition and the preservation of socioemotional wealth (Gómez-Mejía et al. 2007). As a result, they tend to rely on internal capabilities (De Massis et al. 2015) and informed decision-making within the family (Neneh and Welsh 2025; Welsh and Kaciak 2019). This phenomenon helps to explain why an external focus on competitors can hinder performance and supports the argument that family businesses derive competitive advantage primarily through internal strengths, even if doing so reduces responsiveness to competitors (Kellermanns et al. 2012). These findings extend knowledge of market orientation in family businesses by emphasizing that although customer orientation and interfunctional coordination enhance performance, competitor orientation may have a detrimental effect.

Moreover, prior research has shown that increased servitization can enhance manufacturers' business performance (Bustanza et al. 2015; Gebauer et al. 2011), though some studies argue that small, locally focused businesses struggle to implement servitization profitably (Myrthianos et al. 2014; Valtakoski and Witell 2018). The similarities between horticulture and manufacturing, both centred on transforming raw materials into products through standardized processes (Kumar et al. 2024), suggest that servitization may also hold relevance in the horticultural sector. This research extends family business literature by demonstrating a positive and significant relationship between servitization and the performance of family-owned horticultural SMEs. The results challenge the view that smaller, resource-constrained businesses cannot benefit from servitization (Myrthianos et al. 2014; Valtakoski and Witell 2018). Instead, this research has demonstrated that diversification into services can help family-owned horticultural businesses navigate turbulent markets. Furthermore, the findings suggest that servitization can be an effective strategy for family businesses by supporting profitability while maintaining strategic and tactical

control (Berrone et al. 2012) and leveraging socioemotional wealth (Guedes et al. 2022).

Extant research has suggested that market orientation can facilitate servitization, improving customer satisfaction, loyalty and performance outcomes (Raddats et al. 2019). In contrast, this research has found that servitization does not significantly moderate the relationship between customer or competitor orientation and business performance and that it has a negative moderating effect when combined with interfunctional coordination. These results challenge the assumption that strong market orientation consistently enhances performance through servitization in family business contexts (Cano et al. 2004; Liao et al. 2011). A possible explanation lies in the internal orientation of family businesses. Family businesses often resist adapting strategies based on external market signals (De Massis et al. 2014), preferring instead to develop services around internal resources, family values and experience (De Massis et al. 2015; Kellermanns et al. 2012). This behaviour preserves tradition and socioemotional wealth (Gómez-Mejía et al. 2007) but limits the effective use of customer and competitor insights to drive service innovation. As a result, the dynamics of family decision-making could reduce the value of market orientation as a foundation for servitization, distinguishing the performance outcomes of family businesses from those of nonfamily businesses.

Prior research has highlighted that excessive servitization can undermine business performance, either through resource strain or service-product cannibalization (W. Wang et al. 2018; Belvedere 2014). This research supports that perspective by identifying a significant negative moderating role of servitization in the relationship between interfunctional coordination and performance. At high levels, servitization reversed the otherwise positive effect of interfunctional cooperation, reducing overall business performance and providing evidence of the so-called "servitization paradox" (Bortoluzzi et al. 2022). These pressures may be particularly pronounced in small family businesses, which often operate with constrained resources. Strong interfunctional coordination may encourage the pursuit of new services beyond what can be effectively managed, overextending the capacity of the business. For family-owned horticultural SMEs, although moderate servitization can be beneficial, excess diversification risks diluting performance. Effective portfolio management and cautious expansion of services are therefore critical, as servitization can act as a double-edged sword in this context (Eckardt and Skaggs 2018).

5.1 | Theoretical Contributions

This research makes three core contributions by addressing gaps in the family business and servitization literature.

Firstly, it challenges the assumption that all dimensions of market orientation are uniformly beneficial. Although prior research has often emphasized positive links (Cano et al. 2004), evidence on family businesses remains limited (Martín-Santana et al. 2020). Our findings show that customer orientation and interfunctional coordination enhance performance in family-

owned SMEs, whereas competitor orientation can reduce it. Therefore, this research reflects how resource constraints and socioemotional wealth preservation can limit the value of imitative strategies, offering a more nuanced view of how market orientation functions in family businesses.

Secondly, this research extends servitization literature (such as Raddats et al. 2019; W. Wang et al. 2018; W. Wang and Guedes 2024) beyond a manufacturing focus by demonstrating that service diversification can directly improve performance in family horticultural SMEs. In doing so, this research addresses calls for greater attention to the role of servitization in family businesses (Rondi et al. 2021) and challenges assumptions that small, resource-constrained, nonmanufacturing businesses are poorly positioned to benefit from such strategies (Myrthianos et al. 2014; Valtakoski and Witell 2018). The finding that moderate levels of service diversification can enhance performance illustrates how servitization can help family horticultural SMEs navigate turbulent markets while retaining family control and values.

Thirdly, this research identifies a servitization paradox in which moderate diversification is beneficial, but excessive service expansion undermines performance. This highlights the risks of overextension in smaller family businesses and cautions against treating servitization as a universally positive strategy (W. Wang et al. 2018). By recognizing these contingencies, this research offers a more balanced and context-sensitive theoretical framing of servitization in family businesses.

Together, these contributions advance a more context-sensitive understanding of strategy in family business literature and broaden the applicability of market orientation and servitization theories (Raddats et al. 2019; W. Wang et al. 2018; W. Wang and Guedes 2024). Rather than treating these constructs as universally positive, our findings highlight that their effects are contingent on the dynamics and characteristics of family-owned SMEs. Ignoring these dynamics risks leaving the literature with an incomplete, manufacturing-centric view of performance drivers. Many small businesses, including family businesses, in traditional, resource-constrained industries share characteristics such as small scale, local embeddedness (Haq, Johanson, Davies, Ng and Dana 2024b), long-term orientations and the preservation of socioemotional wealth, which similarly shape how strategies such as market orientation and servitization influence performance and support long-term survival.

This research demonstrates that theories of market orientation and servitization cannot be viewed as universally applicable but must be adapted to the specific dynamics of family businesses, such as tradition, risk aversion and distinctive decision-making preferences and constraints, if they are to meaningfully explain performance outcomes.

5.2 | Managerial Implications

This research provides an important insight for managers of family-owned horticultural SMEs navigating market pressures and evolving customer expectations. That is, it shows that

prioritizing customer orientation and interfunctional coordination can directly improve business performance, suggesting that businesses should invest in understanding customer needs and fostering collaboration across internal functions to build agility and responsiveness. However, managers should be cautious about heavily emulating competitors because, as this research has demonstrated, competitor orientation negatively impacts performance, possibly due to resource constraints and misalignment between external strategies and internal capabilities in family businesses. Moreover, although servitization was shown to enhance performance, it should be approached strategically because, as this research has demonstrated, managers must recognize the servitization paradox. That is, excessive or poorly aligned service expansion can strain limited resources and disrupt internal coordination, ultimately harming performance. Thus, service development should be carefully calibrated, aligned with internal capabilities and rooted in authentic value addition rather than reactive diversification. Overall, family business leaders should craft strategies that leverage internal strengths and customer intimacy while exercising restraint in excessive service expansion and/or seeking to copy competitors without thorough consideration.

5.3 | Limitations and Future Research

Despite the numerous contributions made by this research, there are certain limitations that can be addressed in future research. Firstly, this research relied on self-reported data, which—although potentially reducing social desirability bias—may lead to inaccuracies in reporting (Brenner and DeLamater 2016). The sample was selected using a professional directory of German horticultural companies, which may exclude newer entrants and therefore bias the sample toward more established, traditional businesses. Although the sample size met the G*Power requirements, it remains modest and should be acknowledged as a limitation.

Secondly, although this research's novel findings can be adapted in other industries where heterogeneity prevails, it is important to note that horticulture is distinguished by its diversity in products and services, distribution and organization. Future research could be extended to other industries.

Thirdly, based on the analysis of quantitative data, this research has highlighted that servitization can bring both positive and negative effects to family-owned SMEs. Future qualitative research could help to deepen understanding into portfolio management and what services can help to augment current offerings. Such in-depth analysis may be beneficial in elucidating the services that are most effective for various businesses and the potential upper limits that may exist for each business. This in-depth analysis would help improve understanding of when, and at what point, servitization can negatively impact businesses (W. Wang et al. 2018).

Fourthly, although this research has sought to link the market orientation dimensions to servitization, future research could provide more insight into how family businesses use customer and competitor insights and internal collaboration to make

decisions regarding service and portfolio development. Additionally, future research could seek to identify and explore what value family businesses place on customer and competitor insights when developing new services and what other mechanisms they use to develop new services (Alhassan et al. 2025).

Fifthly and finally, this research was conducted in one geographical context and industrial context, where family businesses can be considered relatively formal (Lubinski 2011). Future research could explore other regions and industries.

Acknowledgments

Assistive artificial intelligence was used to support the writing, editing and review of the final manuscript.

Funding

The authors have nothing to report.

Ethics Statement

Ethics approval was granted by the University of Worcester, UK.

Conflicts of Interest

The authors declare no conflicts of interest.

Submission

This paper has not been submitted to any other journal. It is not under review or consideration in any other journal/place.

Data Availability Statement

The authors have nothing to report.

References

- Aas, T. H., K. J. Breunig, and K. M. Hydle. 2017. "Exploring New Service Portfolio Management." *International Journal of Innovation Management* 21, no. 6: 1750044. <https://doi.org/10.1142/S136391961750044X>.
- Alhassan, N., R. Bell, S. Andrews, I. Salifu, and M. Majeed. 2025. "Learning of Innovation Opportunities: Sources and Processes of Open Innovation for Sustaining SME Hotels." *Learning Organization* 32, no. 5: 775–792. <https://doi.org/10.1108/TLO-03-2024-0080>.
- Ali, N., B. Simeonova, and M. Hughes. 2025. "Evolution of Stewardship Across Family and Business Goals: Toward a Stewardship Transition Framework." *Entrepreneurship Theory and Practice* 49, no. 4: 1162–1188. <https://doi.org/10.1177/10422587241311155>.
- Amann, B., and J. Jaussaud. 2012. "Family and Non-Family Business Resilience in an Economic Downturn." *Asia Pacific Business Review* 18, no. 2: 203–223. <https://doi.org/10.1080/13602381.2010.537057>.
- Amin, M., R. Thurasamy, A. M. Aldakhil, and A. H. B. Kaswuri. 2016. "The Effect of Market Orientation as a Mediating Variable in the Relationship Between Entrepreneurial Orientation and Smes Performance." *Nankai Business Review International* 7, no. 1: 39–59. <https://doi.org/10.1108/NBRI-08-2015-0019>.
- Bagozzi, R. P., and Y. Yi. 1988. "On the Evaluation of Structural Equation Models." *Journal of the Academy of Marketing Science* 16, no. 1: 74–94. <https://doi.org/10.1007/BF02723327>.

- Baishya, S., A. Karna, D. Mahapatra, S. Kumar, and D. Mukherjee. 2025. "Dynamic Managerial Capabilities: A Critical Synthesis and Future Directions." *Journal of Business Research* 186: 115015. <https://doi.org/10.1016/j.jbusres.2024.115015>.
- Bammens, Y., W. Voordeckers, and A. Van Gils. 2011. "Boards of Directors in Family Businesses: A Literature Review and Research Agenda." *International Journal of Management Reviews* 13, no. 2: 134–152. <https://doi.org/10.1111/j.1468-2370.2010.00289.x>.
- Barrett, M., E. Davidson, J. Prabhu, and S. L. Vargo. 2015. "Service Innovation in the Digital Age: Key Contributions and Future Directions." *MIS Quarterly* 39, no. 1: 135–154. <https://doi.org/10.25300/misq/2015/39:1.03>.
- Basco, R. 2015. "Family Business and Regional Development: A Theoretical Model of Regional Familiness." *Journal of Family Business Strategy* 6, no. 4: 259–271. <https://doi.org/10.1016/j.jfbs.2015.04.004>.
- Baumgart, A., R. Bell, and R. Wiid. 2024. "Internal Communication and Family Business: A Perspective Article." *Journal of Family Business Management* 14, no. 5: 1031–1036. <https://doi.org/10.1108/JFBM-10-2023-0224>.
- Beck, S., and P. Kenning. 2015. "The Influence of Retailers' Family Firm Image on New Product Acceptance: An Empirical Investigation in the German FMCG Market." *International Journal of Retail & Distribution Management* 43, no. 12: 1126–1143. <https://doi.org/10.1108/IJRDM-06-2014-0079>.
- Bell, R., and T. T. Pham. 2020. "Modelling the Knowledge Transfer Process Between Founder and Successor in Vietnamese Family Businesses Succession." *Journal of Family Business Management* 11, no. 4: 479–495. <https://doi.org/10.1108/JFBM-03-2020-0024>.
- Belvedere, V. 2014. "Defining the Scope of Service Operations Management: An Investigation on the Factors That Affect the Span of Responsibility of the Operations Department in Service Companies." *Production Planning & Control* 25, no. 6: 447–461. <https://doi.org/10.1080/09537287.2012.705353>.
- Berrone, P., C. Cruz, and L. R. Gomez-Mejia. 2012. "Socioemotional Wealth in Family Firms: Theoretical Dimensions, Assessment Approaches, and Agenda for Future Research." *Family Business Review* 25, no. 3: 258–279. <https://doi.org/10.1177/0894486511435355>.
- Bhalla, G., and L. Lin. 1987. "Cross-Cultural Marketing Research: A Discussion of Equivalence Issues and Measurement Strategies." *Psychology and Marketing* 4: 185–216.
- Bhattarai, C. R., C. C. Y. Kwong, and M. Tasavori. 2019. "Market Orientation, Market Disruptiveness Capability and Social Enterprise Performance: An Empirical Study From the United Kingdom." *Journal of Business Research* 96: 47–60. <https://doi.org/10.1016/j.jbusres.2018.10.042>.
- BMEL (Federal Ministry of Food and Agriculture). 2021. *Horticulture Report 2021*. BMEL.
- BMEL Statistik (Federal Ministry of Food and Agriculture). 2023. *Allgemeines Zum Gartenbau*. BMEL Statistik.
- Bortoluzzi, G., M. Chiarvesio, R. Romanello, R. Tabacco, and V. Veglio. 2022. "Servitisation and Performance in the business-to-business Context: The Moderating Role of Industry 4.0 Technologies." *Journal of Manufacturing Technology Management* 33, no. 9: 108–128. <https://doi.org/10.1108/JMTM-08-2021-0317>.
- Bozer, G., L. Levin, and J. C. Santora. 2017. "Succession in Family Business: Multi-Source Perspectives." *Journal of Small Business and Enterprise Development* 24, no. 4: 753–774. <https://doi.org/10.1108/JSBED-10-2016-0163>.
- Brax, S. A., A. Calabrese, N. Levaldi Ghiron, L. Tiburzi, and C. Grönroos. 2021. "Explaining the Servitization Paradox: A Configurational Theory and a Performance Measurement Framework."

- International Journal of Operations & Production Management* 41, no. 5: 517–546. <https://doi.org/10.1108/IJOPM-08-2020-0535>.
- Brenner, P. S., and J. DeLamater. 2016. “Lies, Damned Lies, and Survey Self-Reports? Identity as a Cause of Measurement Bias.” *Social Psychology Quarterly* 79, no. 4: 333–354. <https://doi.org/10.1177/0190272516628298>.
- Bustanza, O. F., A. Z. Bigdeli, T. Baines, and C. Elliot. 2015. “Servitization and Competitive Advantage: The Importance of Organizational Structure and Value Chain Position.” *Research-Technology Management* 58, no. 5: 53–60. <https://doi.org/10.5437/08956308X5805354>.
- Cano, C. R., F. A. Carrillat, and F. Jaramillo. 2004. “A meta-analysis of the Relationship Between Market Orientation and Business Performance: Evidence From Five Continents.” *International Journal of Research in Marketing* 21, no. 2: 179–200. <https://doi.org/10.1016/j.ijre-smar.2003.07.001>.
- Carney, M., M. Van Essen, E. R. Gedajlovic, and P. P. M. A. R. Heugens. 2015. “What do we Know About Private Family Firms? A Meta-Analytical Review.” *Entrepreneurship Theory and Practice* 39, no. 3: 513–544. <https://doi.org/10.1111/etap.12054>.
- Chesbrough, H. 2011. *Open Services Innovation: Rethinking Your Business to Grow and Compete in a New Era*. John Wiley & Sons.
- Chrisman, J. J., J. H. Chua, A. De Massis, F. Frattini, and M. Wright. 2015. “The Ability and Willingness Paradox in Family Firm Innovation.” *Journal of Product Innovation Management* 32, no. 3: 310–318. <https://doi.org/10.1111/jpim.12207>.
- Cohen, J. 1988. *Statistical Power Analysis for the Behavioral Sciences*. 2nd ed. Lawrence Erlbaum Associates.
- Correia, R. J., J. G. Dias, and M. S. Teixeira. 2021. “Dynamic Capabilities and Competitive Advantages as Mediator Variables Between Market Orientation and Business Performance.” *Journal of Strategy and Management* 14, no. 2: 187–206. <https://doi.org/10.1108/JSMA-12-2019-0223>.
- Czakon, W., P. Klimas, A. Kawa, and S. Kraus. 2023. “How Myopic Are Managers? Development and Validation of a Multidimensional Strategic Myopia Scale.” *Journal of Business Research* 157: 113573. <https://doi.org/10.1016/j.jbusres.2022.113573>.
- Davcik, N. S., and P. Sharma. 2016. “Marketing Resources, Performance, and Competitive Advantage: A Review and Future Research Directions.” *Journal of Business Research* 69, no. 12: 5547–5552. <https://doi.org/10.1016/j.jbusres.2016.04.169>.
- Dawson, J. F. 2014. “Moderation in Management Research: What, Why, When, and How.” *Journal of Business and Psychology* 29, no. 1: 1–19. <https://doi.org/10.1007/s10869-013-9308-7>.
- De Massis, A., A. Di Minin, and F. Frattini. 2015. “Family-Driven Innovation: Resolving the Paradox in Family Firms.” *California Management Review* 58, no. 1: 5–19. <https://doi.org/10.1525/cmr.2015.58.1.5>.
- De Massis, A., F. Frattini, A. Majocchi, and L. Piscitello. 2018. “Family Firms in the Global Economy: Toward a Deeper Understanding of Internationalization Determinants, Processes, and Outcomes.” *Global Strategy Journal* 8, no. 1: 3–21. <https://doi.org/10.1002/gsj.1199>.
- De Massis, A., J. Kotlar, J. H. Chua, and J. J. Chrisman. 2014. “Ability and Willingness as Sufficiency Conditions for Family-Oriented Particularistic Behavior: Implications for Theory and Empirical Studies.” *Journal of Small Business Management* 52, no. 2: 344–364. <https://doi.org/10.1111/jsbm.12102>.
- Dibrell, C., J. B. Craig, and D. O. Neubaum. 2014. “Linking the Formal Strategic Planning Process, Planning Flexibility, and Innovativeness to Firm Performance.” *Journal of Business Research* 67, no. 9: 2000–2007. <https://doi.org/10.1016/j.jbusres.2013.10.011>.
- Dirksmeyer, W., H. Garming, S. Ludwig-Ohm, and A. Muder. 2022. *Structural Change and Competitiveness of the German Horticultural Sector*. Johann Heinrich von Thünen Institute.
- Doloreux, D., A. Frigon, and E. Turkina. 2025. “What Types of Knowledge-Intensive Business Services Use Services as a Source of Innovation?” *Canadian Journal of Administrative Sciences* 42, no. 4: 533–544. <https://doi.org/10.1002/cjas.70009>.
- Duran, P., N. Kammerlander, M. van Essen, and T. Zellweger. 2016. “Doing More With Less: Innovation Input and Output in Family Firms.” *Academy of Management Journal* 59, no. 4: 1224–1264. <https://doi.org/10.5465/amj.2014.0424>.
- Eckardt, R., and B. C. Skaggs. 2018. “Service Diversification and Growth of Professional Service Firms.” *Long Range Planning* 51, no. 1: 111–126. <https://doi.org/10.1016/j.lrp.2017.06.003>.
- Engelke, C. 2017. “Analysing the Service Portfolio on SME. A Cluster Analysis Approach by Way of Example in the Heterogenous German Horticulture.” *International Journal of Mechanical Engineering* 7, no. 1: 45–72.
- Evans, A. N., and B. J. Rooney. 2013. *Methods in Psychological Research*. SAGE Publications. Los Angles.
- Family Firm Institute. 2017. *Global Data Points*. Family Firm Institute. <http://www.ffi.org/page/globaldatapoints>.
- Faul, F., E. Erdfelder, A. Buchner, and A.-G. Lang. 2009. “Statistical Power Analyses Using G*Power 3.1: Tests for Correlation and Regression Analyses.” *Behavior Research Methods* 41, no. 4: 1149–1160. <https://doi.org/10.3758/BRM.41.4.1149>.
- Favoretto, C., G. H. S. Mendes, M. G. Oliveira, P. A. Cauchick-Miguel, and W. Coreynen. 2022. “From Servitization to Digital Servitization: How Digitalization Transforms Companies’ Transition Towards Services.” *Industrial Marketing Management* 102: 104–121. <https://doi.org/10.1016/j.indmarman.2022.01.003>.
- Field, A. 2017. *Discovering Statistics Using IBM SPSS Statistics*. SAGE Publications Ltd.
- Filatotchev, I., Z. Su, and G. D. Bruton. 2017. “Market Orientation, Growth Strategy, and Firm Performance: The Moderating Effects of External Connections.” *Management and Organization Review* 13, no. 3: 575–601. <https://doi.org/10.1017/mor.2016.31>.
- Fornell, C., and D. F. Larcker. 1981. “Evaluating Structural Equation Models With Unobservable Variables and Measurement Error.” *Journal of Marketing Research* 18, no. 1: 39–50. <https://doi.org/10.2307/3151312>.
- Gabriel, A., and V. Bitsch. 2019. “Impacts of Succession in Family Business: A Systemic Approach for Understanding Dynamic Effects in Horticultural Retail Companies in Germany.” *Journal of Small Business and Enterprise Development* 26, no. 3: 304–324. <https://doi.org/10.1108/JSBED-01-2018-0030>.
- Gebauer, H., A. Gustafsson, and L. Witell. 2011. “Competitive Advantage Through Service Differentiation by Manufacturing Companies.” *Journal of Business Research* 64, no. 12: 1270–1280. <https://doi.org/10.1016/j.jbusres.2011.01.015>.
- Gómez-Mejía, L. R., K. T. Haynes, M. Núñez-Nickel, K. J. L. Jacobson, and J. Moyano-Fuentes. 2007. “Socioemotional Wealth and Business Risks in Family-Controlled Firms: Evidence From Spanish Olive Oil Mills.” *Administrative Science Quarterly* 52, no. 1: 106–137. <https://doi.org/10.2189/asqu.52.1.106>.
- Gotteland, D., J. Shock, and S. Sarin. 2020. “Strategic Orientations, Marketing Proactivity and Firm Market Performance.” *Industrial Marketing Management* 91: 610–620. <https://doi.org/10.1016/j.indmarman.2020.03.012>.
- Gronum, S., J. Steen, and M.-L. Verreyne. 2016. “Business Model Design and Innovation: Unlocking the Performance Benefits of Innovation.” *Australian Journal of Management* 41, no. 3: 585–605. <https://doi.org/10.1177/0312896215587315>.
- Guedes, M. J., P. C. Patel, C. Kowalkowski, and P. Oghazi. 2022. “Family Business, Servitization, and Performance: Evidence From Portugal.”

- Technological Forecasting and Social Change* 185: 122053. <https://doi.org/10.1016/j.techfore.2022.122053>.
- Guenther, P., M. Guenther, C. M. Ringle, G. Zaefarian, and S. Cartwright. 2023. "Improving PLS-SEM Use for Business Marketing Research." *Industrial Marketing Management* 111: 127–142. <https://doi.org/10.1016/j.indmarman.2023.03.010>.
- Hair, J. F. Jr, M. Sarstedt, L. Hopkins, and V. G. Kuppelwieser. 2014. "Partial Least Squares Structural Equation Modeling (PLS-SEM): An Emerging Tool in Business Research." *European Business Review* 26, no. 2: 106–121. <https://doi.org/10.1108/EBR-10-2013-0128>.
- Haq, M., M. Johanson, J. Davies, L.-P. Dana, and T. Budhathoki. 2021. "Compassionate Customer Service in Ethnic Minority Micro-businesses." *Journal of Business Research* 126: 279–290. <https://doi.org/10.1016/j.jbusres.2020.12.05>.
- Haq, M., M. Johanson, J. Davies, W. Ng, and L.-P. Dana. 2024a. "Bourdieuian and Resource-Based Perspectives on Ethnic Minority Microbusinesses: The Construction of a Culture-Induced Entrepreneurship Model." *Journal of Small Business Management* 62, no. 4: 1982–2015. <https://doi.org/10.1080/00472778.2023.2192760>.
- Haq, M., M. Johanson, J. Davies, W. Ng, and L. P. Dana. 2024b. "Human Capital Resources Creation and Utilization in Ethnic Minority Micro-businesses: The Construction of a Culture-Induced Entrepreneurship Model." *Journal of the International Council for Small Business* 5, no. 2: 106–116. <https://doi.org/10.1080/26437015.2023.2201692>.
- Harman, D. 1967. "A Single Factor Test of Common Method Variance." *Journal of Psychology* 35, no. 1967: 359–378.
- Hauser, A., F. Eggers, and S. Guldenberg. 2020. "Strategic Decision-Making in SMEs: Effectuation, Causation, and the Absence of Strategy." *Small Business Economics* 54, no. 3: 775–790. <https://doi.org/10.1007/s11187-019-00152-x>.
- Hennart, J.-F., A. Majocchi, and E. Forlani. 2019. "The Myth of the Stay-At-Home Family Firm: How Family-Managed SMEs Can Overcome Their Internationalization Limitations." *Journal of International Business Studies* 50, no. 5: 758–782. <https://doi.org/10.1057/s41267-017-0091-y>.
- IT-Dienstleistungen. 2017. "Landesbetrieb IT.NRW Statistik Und Landwirtschaft: Immer Weniger Betriebe Bewirtschaften Immer Größere Flächen." *Westfalen Heute*. <https://www.westfalen-heute.de/landwirtschaft-immer-weniger-betriebe-bewirtschaften-immer-groessere-flaechen/>.
- Kajalo, S., and A. Lindblom. 2015. "Market Orientation, Entrepreneurial Orientation and Business Performance Among Small Retailers." *International Journal of Retail & Distribution Management* 43, no. 7: 580–596. <https://doi.org/10.1108/IJRDM-04-2014-0044>.
- Kallmuenzer, A., A. Strobl, and M. Peters. 2018. "Tweaking the Entrepreneurial Orientation-Performance Relationship in Family Firms: The Effect of Control Mechanisms and Family-Related Goals." *Review of Managerial Science* 12, no. 4: 855–883. <https://doi.org/10.1007/s11846-017-0231-6>.
- Kamp, B., and G. Parry. 2017. "Servitization and Advanced Business Services as Levers for Competitiveness." *Industrial Marketing Management* 60: 11–16. <https://doi.org/10.1016/j.indmarman.2016.12.008>.
- Kellermanns, F. W., K. A. Eddleston, R. Sarathy, and F. Murphy. 2012. "Innovativeness in Family Firms: A Family Influence Perspective." *Small Business Economics* 38, no. 1: 85–101. <https://doi.org/10.1007/s11187-010-9268-5>.
- Kindström, D., C. Kowalkowski, and E. Sandberg. 2013. "Enabling Service Innovation: A Dynamic Capabilities Approach." *Journal of Business Research* 66, no. 8: 1063–1073. <https://doi.org/10.1016/j.jbusres.2012.03.003>.
- Kinias, I., S. Chalis, and L. Glyptis. 2023. "Family Business Research: A Systematic Review and an Uncelebrated Role of Marketing." *Journal of Business Research* 162: 113894. <https://doi.org/10.1016/j.jbusres.2023.113894>.
- Kohli, A. K., and B. J. Jaworski. 1990. "Market Orientation: The Construct, Research Propositions, and Managerial Implications." *Journal of Marketing* 54, no. 2: 1–18. <https://doi.org/10.1177/002224299005400201>.
- Kowalkowski, C., H. Gebauer, and R. Oliva. 2017. "Service Growth in Product Firms: Past, Present, and Future." *Industrial Marketing Management* 60: 82–88. <https://doi.org/10.1016/j.indmarman.2016.10.015>.
- Kudrats, J., W. C. McDowell, and R. V. Mahto. 2019. "Unrelated but Together: Trust and Intergroup Relations in Multi-Family Businesses." *Journal of Business Research* 101: 750–756. <https://doi.org/10.1016/j.jbusres.2018.12.073>.
- Kumar, S., A. W. Wani, R. Kaushik, et al. 2024. "Navigating the Landscape of Precision Horticulture: Sustainable Agriculture in the Digital Age." *Scientia Horticulturae* 338: 113688. <https://doi.org/10.1016/j.scienta.2024.113688>.
- Lam, L. W. 2012. "Impact of Competitiveness on Salespeople's Commitment and Performance." *Journal of Business Research* 65, no. 9: 1328–1334. <https://doi.org/10.1016/j.jbusres.2011.10.026>.
- Le Breton-Miller, I., and D. Miller. 2013. "Socioemotional Wealth Across the Family Firm Life Cycle: A Commentary on 'Family Business Survival and the Role of Boards'." *Entrepreneurship Theory and Practice* 37, no. 6: 1391–1397. <https://doi.org/10.1111/etap.12072>.
- Liao, S.-H., W.-J. Chang, C.-C. Wu, and J. M. Katrichis. 2011. "A Survey of Market Orientation Research (1995–2008)." *Industrial Marketing Management* 40, no. 2: 301–310. <https://doi.org/10.1016/j.indmarman.2010.09.003>.
- Lu, L., W. Pan, H. Wang, S. Yang, Z. Liu, and Q. Li. 2024. "The Effect of Servitising Level on Firm Performance of Listed Chinese Sporting Goods Manufacturing Companies—With Moderated Mediation Effect." *PLoS One* 19, no. 2: e0297226. <https://doi.org/10.1371/journal.pone.0297226>.
- Lubinski, C. 2011. "Path Dependency and Governance in German Family Firms." *Business History Review* 85, no. 4: 699–724. <https://doi.org/10.1017/s0007680511001164>.
- Malhotra, N. K., and S. Dash. 2011. *Marketing Research: An Applied Orientation*. Pearson.
- Marsh, H. W., J. Guo, T. Dicke, P. D. Parker, and R. G. Craven. 2020. "Confirmatory Factor Analysis (CFA), Exploratory Structural Equation Modeling (ESEM), and Set-ESEM: Optimal Balance Between Goodness of Fit and Parsimony." *Multivariate Behavioral Research* 55, no. 1: 102–119. <https://doi.org/10.1080/00273171.2019.1602503>.
- Martín-Santana, J. D., M. K. Cabrera-Suárez, and M. de la C. Déniz-Déniz. 2020. "Familiness, Social Capital and Market Orientation in the Family Firm." *European Journal of Marketing* 54, no. 7: 1731–1760. <https://doi.org/10.1108/EJM-04-2018-0274>.
- Miller, D., and I. Le Breton-Miller. 2005. *Managing for the Long Run. Lessons in Competitive Advantage from Great Family Businesses*. Harvard Business Review Press.
- Miller, D., and I. Le Breton-Miller. 2014. "Deconstructing Socioemotional Wealth." *Entrepreneurship Theory and Practice* 38, no. 4: 713–720. <https://doi.org/10.1111/etap.12111>.
- Miller, D., I. Le Breton-Miller, and B. Scholnick. 2008. "Stewardship vs. Stagnation: An Empirical Comparison of Small Family and Non-Family Businesses." *Journal of Management Studies* 45, no. 1: 51–78. <https://doi.org/10.1111/j.1467-6486.2007.00718.x>.
- Mina, A., E. Bascavusoglu-Moreau, and A. Hughes. 2014. "Open Service Innovation and the Firm's Search for External Knowledge." *Research Policy* 43, no. 5: 853–866. <https://doi.org/10.1016/j.respol.2013.07.004>.
- Monferrer, D., A. Blesa, and M. Ripollés. 2015. "Born Globals Trough Knowledge-Based Dynamic Capabilities and Network Market

- Orientation." *BRQ Business Research Quarterly* 18, no. 1: 18–36. <https://doi.org/10.1016/j.brq.2014.04.001>.
- Myrthianos, V., F. Vendrell-Herrero, G. Parry, and O. F. Bustinza. 2014. "Firm Profitability During the Servitization Process in the Music Industry." *Strategic Change* 23, no. 5–6: 317–328. <https://doi.org/10.1002/jsc.1979>.
- Najafi-Tavani, S., H. Sharifi, and Z. Najafi-Tavani. 2016. "Market Orientation, Marketing Capability, and New Product Performance: The Moderating Role of Absorptive Capacity." *Journal of Business Research* 69, no. 11: 5059–5064. <https://doi.org/10.1016/j.jbusres.2016.04.080>.
- Namazi, M., and N.-R. Namazi. 2016. "Conceptual Analysis of Moderator and Mediator Variables in Business Research." *Procedia Economics and Finance* 36: 540–554. [https://doi.org/10.1016/S2212-5671\(16\)30064-8](https://doi.org/10.1016/S2212-5671(16)30064-8).
- Narver, J. C., and S. F. Slater. 1990. "The Effect of a Market Orientation on Business Profitability." *Journal of Marketing* 54, no. 4: 20–35. <https://doi.org/10.1177/002224299005400403>.
- Neneh, B. N., and D. H. B. Welsh. 2025. "What Influences Family Satisfaction?" *Canadian Journal of Administrative Sciences* 42, no. 3: 440–458. <https://doi.org/10.1002/cjas.1780>.
- Ng, W., and K. Keasey. 2010. "Growing Beyond Smallness: How do Small, Closely Controlled Firms Survive?" *International Small Business Journal* 28, no. 6: 620–630. <https://doi.org/10.1177/0266242610369879>.
- Pham, T. T., R. Bell, and D. Newton. 2019. "The Father's Role in Supporting the Son's Business Knowledge Development Process in Vietnamese Family Businesses." *Journal of Entrepreneurship in Emerging Economies* 11, no. 2: 258–276. <https://doi.org/10.1108/JEEE-01-2018-0006>.
- Podsakoff, P. M., S. B. MacKenzie, J.-Y. Lee, and N. P. Podsakoff. 2003. "Common Method Biases in Behavioral Research: A Critical Review of the Literature and Recommended Remedies." *Journal of Applied Psychology* 88, no. 5: 879–903. <https://doi.org/10.1037/0021-9010.88.5.879>.
- Qiu, T. 2008. "Scanning for Competitive Intelligence: A Managerial Perspective." *European Journal of Marketing* 42, no. 7–8: 814–835. <https://doi.org/10.1108/03090560810877178>.
- Raddats, C., C. Kowalkowski, O. Benedettini, J. Burton, and H. Gebauer. 2019. "Servitization: A Contemporary Thematic Review of Four Major Research Streams." *Industrial Marketing Management* 83: 207–223. <https://doi.org/10.1016/j.indmarman.2019.03.015>.
- Reuber, A. R., and E. Fischer. 2011. "Marketing (In) the Family Firm." *Family Business Review* 24, no. 3: 193–196. <https://doi.org/10.1177/0894486511409979>.
- Rigtering, J. P. C., S. Kraus, F. Eggers, and S. H. Jensen. 2014. "A Comparative Analysis of the Entrepreneurial Orientation/Growth Relationship in Service Firms and Manufacturing Firms." *Service Industries Journal* 34, no. 4: 275–294. <https://doi.org/10.1080/02642069.2013.778978>.
- Rondi, E., A. De Massis, and S. Kraus. 2021. "Servitization Through Open Service Innovation in Family Firms: Exploring the Ability-Willingness Paradox." *Journal of Business Research* 135: 436–444. <https://doi.org/10.1016/j.jbusres.2021.06.040>.
- Roscher, F. 2015. "What Makes Germany's Mittelstand Special." *Handelsblatt Today*.
- Ruiz-Alba, J. L., A. Soares, M. A. Rodríguez-Molina, and D. M. Frias-Jamilena. 2018. "Servitization Strategies From Customers' Perspective: The Moderating Role of Co-Creation." *Journal of Business & Industrial Marketing* 34, no. 3: 628–642. <https://doi.org/10.1108/JBIM-02-2017-0028>.
- Schachter, H. L. 2010. "Objective and Subjective Performance Measures: A Note on Terminology." *Administration & Society* 42, no. 5: 550–567. <https://doi.org/10.1177/0095399710378080>.
- Sirmon, D. G., and M. A. Hitt. 2003. "Managing Resources: Linking Unique Resources, Management, and Wealth Creation in Family Firms." *Entrepreneurship Theory and Practice* 27, no. 4: 339–358. <https://doi.org/10.1111/1540-8520.t01-1-00013>.
- Statistisches Bundesamt. 2025. *Small and medium-sized Enterprises (SME)*. Statistisches Bundesamt. <https://www.destatis.de/EN/Themes/Economic-Sectors-Enterprises/Enterprises/Small-Sized-Enterprises-Medium-Sized-Enterprises/ExplanatorySME.html>.
- Story, V. M., C. Raddats, J. Burton, J. Zolkiewski, and T. Baines. 2017. "Capabilities for Advanced Services: A Multi-Actor Perspective." *Industrial Marketing Management* 60: 54–68. <https://doi.org/10.1016/j.indmarman.2016.04.015>.
- Suddaby, R., W. Ng, N. Vershinina, G. Markman, and M. Cadbury. 2023. "Sacralization and the Intergenerational Transmission of Values in Cadbury." *Family Business Review* 36, no. 3: 296–314. <https://doi.org/10.1177/08944865231188788>.
- Tabachnick, B. G., and L. S. Fidell. 2018. *Using Multivariate Statistics*. Pearson.
- Tarashkar, M., A. Rahimi, and S. Qureshi. 2025. "AI-driven Insights into Urban Agriculture: Using Youtube Data to Promote Social Resilience and Self-Sufficiency." *Sustainable Cities and Society* 123: 106275. <https://doi.org/10.1016/j.scs.2025.106275>.
- Thietart, R.-A. 2007. *Doing Management Research: A Comprehensive Guide*. SAGE.
- Ulaga, W., and W. J. Reinartz. 2011. "Hybrid Offerings: How Manufacturing Firms Combine Goods and Services Successfully." *Journal of Marketing* 75, no. 6: 5–23. <https://doi.org/10.1509/jm.09.0395>.
- Valtakoski, A., and L. Witell. 2018. "Service Capabilities and Servitized SME Performance: Contingency on Firm Age." *International Journal of Operations & Production Management* 38, no. 4: 1144–1164. <https://doi.org/10.1108/IJOPM-06-2016-0328>.
- Vargo, S. L., and R. F. Lusch. 2008. "Service-Dominant Logic: Continuing the Evolution." *Journal of the Academy of Marketing Science* 36, no. 1: 1–10. <https://doi.org/10.1007/s11747-007-0069-6>.
- Vendrell-Herrero, F., G. Parry, O. F. Bustinza, and N. O'Regan. 2014. "Servitization as a Driver for Organizational Change." *Strategic Change* 23, no. 5–6: 279–285. <https://doi.org/10.1002/jsc.1976>.
- Vidickienė, D., V. Simonaitytė, R. Lankauskienė, and Ž. Gedminaitė-Raudonė. 2023. "Servitization of Farming: A New Approach to Local Food Systems Building." *European Countryside* 15, no. 1: 1–17. <https://doi.org/10.2478/euco-2023-0001>.
- Wang, Q., X. Zhao, and C. Voss. 2016. "Customer Orientation and Innovation: A Comparative Study of Manufacturing and Service Firms." *International Journal of Production Economics* 171: 221–230. <https://doi.org/10.1016/j.ijpe.2015.08.029>.
- Wang, W., and M. J. Guedes. 2024. "Timing and Experience in Global Markets: Unraveling the Impact of Servitization on New Manufacturing Venture Survival." *International Entrepreneurship and Management Journal* 21, no. 1: 21. <https://doi.org/10.1007/s11365-024-01034-9>.
- Wang, W., K.-H. Lai, and Y. Shou. 2018. "The Impact of Servitization on Firm Performance: A Meta-Analysis." *International Journal of Operations & Production Management* 38, no. 7: 1562–1588. <https://doi.org/10.1108/IJOPM-04-2017-0204>.
- Wassmus, A. 2014. *Serviceorientierung als Erfolgsfaktor und Komplexitätstreiber Beim Angebot Hybrider Produkte*. Springer.
- Watson, R. 2015. "Quantitative Research." *Nursing Standard: 1987* 29, no. 31: 44–48. <https://doi.org/10.7748/ns.29.31.44.e8681>.
- Welsh, D. H. B., and E. Kaciak. 2019. "Family Enrichment and Women Entrepreneurial Success: The Mediating Effect of Family Interference." *International Entrepreneurship and Management Journal* 15, no. 4: 1045–1075. <https://doi.org/10.1007/s11365-019-00587-4>.

Wirtz, J., and C. Kowalkowski. 2022. "Putting the 'Service' into B2B Marketing: Key Developments in Service Research and Their Relevance for B2B." *Journal of Business & Industrial Marketing* 38, no. 2: 272–289. <https://doi.org/10.1108/JBIM-02-2022-0085>.

Wortman, M. S. 1994. "Theoretical Foundations for Family-Owned Business: A Conceptual and Research-Based Paradigm." *Family Business Review* 7, no. 1: 3–27. <https://doi.org/10.1111/j.1741-6248.1994.00003.x>.

Xing, Y., Y. Liu, and P. Davies. 2023. "Servitization Innovation: A Systematic Review, Integrative Framework, and Future Research Directions." *Technovation* 122: 102641. <https://doi.org/10.1016/j.technovation.2022.102641>.

Zehnder, E., and J. O. Schwarz. 2025. "The Interplay of Future Making and Foresight: Insights From a Family Business Case Study." *Futures* 170: 103608. <https://doi.org/10.1016/j.futures.2025.103608>.

Zellweger, T. M., R. S. Nason, and M. Nordqvist. 2012. "From Longevity of Firms to Transgenerational Entrepreneurship of Families: Introducing Family Entrepreneurial Orientation." *Family Business Review* 25, no. 2: 136–155. <https://doi.org/10.1177/0894486511423531>.

Zhang, R., X. Niu, and B. Zhang. 2024. "Workplace Ostracism and Turnover Intention: A Moderated Mediation Model of Job Insecurity and Coaching Leadership." *Canadian Journal of Administrative Sciences* 41, no. 1: 109–122. <https://doi.org/10.1002/cjas.1731>.