



CEO passion, digitalization, and family firm performance: A socio-emotional wealth perspective

Qiang Wu^a, Muhammad Sualeh Khattak^{a,b}, Muhammad Anwar^{c,d}, Imad Bani Hani^{c,*}, Omar Hujran^{c,e}

^a School of Accounting and Finance, The Hong Kong Polytechnic University, Hong Kong Special Administrative Region

^b Division of Business and Hospitality Management, College of Professional and Continuing Education, The Hong Kong Polytechnic University, Hong Kong Special Administrative Region

^c Department of Statistics and Business Analytics, United Arab Emirates University (UAEU), United Arab Emirates

^d Department of Controlling, University of Kassel, Germany

^e Human Capital Research Center, United Arab Emirates University, Al Ain 15551, United Arab Emirates

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ABSTRACT

Family business leaders often grapple with paradoxical tensions between digitalizing their companies and preserving their social-emotional wealth (SEW). This study focuses on the influence of chief executive officers' (CEOs) passion for inventing (PFI) on the performance of family firms. It further examines how digitalization capacity mediates this relationship and how the commitment to preserving SEW may moderate it. For methodological rigor, we employed a dual data approach, using primary and secondary data from 100 family firms. We found no significant direct effect of CEOs' PFI on the performance of family firms. However, this impact is indirect, primarily affecting digitalization capacity. Additionally, a strong commitment to preserving SEW can shift the influence of CEOs' passion on digitalization capacity from positive to negative. Our findings suggest that family firms should not exclusively focus on non-economic goals because this could hinder CEOs' efforts toward digitalization. Instead, family CEOs should create a balance between the preservation of SEW and digitalization capacity, which contributes to increased performance. This study adds to the knowledge of upper echelons theory and SEW theory by examining the nuances of the interactions between CEOs' PFI, digitalization capacity, and performance in family business.

1. Introduction

Top managers of business firms are confronted with various challenges and must select strategies for ensuring their performance and survival in the markets (Annosi et al., 2025; Capolupo et al., 2024). One of the main strategies for enhancing a company's performance and competitive position is digitalization capacity (Anwar et al., 2022a; Yang & Yee, 2022). This tension is even higher in family businesses due to their idiosyncratic characteristics (Capolupo et al., 2024). Literature shows that family business leaders need passion to adapt to digitalization, which could save them in the long run. Entrepreneurial passion is defined as "an entrepreneur's intense behavioral manifestations of high personal value" (Chen et al., 2009, p. 199). Cardon et al. (2013) later proposed three dimensions of entrepreneurial passion: passion for

inventing, passion for founding, and passion for developing. This study emphasizes the entrepreneurial passion for inventing (PFI), which focuses on digitalization capacity (e.g., scanning the environment to invent new products, services, and prototypes and exploiting new opportunities; (Chen et al., 2009).

Numerous scholars have shown that CEOs' passion influences firm-level outcomes such as new product development (Ahsan et al., 2023) and firm performance (Adomako & Ahsan, 2022; Ma et al., 2017) in non-family firms and utilized single-source data. However, this phenomenon has not been studied in the family firms of Asian emerging economies following a dual data approach. Additionally, Vanhees et al. (2023) called for scholars to explain the link between CEOs' passion and firm-level outcomes within family-owned firms. In response, the present research extends these scholarly works by scrutinizing the role of CEOs'

* Corresponding author. Department of Statistics and Business Analytics, United Arab Emirates University (UAEU), United Arab Emirates

E-mail addresses: qiang.wu@polyu.edu.hk (Q. Wu), Sualeh_ktk@yahoo.com (M.S. Khattak), m.anwar.ims@gmail.com (M. Anwar), ibanihani@uaeu.ac.ae (I.B. Hani), o.hujran@uaeu.ac.ae (O. Hujran).

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PFI and firm performance using mixed data (survey and annual report data) from family firms. Based on our extensive review regarding both family and non-family firms, we concluded that studies have neglected the intervening role of digitalization capacity between PFI and family firm performance.

There are several mechanisms through which CEO PFI might mediate between an organization's digitalization capacity and family firm performance. First, to digitalize the existing business models, organizations need leaders who have strong motivation to implement digital practices (Kohli & Johnson, 2011; Wrede et al., 2020). Second, CEOs with a PFI enjoy novel ideas, developing new products, digital solutions, and exploring new business opportunities (Cardon et al., 2017). In the context of family business, the literature has produced ambivalent results. For instance, family business leaders plan for succession, aim for a good reputation, and tend to stay on longer (Ciravegna et al., 2020; King & Peng, 2013). Due to their long-term orientation and intragenerational goals, family business leaders have a passion for exploring new ideas and digitalization in the digital era (Appleton et al., 2025; Capolupo et al., 2025; Rashid & Ratten, 2020). Additionally, because of their risk-taking behavior, family CEOs tend to digitalize their business products and services (Issah & Calabro, 2024b). In the digital era, family ownership's forward-looking attitude is associated with a uniquely high passion for digital transformation (He et al., 2024) and artificial intelligence adoption (Soluk et al., 2025). Risk-averse CEOs with a lack of desire for digitalization are more interested in safer activities (Cobben et al., 2023).

However, family business leaders are confronted with the paradoxical tension between concern for socioemotional wealth (SEW) and digitalization. For example, family businesses are highly concerned with non-economic goals such as family identity, family relationship, bond renewal, and family control (Gomez-Mejia et al., 2007). Family businesses do not solely focus on financial outcomes but also have a strong desire to preserve their non-economic goals (e.g., SEW; (Gomez-Mejia et al., 2011)). These non-economic goals sometimes prevent family CEOs from acting proactively to digitalize or implement strategic change in a dynamic environment (Issah et al., 2023; Schepers et al., 2014). Moreover, this motivation leads them to engage in safer activities rather than being engaged in digital sphere creative, and risk-takers (Appleton et al., 2025). Hence, this paradoxical tension—that is, whether family business leaders have a passion for inventing to digitalize or seek to preserve SEW—is a hot topic in the family business literature. Building on this, family business scholars seek evidence on how family firms' leaders with PFI lead digitalization capacity to improve their performance while preserving SEW (Bornhausen & Wulf, 2023; Lazzarotti et al., 2022; Pan et al., 2023b; Prügl & Spitzley, 2021). These insights do not offer clear policy guidance regarding whether a strong emphasis on preserving SEW positively or negatively influences the impact of CEOs' PFI on digitalization capacity, which could, in turn, enhance family firms' performance. Family business scholars demonstrate that family businesses have a vigorous concern for SEW, which makes them risk-averse and prevents them from embracing digitalization and renewing their strategies (Issah et al., 2023), even if it is profitable (Miller, 2014). These dual insights have motivated us to explore the moderating role of the preservation of SEW between family CEOs' PFI and digitalization capacity. Our research thus extends existing scholarly works by examining the role of passion for inventing in family firm performance and how digitalization capacity mediates the relationship. Moreover, we test how the preservation of SEW moderates the path between passion for inventing and digitalization capacity. To enrich the literature, we address the following research questions:

Q1: Does CEOs' PFI boost the performance of family-owned firms?

Q2: Does digitalization capacity significantly mediate the link between CEOs' PFI and the performance of family-owned firms?

Q3: Does SEW moderate the links between CEOs' PFI and digitalization capacity in family-owned firms?

This research focuses on an emerging economy, Pakistan, which is

located along favorable trade routes and has strong trade and business ties with Europe and Asia. Digitalization among business industries in Pakistan emerged during the COVID-19 pandemic (Ahmad et al., 2024). Top management has since shown a high desire to digitalize their firms. Family businesses are the most popular form of business in Pakistan, with more than 80% of large firms and almost all small businesses owned by families (Kraiczy et al., 2014). Despite the growing role of family firms in Pakistan and the intention of top management teams to digitalize, research has overlooked the importance of family businesses in the strategic decision-making process. Although some studies have attempted to identify the determinants of digitalization and entrepreneurial orientation, the emphasis has been on non-family firms (Nadeem et al., 2024; Shakeel et al., 2020). How family business leaders direct their strategic framework toward digitalization given the tension between the latter and SEW preservation has been neglected.

To fill this critical theoretical and empirical gap, our research offers a theoretically unified contribution by integrating upper echelons theory (UET) with the dynamics of SEW in the context of family-owned firms in an emerging economy. It extends the literature on family business dynamics by integrating a behavioral aspect of CEOs (i.e., PFI) embedded into UET (Hambrick, 2007) and SEW preservation. For instance, UET sheds light on the role of behavioral (e.g., personality, attributes, intentions, etc.) and demographic (e.g., age, experience, education, etc.) factors in the heterogeneous outcomes of organizations (Aljuhmani et al., 2021; Khattak et al., 2023; Khattak et al., 2024; Wang & Chen, 2020; Zaman et al., 2024). In this study, we focused on the behavioral aspect—namely, PFI—and sought to understand how the integration of PFI and the preservation of SEW affect digitalization capacity and performance in family businesses. We aimed to uncover the importance of CEO PFI as a direct (assuming no or low concern for SEW) and a strong focus on SEW (as a moderator) for digitalization capacity and firm performance. In particular, we enrich the literature by integrating this behavioral aspect of CEOs with their preservation of SEW to understand their preference for digitalization, which could enhance their performance. We move beyond a mere juxtaposition of these literatures to articulate a cohesive framework that shows how the behavioral orientation of top executives, specifically CEOs' PFI, is shaped or constrained by SEW concerns. Our findings show that CEO passion, as a direct construct, plays a positive role in digitalization but could impede digitalization capacity when it interacts with the preservation of SEW in family businesses. This enhances explanations of paradoxical tensions toward better strategic decision-making in family enterprises. These insights may help family business leaders understand the importance of CEOs' PFI in digitalization capacity and its impact on performance while preserving SEW. It could help family businesses cope with the paradoxical tension between traditions (e.g., SEW) and digitalization capacity.

2. Theoretical background

2.1. CEOs' passion for inventing

CEO passion is a behavioral factor (e.g., how to inspire) that affects strategic decision-making (Cai et al., 2021; Luu & Nguyen, 2021). In this study, CEO passion is aligned with behavioral aspects (e.g., feeling and inspiration for digitalization) as we examine how CEOs are passionate about digitalization to improve performance.

In the context of business and management, CEOs' passion is divided into three components: PFI, passion for founding, and passion for developing. Each is conceptually different from the others. In this study, we focus on CEOs' PFI, excluding passion for founding and developing because they are more relevant to new ventures (Strese et al., 2018). According to Cardon et al. (2009), PFI demonstrates CEOs' passion for mapping, inventing, and recognizing novel opportunities. PFI concerns developing new goods and services, looking for potential new markets, and exploring new prototypes. PFI is considered an influential

behavioral factor (Kiani, Ali, et al., 2022) that significantly affects firm-level outcomes such as innovation (Strese et al., 2018), innovative performance (Ahsan et al., 2023), technological innovation (Kiani, Ali, et al., 2022), firm performance (Adomako & Ahsan, 2022), and firm success (Mensmann et al. (2018).

2.2. Digitalization capacity

Digitalization capacity refers to an organization's ability or readiness to adopt and implement digital technologies and strategies effectively (Anwar et al., 2022b). It emphasizes the organization's capability to build new products, services, and processes by utilizing digital tools, processes, and resources to enhance its operations, services, and overall performance in the digital age.

2.3. Socio-emotional wealth

SEW is defined as the "non-financial aspects of the firm that meet the family's affective needs, such as identity, the ability to exercise family influence, and the perpetuation of the family dynasty" (Gomez-Mejia et al., 2007, p. 106). Family business scholars have conceptualized five dimensions of SEW into a FIBER framework: family influence or control, family identification, family binding, emotional attachment, and renewal of family bonds. SEW is characterized by non-economic goals and is a unique factor that distinguishes family enterprises from non-family enterprises (Berrone et al., 2012; Razzak et al., 2019). Efforts to preserve SEW significantly affect the decision-making process in family firms, particularly when dealing with uncertainty and transformation (Davila et al., 2023; Liu et al., 2023; Ng et al., 2022). Family businesses with a high preservation of SEW usually hesitate to digitalize or innovate their business for fear of jeopardizing their non-economic goals.

2.4. Upper echelons theory

The conceptual model for this research is grounded in the tenets of UET (Hambrick, 2007) and examines the nuances of the interactions between CEOs' PFI, the preservation of SEW, digitalization capacity, and firm performance. UET primarily focuses on the importance of managerial demographic factors such as age, education, literacy, and tenure and psychological determinants, including personality, emotions, intentions, and behaviors, in organizational outcomes (Hashim et al., 2022; Shah et al., 2021). The role of CEOs in strategic management has been widely recognized under the umbrella of UET (Hambrick, 2007; White & Borgholthaus, 2022). According to UET, CEOs' characteristics strongly influence strategic decisions, especially in family-owned companies (Martino et al., 2020). In family businesses, the CEO is considered one of the most authoritative and dominant actors caring for the firm (LeCounte, 2022). According to UET, behavioral characteristics assist CEOs in pursuing long-term organizational goals and improving their decision-making (Yu et al., 2023; Zulfiqar et al., 2021). Previous works applying UET have explored the role of CEOs' passion in organizational innovation (Cai et al., 2021; Cai et al., 2023), technological innovation (Kiani, Yang, et al., 2022), and growth (Drnovsek et al., 2016) in non-family businesses. While previous studies have contributed to the literature on UET by emphasizing CEO demographics in family firms, the present research integrates a behavioral aspect of CEOs (specifically PFI) with SEW in the context of digitalization capacity. Our study thus adds to the UET literature on family business dynamics.

Our model emphasizes the paradoxical tension between traditions and innovation (Erdogan et al., 2020). On the one hand, family businesses think about succession planning, longevity, and future growth (Gagne et al., 2021), while CEOs' behaviors in family firms are highly related to business change and growth in dynamic environments (Lu et al., 2021). Hence, these family business leaders have a unique passion for ideas and growth in the digital era (Rashid & Ratten, 2020). On the

other hand, a high concern for preserving SEW attenuates CEOs' motivation to innovate or digitalize their business (Gomez-Mejia et al., 2007). Hence, the behaviors of family business leaders (e.g., entrepreneurial passion) hold significant importance in the digital age, demonstrating how CEOs either drive digitalization to enhance their companies' performance or prioritize the preservation of their SEW and, thus, potentially compromise digitalization and performance. Therefore, we contribute to UET by exploring how this tension influences family business leaders with entrepreneurial passion in a digital environment.

2.5. CEOs' passion for inventing and firm performance

CEOs play a crucial role in strategic decision-making, especially in family-owned companies, where family-affiliated CEOs may manage operations differently from non-family CEOs (Zona, 2016) and have an even more significant impact on firm-level outcomes (Cai, 2012). Due to ownership control and managerial power, CEOs in family firms are dominant individuals caring for their firms, with the result being even more effective decision-making (Chu, 2011; Cirillo et al., 2015). Among all these characteristics, PFI is the most important as it drives a firm's innovative performance (Strese et al., 2018). As the top leaders of their firms, family CEOs have a strong influence on firm-level outcomes (Vanhees et al., 2023) and financial performance (Minichilli et al., 2010) because of their unique characteristics (e.g., managerial control, ownership, and passion contagion). Vanhees et al. (2023b) demonstrated that CEOs with entrepreneurial passion contribute to entrepreneurial activities and performance positively in family firms.

Stenholm and Renko (2016) reported that PFI enables CEOs to manage existing resources (through bricolage) more appropriately and solve issues to gain maximum returns. Supporting this, Mensmann et al. (2018) assert that the PFI of female entrepreneurs significantly contributes to firm success. PFI helps CEOs identify and capture new business opportunities and fosters firm performance (Drnovsek et al., 2016). Similarly, Ma et al. (2017) demonstrated that the success of enterprises depends on their leaders' (i.e., CEOs) PFI. Passionate CEOs enable firms to recognize opportunities such as new clients and products and renew firm operations (Türk et al., 2020). Passionate CEOs' behaviors significantly enhance firm growth (Haar et al., 2009; Kiani, Yang, et al., 2022). In a recent study, Maina and Lawrence (2023) found that CEO passion is an essential determinant of firm performance in a continuously volatile environment. According to Momtaz (2021), CEOs' behavioral traits provide good signals about the current operations of their firms, indicating that all business activities are going smoothly, which ultimately improves firm value. Therefore, we propose the following hypothesis:

H1. CEOs' passion for inventing has a significant positive influence on family firm performance.

2.6. The mediating role of digitalization capacity

Prior studies have claimed that CEOs' PFI alone is not sufficient to ensure the success of a firm in the digital era (e.g., Ma et al., 2017). Mediation mechanisms are required to foster firm performance. For example, Ma et al. (2017) showed that CEOs' PFI is indirectly related to firm performance through organizational innovation. If CEOs of business firms try to enhance firm performance, they must focus on different digital strategies and technological activities (Lashitew, 2023; Mithas et al., 2013; Tsou & Chen, 2023).

In today's digital era, digitalization (or digitalization capacity) pays off in the long run in terms of returns and revenues (Abou-Foul et al., 2021; Yang & Yee, 2022). In a dynamic environment, firms can easily gain a competitive edge and achieve higher performance by digitalizing their business operations and processes. Digitalization capacity is thus one of the most essential tools for boosting firm performance and sustaining it in the long run in the current digital environment (Ritter & Pedersen, 2020). Firms with digital capacity are in a better position to

generate more revenue and financial returns by offering innovative products to their customers (Ritter & Pedersen, 2020). In family firms, digitalization initiatives are the most essential tools for fostering firm performance and sustaining it in the long run in a dynamic environment (Issah & Calabro, 2024a). These initiatives help family firms reduce costs and improve the efficiency of business processes via process automation (Argun & Kilic, 2023; Soluk et al., 2021).

However, digitalizing existing business processes and models requires the services of passionate CEOs who pay attention to digitalization practices (Kohli & Johnson, 2011; Wrede et al., 2020). CEOs with a PFI indeed play a crucial role in the adoption of digital technologies and have a strong desire to implement digitalization to achieve long-term outcomes (Drnovsek et al., 2016; Lashitew, 2023). Additionally, inventiveness and overall digitalization activities can be improved when PFI dominates (Elnadi & Gheith, 2023). Whereas traditional CEOs with low PFI cannot easily digitalize their companies' business operations or adopt digital technologies, CEOs with a PFI are more inclined toward digitalization processes (Strese et al., 2018) and more efficient in terms of performance and profitability (Adomako & Ahsan, 2022). Because of their forward-looking behaviors (e.g., intragenerational entrepreneurship, succession planning, longevity, etc.), family business leaders tend to innovate and digitalize their businesses to enhance performance in the competitive context (Issah et al., 2023; Issah & Calabro, 2024a). To digitalize their products and services and improve competitiveness, family CEOs must engage in risk-taking behaviors (Kraczy et al., 2015). In family businesses with low concern for SEW preservation and that are not deeply embedded in cultural traditions, CEOs tend to respond to dynamic capabilities and pursue digitalization to enhance performance (Razzak et al., 2025; Soluk & Kammerlander, 2021). Family businesses compete in diverse markets, and their PFI motivates them to adopt digital technologies to improve revenue (Anwar, 2024; Saura et al., 2023). Moreover, family business leaders' financial investment in their companies compels them to compete in digital markets to survive in turbulent environments and sustain performance over the long term (Lumpkin et al., 2010; Zapata-Cantu et al., 2023). Grounded in their resources, family business leaders have a passion for investing in digitalization strategies to improve their companies' performance in the competitive markets (Ano & Bent, 2022; Porfirio et al., 2024). Consequently, we propose that digitalization capacity might act as an intervening mechanism through which CEOs' PFI influences the performance of family firms. Hence, we hypothesize the following:

H2. Digitalization capacity mediates the relationship between CEOs' PFI and family firm performance

2.7. The moderating role of socio-emotional wealth

According to Xu et al. (2023), family firms consider the preservation of SEW as a prime reference point when making strategic decisions, such as digitalization and research and development activities. Furthermore, Laffranchini et al. (2020) emphasized that the preservation of SEW is more important than purely economic aspirations in family firms. This makes family firms hesitant to take initiatives (Gomez-Mejia et al., 2007).

In the digital era, digitalization has become an imperative for all types of businesses, especially family businesses, given their prominent role in the global economy (Khan et al., 2022). On the one hand, family enterprises tend to be innovative and digitalized; on the other hand, they aim to preserve their SEW. This duality poses a dilemma to family business leaders.

Liu et al. (2023) explain that family businesses are less inclined to invest in digitalization practices because they perceive the risk of losing SEW as higher than their financial goals. Moreover, family business owners are more worried about preserving family control and unwilling to relinquish ownership of their firms in exchange for external finance (Gomez-Mejia et al., 2018). Due to their attentiveness towards

preserving SEW (and their risk-averse nature), family firms may not actively engage in digitalization and innovation activities (Hu & Hughes, 2020). In other words, the emphasis on preserving SEW can limit their innovation capacity (Filser et al., 2018) and restrict their ability to digitalize (Ceipek et al., 2021). According to Kraczy et al. (2015), a strong emphasis on SEW (via family involvement) significantly diminishes the influence of CEOs' capability on new product innovation. Similarly, Schepers et al. (2014) showed that focusing on preserving SEW nullifies the role of entrepreneurial orientation in family firms' performance.

Prior studies point out that *family influence* can impede the mechanism whereby CEOs utilize their passion to attain innovative capability (Vanhees et al., 2021; Vanhees et al., 2023). Family managers are unwilling to take risky decisions (i.e., they are loss averse) and avoid altering their traditional path (De Massis et al., 2013) to protect SEW, especially if they connect their identity to the traditions, history, and identity of the company. A systematic study by Daskalopoulos and Machek (2023) revealed that even when family members are motivated to digitalize their business model, family identity may hinder their motivation because traditions are prioritized and there is resistance to change. Therefore, family identity mitigates family firms' intention to develop new capabilities for successful digital transformation. While *long-term orientation* of family firms fosters digitalization, it poses challenges during digital transformation when firms reconfigure capabilities and manage resources for quick response and to achieve short-term digitalization goals (Daskalopoulos & Machek, 2023). Furthermore, Pan et al. (2023a) reported that companies their long-term orientation means that family CEOs are confronted with dysfunctional conservatism, which hampers their behaviors oriented toward digital transformation. *Family binding* due to a strong attachment to traditions and culture impedes digital transformation, and family business leaders are thus resistant to adopting digital strategies (Ranaldo et al., 2024).

The influence of SEW as a moderating factor in the relationship between Entrepreneurial Orientation (EO) and digital transformation was explored in a recent paper (Lasio et al., 2024). Additionally, the impact of SEW as a moderating mechanism in the nexus between digitalization and performance among European family firms was investigated by Issah and Calabro (2024b). They revealed that SEW attenuates the relationship between digitalization and performance due to its preservation of non-financial goals. Meanwhile, the role of SEW in the link between CEO PFI and digitalization capacity has been overlooked; SEW might act as a crucial moderator and attenuate the positive impact of CEO PFI on digitalization capacity. Therefore, the existing literature indicates that although some dimensions—in particular long-term orientation—could foster digitalization, SEW preservation, as a single construct, could impede family businesses from digitalizing. Therefore, we propose the following hypothesis:

H3. The positive relationship between CEOs' passion for inventing and digitalization capacity is weakened or even negative when firms adhere strongly to SEW preservation.

3. Methodology

We used two approaches, annual reports and a survey, to gather data for our study. First, there are around 556 firms (up to 2023) listed on the website of the Pakistan Stock Exchange, including government-owned, financial, and non-family firms. Some firms have been merged, while some firms have missing information, leaving a final list of 323 family firms in Pakistan with complete data. Our research focuses on an emerging economy, Pakistan, which is strategically located along major trade routes and connects Asia, the Gulf region, and Europe through various business collaborations. Family businesses are highly prevalent in Pakistan and are characterized by strong family structures and deep-rooted dynamics. Many Pakistani family firms have expanded their operations internationally, particularly in China and the Gulf countries,

and therefore share similar characteristics with these regions in terms of business practices. Accordingly, the insights from this research are not limited to the Pakistani context; rather, the implications may be transferable and relevant to family businesses operating in other regions with comparable socio-cultural and governance structures. As in many other countries, governance and strategic decision-making in Pakistani family firms are typically concentrated within the family. In numerous prominent firms, family members occupy key leadership roles, including board-level positions, thereby reinforcing the family's legacy, traditions, and cultural values. This strong emphasis on family involvement often translates into a heightened desire to preserve SEW, which influences companies' market behaviors and operational strategies. Pakistani family businesses tend to prioritize the protection of their family identity, reputation, and continuity—core components of SEW—in both domestic and international markets. Hence, family businesses in Pakistan are not significantly culturally different from those of other countries, overall.

We focused on family firms to understand how SEW preservation moderates the path between CEOs' PFI and digitalization capacity, as well as the mediating role of digitalization capacity between CEOs' PFI and performance. We relied on the definition of family firm provided by Miller et al. (2007), who describe them as firms in which more than one family member holds a board position and major decisions are made by them. Based on this definition and according to previous studies (e.g. Sattar et al., 2020), more than 80% of the businesses are family-owned in Pakistan (323*0.80=258). We received a list of identified family firms from Home - Open Doors for All. Their annual reports contained data related to assets, sales, liabilities, return on assets (ROA), and return on equity, among others, but no information related to SEW or CEOs' intentions.

Second, due to the scarcity of data about CEOs' PFI, SEW, and digitalization capacity in annual reports, we conducted a survey to collect data from CEOs and top management of the family firms. Using multi-source data also helps reduce common method and social desirability bias. In the cover letter, we mentioned that the survey is to be filled out by family CEOs and members (surrogates). We thus asked multiple respondents who hold executive positions in the firms to complete the survey, reducing the likelihood of single-response bias. To align with our study goals, we included only CEOs and managers who had been serving the firms owned by their families. To determine how their PFI affected digitalization capacity—which may affect performance—we sent the survey to more than 250 family firms both online and in hard copy. The data gathering process covered four months, starting in September 2022 and ending in December 2022. A total of 131 responses were received, out of which 100 comprised the final suitable sample, yielding a response rate of 40%. Given the challenges in accessing business owners and CEOs in Pakistan (particularly their general reluctance to participate in surveys or interviews), the sample size can be considered sufficient for the study. Finally, we cross-checked the firms in the survey and annual reports to retain the same sample for both.

The sampled family firms and CEOs are listed in Table 1, which shows that the textile sector had the strongest representation, with 43 firms, accounting for 43% of the total sample. The cement industry placed second, with 11 firms or 11% of the total sample. The chemical and motor vehicle sectors each represented 10% of the sample, whereas other industries such as mineral products, sugar, paper, paperboard, food, and electrical machinery comprised 18% of the total sample. The energy and petroleum sectors each featured four firms, for a relatively low representation. Further, as Table 1 shows, most firms were located in Karachi (44% of the sample), followed by Lahore and Rawalpindi (29% and 5%, respectively). Other cities included Lasbella, Faisalabad, Multan, Kasur, Bannu, Pezu, Kohat, Hattar, Hyderabad, Hub, Bahawalnagar, and Islamabad. (See Fig. 1.)

Table 1
Profile of the firm.

CEOs Particulars	Frequency	Firms Particular	Frequency
<i>CEO age (years)</i>		<i>Firm size (employees)</i>	
31-40	33	Less 250	3
41-50	17	251-500	23
51-60	29	500-750	26
Above 60	21	701-1000	13
<i>Education of the CEO</i>		Above 1000	35
HSSC	28	<i>Firm age (years)</i>	
Bachelor	67	Below 15	4
Master	4	16-30	11
PhD	1	31-45	55
<i>Experience of CEO in years</i>		46-60	16
5 or less	15	60 and above	12
6-10	18	<i>Generation</i>	
11-15	28	First	21
16-20	22	Second	27
21 and above	17	Third	52
<i>Industry</i>		<i>Location</i>	
Textile	43	Karachi	44
Cement	11	Lahore	29
Chemicals	10	Rawalpindi	5
Motor vehicles	10	Other cities*	22
Fuel and energy	4		
Petroleum	4		
Others*	18		
Total	100	Total	100

Note: *Others: Mineral products, sugar, Paper, Paperboard, Food, Electrical Machinery.

Other cities: Lasbella, Faisalabad, Multan, Kasur, Bannu, Pezu, Kohat, Hattar, Hyderabad, Hub, Bahawalnagar, Islamabad.

3.1. Measurement of the variables

We measured the survey variables using five-point Likert scales from “strongly disagree” (1) to “strongly agree” (5). However, we used various proxies for the variables based on the annual report data.

3.1.1. Firm performance

To measure the firms' performance, we utilized the accounting measure ROA, which is the most commonly used measure in family enterprise studies (Afonso Alves et al., 2021; Rutherford et al., 2008). To calculate ROA, we gathered quantitative data on various ratios, such as earnings, interest expenses, non-cash items, taxes, and assets, from the annual reports of each firm. The ROA of each firm was calculated as earnings before interest expenses, non-cash items, and tax payments, divided by assets employed. ROA thus describes “how efficiently a firm is employing its resources to obtain return”. This measure of firm performance was used and validated by previous studies in similar contexts (Farooq et al., 2022; Khan et al., 2023) and is considered the more reliable accounting measure of firm performance for listed firms (Rahman et al., 2023). Because our survey was conducted at a single point in time, we calculated the average firm performance over the previous three years (2020–2022) to align with the other survey measures from the subsequent year.

We used the following formula to calculate ROA:

$$ROA = \left(\frac{\text{Net Income after deducting interest and tax}}{\text{Total assets}} \right)$$

3.1.2. CEOs' passion for inventing

To evaluate the independent variable (CEOs' PFI), we adopted the measure developed by Cardon and Kirk (2015). CEOs' PFI concerns the CEOs' desire to pursue market disruption prospects and inventiveness-related actions, such as the creation of innovative goods. CEOs' PFI focuses on novel ways of doing business, searching for new ideas, and pursuing new opportunities in the external dynamic market (Cardon et al., 2013). To measure CEOs' PFI, we used five items that were employed and validated by Cardon et al. (2013) and Strese et al. (2018). Examples include

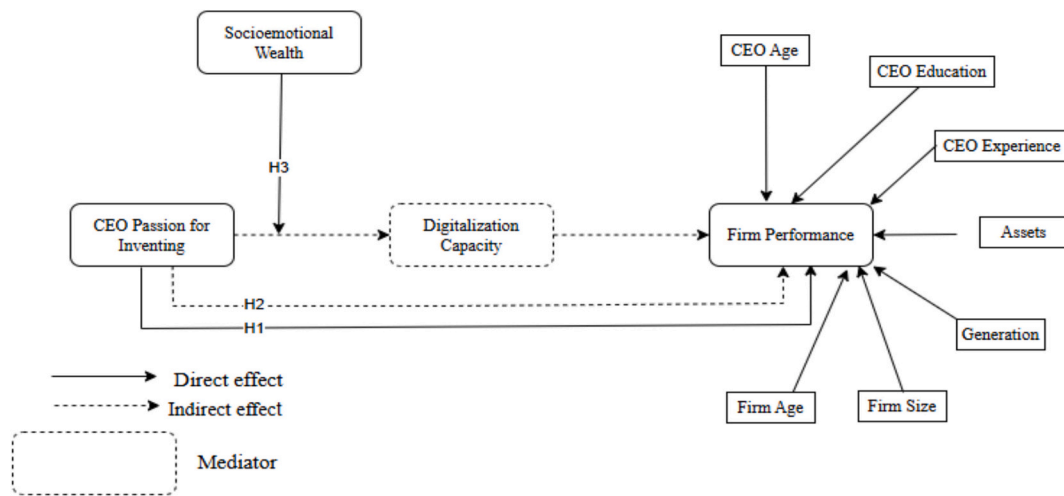


Fig. 1. Conceptual framework.

“It is exciting to figure out new ways to solve unmet market needs that can be commercialized.”

3.1.3. Digitalization capacity

We used digitalization capacity as a mediating mechanism. Digitalization capacity demonstrates firms’ ability or readiness to adopt and implement new digital technologies and strategies underlying services, systems, and networks (Annarelli et al., 2021; Anwar et al., 2022b). In this study, we sought to determine the digitalization capacity of the firms for the previous three years. Researchers have addressed digitalization capacity in various contexts, referring to it as digital capacity (Benitez et al., 2022; Kastelli et al., 2024) that mainly emphasizes firms’ ability to digitalize products, services, and business models. To measure digitalization capacity, we used four items and asked firms to what degree specific areas were digitalized in their firms in terms of products, services, processes, and new business models.

3.1.4. Socio-emotional wealth

To gauge the moderating variable SEW, we used the multidimensional approach adopted by (Berrone et al., 2012). SEW comprises five dimensions, which are collectively labeled as FIBER. To quantify these dimensions, participants were presented with five statements (one statement for each dimension) proposed and validated by Vandekerckhof et al. (2018) with adequate factor loading for all items and reliability of 0.70. These items were pre-tested and validated by several studies with desirable validity and reliability greater than 0.80 (Gerken et al. (2022); Hernández-Linares et al. (2020)). The participants were asked to answer statements related to SEW (see Appendix).

3.2. Control variables

Demographic factors play a significant role in firm outcomes. Similarly, firm-level characteristics, for instance, size and age, are also associated with significant differences in performance and success (Haran et al., 2021; Khattak et al., 2024). Hence, firm-level (e.g., total assets, average sales revenue, generation, and firm size) and managerial-level (i.e., CEO’s experience, education, and age) attributes were controlled for in the conceptual model to curtail the likelihood of spurious results. Firm size was measured by the total number of employees working within the organization (Ur Rahman & Amjad, 2024). Family member generation is known to influence firm success; for instance, first- and second-generation board members play divergent roles in achieving positive returns in family businesses (Badrul Muttakin et al., 2014). According to Villalonga & Amit (2006), the founding generation of a family firm (i.e., the first generation) is more concerned

about the reputation, wealth, longevity, and future growth of the company. Accordingly, we controlled for generations, divided into three groups: first generation, second generation, and third generation (Badrul Muttakin et al., 2014). Further, family businesses led by leaders who have higher qualifications (e.g., a master’s degree) have been shown to generate superior returns due to their specialized business skills and knowledge (DasGupta & Pathak, 2022). Additionally, highly qualified CEOs are more proactive and may manage business operations more effectively for maximum profit generation (Goll et al., 2008). Hence, we controlled for the CEO’s educational background: matric or below, intermediate, bachelor’s degree, master’s degree, and PhD. We also controlled for the business experience of CEOs to limit the likelihood of spurious results. Issah et al. (2023) pointed out that, in contrast to less experienced CEOs, professionally experienced CEOs are more capable of effectively managing their firms’ resources and financing strategies to generate long-term benefits. Therefore, to check the effect of CEO experience, we obtained data on total assets and average sales revenue from the annual reports. The outcomes of the structural model indicate that CEOs’ experience had a significant influence on firm performance, whereas other control variables had an insignificant effect on firm performance.

4. Data analysis and results

4.1. Common method bias

Cross-sectional data is associated with a high chance of common method bias (CMB), which affects the results (Podsakoff et al., 2024). Although we employed two sources of data (survey and annual reports) to reduce the chances of CMB, we further applied Harman’s single factor test in SPSS with all the items of CEOs’ PFI, digital capacity, and SEW. Only three factors received eigenvalues higher than 1, the first of which displayed a variance of 46.43% (thus under 50%, confirming the absence of CMB). However, according to Ketokivi and Schroeder (2004), Harman’s test may not be sufficiently rigorous and decisive to gauge potential CMB. Therefore, we executed the variance inflation factor (VIF) test in SPSS. The VIF values were below the threshold of 3.3 for all the constructs, indicating that CMB was not present in our sample data, as suggested by Kock (2015).

Further, the survey was answered by multiple family members instead of a single member, which mitigated the chance of single-respondent bias. Additionally, we performed an independent t-test to address the possibility of non-response bias, comparing the outcomes of the first and last 40% responses to look for any significant difference. The independent t-test revealed no significant variance in the outcomes

within the two groups, demonstrating the absence of non-response bias.

4.2. Descriptive statistics

Table 2 presents the descriptive statistics for all the constructs. CEO PFI and firm performance received mean scores of 2.986 and 0.632, respectively, and digitalization capacity and SEW had average values of 3.212 and 3.278, respectively.

4.3. Validity and reliability

We ensured the accuracy and validity of the model’s constructs through the algorithm approach in SmartPLS. The results displayed in Table 3 demonstrate that the standardized loadings of all items point to significant variance on their respective construct (0.70 or above; (Hair et al., 2013; Henseler & Schubert, 2020). (See Table 4.)

As concerns convergent validity (see Table 5), the average variance extracted (AVE) met the minimum threshold of 0.50 (Taherdoost, 2016). To assess the discriminant validity, we used HTMT and the radical function of AVE. In our study, the radical function of AVE ($\sqrt{\text{AVE}}$) of the constructs was above 0.70 (Fornell & Larcker, 1981), and HTMT was below 0.90 (Henseler et al., 2016), hereby confirming satisfactory discriminant validity (see Table 5). Furthermore, to evaluate the inner consistency of the factors, we used Cronbach’s alphas and composite reliability (CR) have been executed. The CR (see Table 5) of all constructs was above the cutoff criteria of 0.70 (Nunnally & Bernstein, 1994), and the VIF scores (see Table 5) were lower than the threshold of 3, which confirmed the absence of a multicollinearity issue, as suggested by Thompson et al. (2017).

Lastly, the F-squared value indicates the effect size of predictor constructs on the outcome variables in a model. An f-square score under 0.15 points to a small effect, 0.15–0.30 represents a medium-sized effect, and a score above 0.30 denotes a large effect (Cohen, 1988). Based on the F-squared values, CEOs’ PFI had a medium-sized effect on digitalization capacity (0.157), while SEW had a small effect (0.007) on digitalization capacity. Similarly, PFI had a small effect (0.026) on firm performance, while digitalization capacity showed a smaller effect (0.142) on firm performance. The control variables had smaller effects on digitalization capacity and firm performance.

4.4. Structural model

We used the bootstrapping method with 5,000 resamples in SmartPLS to substantiate the hypotheses of the study. The results presented in Fig. 2 show that CEOs’ PFI did not significantly contribute to firm performance ($\beta = 0.15, p = 0.091$), contradicting H1. In contrast, CEOs’ PFI had a significant influence on digitalization capacity ($\beta = 0.59, p = 0.000$), and digitalization capacity significantly boosted firm performance ($\beta = 0.392, p = 0.008$).

The indirect path from CEOs’ PFI to firm performance through digitalization capacity was significant. While CEOs’ PFI did not directly

Table 2 Descriptive statistics.

Variables	Minimum	Maximum	Mean	S.D
Firm age	1.00	5.00	3.214	0.944
Firm size	1.00	5.00	3.540	1.266
Sales	2.75	8.40	6.702	1.163
Assets	2.02	8.83	5.849	1.116
CEO education	2.00	5.00	2.750	0.538
CEO Experience	1.00	5.00	3.080	1.300
CEO age	2.00	5.00	3.380	1.152
CEO passion for inventing	1.20	4.60	2.986	0.804
SEW	1.20	5.00	3.278	1.014
Digitalization capacity	1.00	5.00	3.212	1.158
ROA	-0.88	5.59	0.632	0.754

Table 3

Cross loading.

Items	CEO’s passion for inventing	Digitalization Capacity	SEW
dc1	0.515	0.931	0.188
dc2	0.465	0.912	0.134
dc3	0.602	0.934	0.181
dc4	0.570	0.930	0.045
pi1	0.773	0.529	0.135
pi2	0.791	0.438	0.162
pi3	0.822	0.449	0.056
pi4	0.719	0.398	0.072
pi5	0.843	0.477	-0.025
sew1	0.143	0.123	0.886
sew2	0.041	0.007	0.780
sew3	0.062	0.181	0.938
sew4	0.096	0.073	0.901
sew5	0.091	0.131	0.929

contribute to firm performance (direct path: $\beta = 0.150, p = 0.091$; indirect path: $\beta = 0.23, p = 0.009$). These results confirm that digitalization capacity played a mediating role between CEOs’ PFI and the performance of family firms. Hence, H2 is accepted.

The results of the interactive term (CEOs’ PFI*SEW) indicate that SEW turned the positive relationship between CEOs’ PFI and digitalization capacity negative ($\beta = -0.181, p < 0.05$). These results support H3, suggesting that high preservation of SEW leads to a negative impact of CEOs’ PFI on firm performance in family businesses.

4.5. Robustness

To verify the mediating role of digitalization capacity between CEO PFI and firm performance, we employed the bootstrapping method in SPSS. Table 5 demonstrates that the results of the bootstrapping method correspond to those obtained by SmartPLS.

5. Discussion

To configure performance in the competitive environment, family firms must focus on innovation, entrepreneurial activities, and digitalization (Capolupo et al., 2023; Karki & Porras, 2021). This entails not only investigating non-economic goals and traditions but also striking a balance between the preservation of SEW and digitalization to spur performance. In this context, we followed a dual data approach (using primary and secondary data) to determine whether CEOs with PFI directly contribute to firm performance or whether they first build and utilize digitalization capacity to pursue better performance. Additionally, considering the heterogeneous findings in the literature, our research will inform family businesses regarding how to reconcile tensions between traditions and digitalization (EO and innovation, etc.).

The results of this study extend the existing literature, clarifying that CEOs’ PFI boosts digitalization capacity, ultimately enhancing the performance of family-owned firms. First, the empirical data we used from family firms revealed that CEOs’ PFI does not directly impact firm performance. In this regard, our findings differ from those of Adomako and Ahsan (2022), who found a significant association between entrepreneurial PFI and SME performance. Likewise, our results are different from those of Ahsan et al. (2023), who concluded that CEOs with a PFI generate more profit and sales revenues. However, our findings are congruent with Sirén et al. (2016), who revealed that a top executive’s passion has no direct linkage with the performance of enterprises. Our findings show that the CEO’s PFI is not a direct predictor of firm performance in family-owned Pakistani firms.

Second, our findings indicate that digitalization capacity has a significant positive association with firm performance. This suggests that it is important for family firms to enhance their digitalization efforts to boost firm performance. This finding is in line with those of Yang and Yee (2022), who observed that digitalization initiatives are beneficial

Table 4
HTMT ratio of discriminate reliability.

Variables	1	2	3	4	5	6	7	8	9	10	11	12
Firm age	-											
Assets	0.226	-										
CEO Age	0.02	0.339	-									
CEO Education	0.047	0.013	0.138	-								
CEO Experience	0.034	0.24	0.527	0.042	-							
CEO passion	0.061	0.254	0.152	0.113	0.114	-						
Digital. capacity	0.074	0.355	0.423	0.057	0.258	0.644	-					
Firm Performance	0.035	0.329	0.396	0.019	0.376	0.462	0.606	-				
Generation	0.035	0.273	0.928	0.158	0.531	0.073	0.315	0.312	-			
Firm size	0.241	0.057	0.17	0.081	0.115	0.109	0.053	0.094	0.182	-		
SEW	0.05	0.073	0.077	0.052	0.098	0.129	0.135	0.016	0.046	0.112	-	
SEW x CEO passion for inventing	0.191	0.101	0.078	0.111	0.026	0.114	0.155	0.022	0.118	0.047	0.089	-
VIF (Firm performance)	-	-	-	-	-	1.295	1.879	-	-	-	-	1.082
VIF (Digital. capacity)	-	-	-	-	-	1.295	-	-	-	-	-	1.087
AVE	-	-	-	-	-	0.625	0.859	-	-	-	-	0.789
√AVE	-	-	-	-	-	0.790	0.926	-	-	-	-	0.888
Cronbach's alpha	-	-	-	-	-	0.849	0.945	-	-	-	-	0.941
Composite reliability	-	-	-	-	-	0.893	0.961	-	-	-	-	0.949

Table 5
Meditation analysis (bootstrapping method).

	β	t	LLCI	ULCI
Total effect of CEO PFI on firm performance	0.322	3.924	0.159	0.486
Direct path of CEO PFI on firm performance	0.173	1.876	-0.010	0.357
Indirect path of CEO PFI on firm performance via digitalization capacity	0.148	-	0.0712	0.2311
Standardized indirect path of CEO PFI on firm performance via digitalization capacity	0.155	-	0.0614	0.3240

Note: "LLCI= Lower-Level Confidence Interval", "ULCI= Lower-Level Confidence Interval", "PFI=Passion for inventing"

for firm success.

Third, our findings illustrate that CEOs' PFI also contributes to firm performance indirectly through digitalization capacity. Our results show that digitalization capacity fully mediates the link between CEO PFI and firm performance. CEOs' PFI develops family firms' digitalization capacity and allows them to achieve superior performance. Hence, H2 was supported, achieving the second research objective by proving that the CEO's PFI indirectly contributes to the firm's performance through digitalization capacity. Digitalization capacity therefore acts as a

significant decoder of CEO PFI toward firm success. Our results partially match those of [Ma et al. \(2017\)](#), who observed that CEO passion indirectly contributes to new venture performance through organizational innovation in a continuously changing environment. Our results are also partially similar to those of [Lee et al. \(2021\)](#), according to whom entrepreneurs with a high PFI indirectly contribute to the performance of new ventures through innovative solutions (e.g., new products and services) in the Korean context. These prior studies and our findings suggest that CEO's PFI enables family firms to digitalize their business processes to achieve superior performance in the long run.

Finally, we found that SEW negatively moderates the link between CEO PFI and digitalization capacity. Accordingly, high preservation of SEW appears to hinder CEOs from engaging in digitalization activities, even if they possess a high PFI. Our results are in line with those of [Schepers et al. \(2014\)](#), who noted that the influence of the EO on the performance of a family enterprise decreases in the presence of high SEW preservation. Moreover, the results also support SEW theory ([Gomez-Mejia et al., 2007](#)), according to which high SEW preservation prevents family firms from taking risks, leading to poor innovativeness and limited investment in research and development.

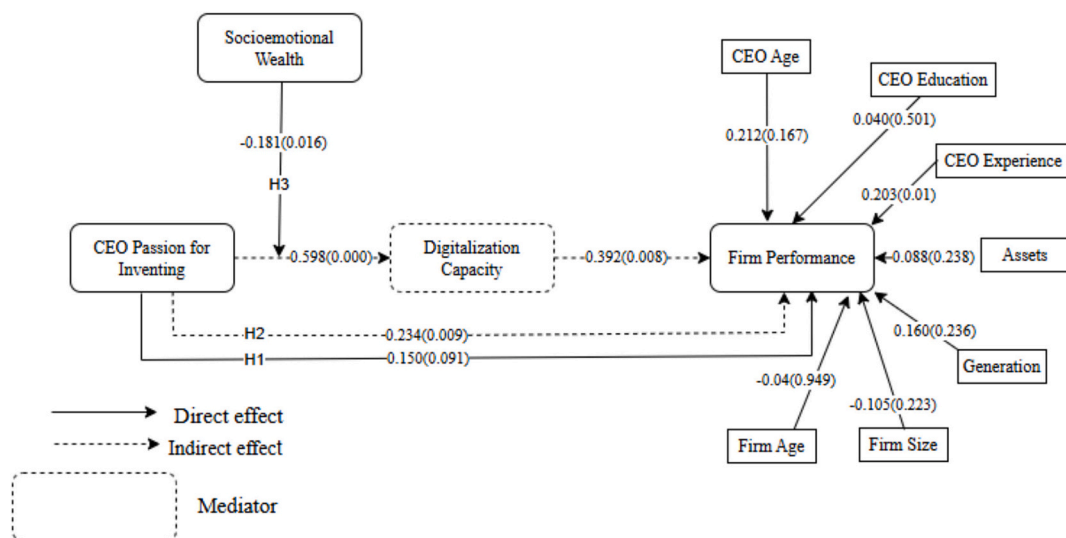


Fig. 2. Structural model.

Note: For direct effect, indirect effect and mediator we used the notation of [Adu et al. \(2023\)](#).

5.1. Theoretical implications

Our research makes a theoretically unified contribution by integrating UET with the dynamics of SEW in the context of family-owned firms. Whereas prior UET scholarship primarily focused on demographic (Heubeck, 2023; Khattak et al., 2023; Zaman et al., 2024) or generic behavioral factors of CEOs (Aljuhmani et al., 2021; Back & Bausch, 2019; Khattak et al., 2024; Wang et al., 2022; Wang & Chen, 2020) in non-family business settings (Ahsan et al., 2023; Strese et al., 2018), our study integrated UET with SEW preservation and applied it to family businesses in an emerging economy.

Crucially, we moved beyond a mere juxtaposition of these literatures to articulate a cohesive framework that shows how the behavioral orientation of top executives—CEOs' PFI in our case—is shaped or constrained by SEW concerns. Our research reveals that although family business leaders possess a drive to digitalize (stemming from PFI), their preference for SEW can hamper their willingness to do so, highlighting a paradoxical tension between traditions and innovation in family firms. By demonstrating how SEW acts as a critical factor by modulating the effect of PFI on digitalization capacity and, subsequently, firm performance, this study adds depth to our understanding of how to balance tensions for strategic decision-making in family enterprises. Furthermore, testing SEW and UET theory in this novel context and utilizing a dual-data approach concerned with CEO behavior (passion) toward digitalization in family businesses in an emerging setting like Pakistan, our research significantly enriches UET by incorporating the nuanced influence of SEW on CEO behavioral attributes and their actions.

5.2. Practical implications

In terms of managerial implications, this research offers valuable insights for family firms. We discovered that although CEOs' PFI may not directly boost profitability in family enterprises, it plays a pivotal role in building digitalization capacity, which ultimately shapes firms' performance. A high level of PFI, particularly among family CEOs, supports decision-making, processes, business models, and practices that eventually enhance digitalization capacity and increase sales revenue in the dynamic business environment. This is crucial because CEOs who exhibit little or no PFI are less well-positioned to bolster digitalization capacity. This underscores the necessity for family businesses to prioritize the appointment of CEOs with a strong PFI to foster their digitalization efforts. For instance, if potential successors or those currently in control lack the necessary passion, family firms should consider hiring managers with a higher level of PFI to enhance their digitalization activities and achieve higher performance.

Moreover, our findings indicate that commitment to SEW hinders CEOs from building digitalization capacity, even if they possess a high PFI. Rather than prioritizing non-economic objectives, in the digital era, family firms should empower their CEOs to drive the digitalization of products, processes, and business models. Understanding this trade-off is crucial for family firms because allowing CEOs to lead efforts towards digitalization can contribute to revenue generation and profitability. The insights of our research thus enrich the literature on paradoxical tensions (e.g., De Massis et al., 2013) and demonstrate that family businesses need to strike a balance between traditions and innovation to enhance their performance. Indeed, a strong focus on preserving SEW may prevent family business leaders from digitalizing their companies' business models.

From a policymaking perspective, our findings have actionable implications for government representatives to encourage the digitalization process in family firms. Policymakers should support family businesses through digital capacity-building initiatives and succession planning frameworks. Digital capacity-building initiatives assist family business industries in leveraging new technologies and implementing digitalization. In parallel, the introduction of strategic succession planning frameworks could support the innovation and continuity potential

of family businesses operating in Pakistan. In addition, government authorities may arrange awareness programs and workshop modules focused on nurturing an innovative mindset among future-generation business leaders, which would stimulate PFI in Pakistani family firms.

5.3. Limitations and future studies

Despite Pakistan's geographic advantages, such as its strategic location along trade routes and border-sharing with evolving countries like India, China, and Russia, the results of this study are specific to this country and may not be generalizable to other cultures and family firm hubs. Future scholars should therefore consider extending the model to their own countries to explore how family firm leaders navigate uncertainty and make strategic decisions for digitalization in different contexts. In addition, our study's limitations offer avenues for future scholars to further the research in this area. First, our research is restricted to a specific type of business, namely, family firms, but improving performance through digitalization is a key strategy for all businesses at present. Therefore, researchers should evaluate the importance of CEOs' passion in non-family enterprises or compare family-owned and non-family businesses to provide comprehensive insights and policy implications. Second, the model was tested on 100 family firms in Pakistan. However, prior research suggests that findings from South Asia may not generalize to Western or even broader emerging market contexts due to institutional, cultural, and economic factors (e.g., Atilgan & Kellermanns, 2025; Chen et al., 2022; Miah et al., 2025). The generalizability of our findings to Western or other emerging markets might thus be limited. Therefore, we encourage scholars to extend the model to other regions, especially Western countries, where family firms place a strong emphasis on digitalization.

Third, UET argues that CEO features can determine the actions of a company (Hambrick & Mason, 1984), which implies that digitalization capacity and firm performance may depend on executive and CEO features other than PFI. Accordingly, we call for studies to test the model by considering additional characteristics that may influence CEOs' intention to digitalize in dynamic environments, as well as their configurations, through FsQA analysis. Fourth, we only approached digitalization capacity as a mediator; consequently, future scholars could usefully focus on additional factors, such as business model innovation, digital transformation, dynamic capability, and strategic flexibility, as mediating mechanisms to provide additional practical insights into the relationship between CEO PFI and performance in family firms. Fifth, our study only examined SEW as a moderating variable, whereas future studies could use generation, succession planning, regulatory focus, and CEO informal power as moderators. Sixth, investigating the role of CEOs' PFI in social activities, for instance, related to environmental sustainability and sustainable development, could provide valuable insights.

To mitigate potential experiential bias and validate our results, researchers should utilize a more diverse sample and an alternative data gathering approach. Relatedly, given the modest sample size in our study, researchers should aim to utilize a more diverse and larger sample and employ other data collection tactics to improve the external validity of the study findings. Moreover, the model may be expanded by adopting a mixed-method approach (combining quantitative data with qualitative interviews) to further enrich our understanding of the topic.

Lastly, we encourage scholars to conduct comparative studies of South Asian and Western countries to further validate and enhance the practical insights of our findings. While our study shows how family businesses may deal with digitalization, future research should emphasize entrepreneurial activities, such as risk-taking and proactiveness, to enrich the literature on family business dynamics. Additionally, we used one item for each dimension of SEW and digitalization capacity, which may have limited the distinguishing role of these dimensions. Future research could extend the model through more detailed measures of these factors.

Authors' contribution

All authors contributed equally. All authors read and approved the final manuscript.

CRediT authorship contribution statement

Qiang Wu: Supervision, Resources, Investigation, Conceptualization. **Muhammad Sualedh Khattak:** Writing – original draft, Software, Methodology, Formal analysis, Data curation. **Muhammad Anwar:** Writing – review & editing, Methodology, Formal analysis, Data

curation. **Imad Bani Hani:** Validation, Resources, Funding acquisition. **Omar Hujran:** Visualization, Project administration.

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Declaration of competing interest

The authors declare that they have no competing interests.

Appendix A. Appendix

CEOs Passion for Inventing

1. It is exciting to figure out new ways to solve unmet market needs that can be commercialized.
2. Searching for new ideas for products/services to offer is enjoyable to me.
3. I am motivated to figure out how to make existing products/services better.
4. Scanning the environment for new opportunities really excites me.
5. Inventing new solutions to problems is an important of who I am.

Digitalization Capacity

To what degree, the following areas are digitalized based on:

1. Product
2. Services
3. Process
4. New Business Model

Socioemotional wealth

1. It is essential to preserve family control and independence of the family firm.
2. The family members have a strong sense of belonging to the family firm.
3. Nonfamily members are treated as part of the family.
4. Emotional bonds between family members are strong.
5. Successful business transfer to the next family generation is an important goal of the family firm.

Data availability

Data is available in the repository demanded.

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