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Challenges and opportunities for non-fungible tokens in (international) business: Estonian agricultural firms

Karl Erik Õim, Tiia Vissak

ABSTRACT

Objective: The objective of the article is to identify how agricultural firms have used non-fungible tokens (NFTs) in international business, the challenges they have faced in implementing this technology, and the ways in which they can improve their results. As non-fungible tokens (NFTs) remain almost unstudied in the international (agricultural) management literature, this article helps fill this gap by addressing the following research question: how have agricultural firms used NFTs in (international) business, which challenges have they faced, and how can they improve their results?

Research Design & Methods: The qualitative study drew on semi-structured in-depth interviews. It focused on two Estonian SMEs that, in addition to their traditional products (eggs and apple juice), also issued NFTs: digital chickens and digital apple trees.

Findings: The results show that the studied firms had contrasting experiences from issuing NFTs. Both have remained mostly focused on their main products and have not yet achieved significant international success.

Implications & Recommendations: Issuing NFTs can help firms advertise themselves, increase sales, and raise capital. However, it requires clear use cases and a well-defined purpose. Firms must understand clearly why they need NFTs and how to achieve their goals. It often requires a compelling story, active (social) media engagement, appropriate pricing, a well-functioning, reliable platform (also for an easier purchasing process), and a clear plan for what benefits the NFT holders will receive.

Contribution & Value Added: This study contributes to the international (agricultural) management literature by mapping the advantages and disadvantages of issuing NFTs for doing (international) business. The firms' experiences and satisfaction with NFTs varied. One firm increased visibility, found additional customers, and raised additional capital to develop new products and invest in production facilities and marketing activities. Notably, it avoided bankruptcy. The second firm did not meet its goals, and the project ended in a financial loss. Optimism towards NFTs remains, but the firms need a reliable, well-performing platform. Moreover, the firms must do more to achieve significant international success.

Article type: research article

Keywords: non-fungible tokens (NFTs); digitalisation; agriculture; international management; qualitative research; Estonia

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INTRODUCTION

Researchers have very actively studied international management topics since the 1970s. Still, due to considerable developments in the global business and technological environment, new themes keep emerging (see e.g., Knight *et al.*, 2025; Massa *et al.*, 2023; Schmeisser *et al.*, 2026). For instance, Shlapak *et al.* (2023, p. 334) state that 'digital transformation has become a critical aspect that determines the competitiveness of countries and businesses in the international arena. With

technological advancements and changes in consumer behaviour, traditional trade practices are being disrupted, and new opportunities are emerging.' Although new digital technologies – including blockchain – could change how firms operate and compete locally and abroad, this topic has not been studied enough yet (Schmeisser *et al.*, 2026).

Non-fungible tokens (NFTs) offer a new way to conduct local and international business (Seol *et al.*, 2024). Firms develop them across many sectors: agriculture, drinks, marketing, art, education, fashion, sports, automotive, media, music, gaming, real estate, healthcare, and the public sector (Affini & Ndou, 2026; Alshater *et al.*, 2025; Dwivedi *et al.*, 2022; Jegorow *et al.*, 2023; NFTGO, 2024; Razi *et al.*, 2024). The Business Research Company (2026) reports that in 2025 the NFT market reached 60.82 billion USD, and by 2030 it would grow to 347.46 billion USD.

Non-fungible tokens are defined as 'cryptographic assets on a blockchain with unique identification codes and metadata that distinguish them from each other' (Peres *et al.*, 2024, p. 3) and as elements that represent 'ownership of items with certain intrinsic value to the owners' (Du *et al.*, 2023, p. 128). In turn, blockchain is 'a decentralized and distributed database for the transparent storage of transactions between parties in a network' (Rezazadeh & Bohnsack, 2025, p. 1). Non-fungible tokens are traded online, and payments are mostly made in cryptocurrencies (Nadini *et al.*, 2021). The first NFTs were created in 2017, with the issuing of CryptoKitties (Alshater *et al.*, 2025).

Although according to Jia and Yao (2024, p. 804), NFTs 'represent an emerging reality of significant economic, social, and cultural importance,' this topic draws limited research attention in the international (agricultural) management literature (Du *et al.*, 2023). Few studies explore NFT applications in agriculture (Razi *et al.*, 2024) and overall, their use in the sector remains underdeveloped (Verma *et al.*, 2025), although issuing them 'could offer small agri-food companies avenues for innovation and market expansion, mitigating the risks they face' (Colamartino *et al.*, 2025, p. 4795). Thus, further studies must explain their potential in agriculture (Kumar *et al.*, 2025). Analysing opportunity discovery, business models, and (less) successful NFT ventures is also important (Chandra, 2022), given the lack of studies on firms' challenges in the adoption of NFTs (Affini & Ndou, 2026; Alshater *et al.*, 2025). Moreover, future studies should examine the qualitative context of the NFT market (Jegorow *et al.*, 2023).

This article helps fill these gaps by addressing the following research question: how have agricultural firms used NFTs in (international) business, which challenges have they faced, and how can they improve their results?

The article contributes to the literature on adopting NFTs in agriculture and international business by showing that although issuing NFTs had several positive impacts on the studied firms – they increased visibility, found additional customers, raised capital, and survived – both stayed focused mainly on their main products and achieved little international success. Both stopped issuing NFTs when their platform ran into difficulties. Still, they might try issuing NFTs again after finding a reliable platform.

Our study found that the entrepreneurs drew on available networks, opportunities, and resources. Therefore, we can draw parallels with the network theory, opportunity-based view, and resource-based view (for a short overviews of these theories, see Appendix 1 and Table 3). Although no single theory fully fits this study's results, together their overlapping elements explain these firms' activities more accurately.

LITERATURE REVIEW

Using digital technologies can affect entrepreneurs in different ways (Głodowska *et al.*, 2023): for instance, firms can use them to digitalise their value chains (Wyciślak, 2017). Many innovative digital solutions build on blockchain, a distributed ledger technology, launched in 2009 as the core technology behind the cryptocurrency Bitcoin (Ramadoss, 2022). Blockchain now drives many solutions not only for cryptocurrencies but also for non-fungible tokens (NFTs) (Figure 1). It can also benefit firm management (Korzynski *et al.*, 2023). Industrial firms can enhance operations by adopting higher technological intensity and innovative solutions, referred to as Industry 4.0 (Niewiadomski *et al.*, 2023). Its agricultural counterpart is Agriculture 4.0 (Mandal *et al.*, 2024). Digital technologies, including blockchain, can advance agricultural business models in various ways

(Huyen *et al.*, 2025). Blockchain can also address food safety concerns by enhancing traceability, transparency, and accountability (Duan *et al.*, 2024).

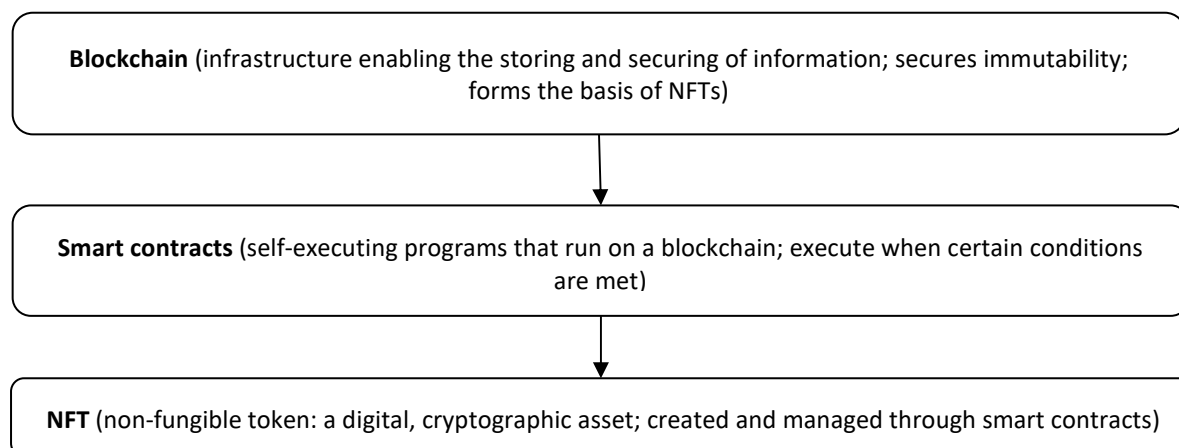


Figure 1. The structure of NFTs

Source: own elaboration of Ko *et al.* (2023), Li and Chen (2023), Puthenveetil and Sappati (2024), and Razi *et al.* (2024).

NFTs ‘represent ownership of unique items that are stored on a blockchain and cannot be changed, replaced, or copied’ (Affini & Ndou, 2026, p. 283). Unlike fungible tokens such as cryptocurrencies, non-fungible tokens are not automatically interchangeable (Yang *et al.*, 2024). NFTs can represent ownership of both physical and intangible – for instance, digital – goods (Du *et al.*, 2023; Jia & Yao, 2024); moreover, they keep a secure, transparent record of transactions (Yang *et al.*, 2024). Table 1 summarises their general advantages and disadvantages.

Some authors note specific advantages of using NFTs and other blockchain-based solutions in manufacturing or agriculture. For instance, manufacturing firms can create NFTs to track the ownership, lifecycle, and recovery of raw materials and components and thereby facilitate recycling (Prause & Gerlitz, 2024). Moreover, firms can use NFTs as marketing tools to make their physical products more popular and thereby reduce excess inventory (Zhu *et al.*, 2025). They can also obtain full transaction data on their NFTs (Du *et al.*, 2023), demonstrate their innovativeness and distinguish themselves from competitors (Zhu *et al.*, 2025).

Agricultural firms can use blockchain for various purposes, such as strengthening their supply chains (Mandal *et al.*, 2024; Peng *et al.*, 2023), as it can improve transparency and traceability (Stopfer *et al.*, 2024). For example, blockchain-driven smart contracts can automate processes, executing automatically when predetermined conditions are met (Uyar *et al.*, 2025). Because blockchain can enhance supply chain security, smart contracts can also address some agri-food industry challenges, for instance by improving quality oversight (Peng *et al.*, 2023).

Non-fungible tokens have fostered NFT-enabled entrepreneurship (Chandra, 2022). In agriculture, NFTs can increase consumer awareness and prove that certified agri-food products genuinely originate from a specific location (Colamartino *et al.*, 2025). They can also tokenise farm assets and sustainable practices, identify livestock, and track the journey of food and its ingredients from producers to consumers (Razi *et al.*, 2024). Firms can also issue NFTs to generate income and reward loyal customers (Kramer *et al.*, 2024). Overall, NFTs can address several agricultural challenges (Verma *et al.*, 2025).

Manufacturing and agricultural firms also face challenges when issuing NFTs. For example, the former must invest in new skills, technologies, and marketing strategies (Zhu *et al.*, 2025). The latter must grasp the potential of NFTs and raise consumer interest (Colamartino *et al.*, 2025). Several challenges listed in Table 1 apply to agricultural firms too, including price volatility, regulatory and security issues (Kramer *et al.*, 2024).

Table 1. Advantages and disadvantages of issuing or using NFTs

advantages	disadvantages
- NFTs have become an emerging asset class (Ante, 2023; Zarifis & Cheng, 2022): NFTs represent ownership of digital or non-digital items (Alshater <i>et al.</i>, 2025; Du <i>et al.</i>, 2023; Dwivedi <i>et al.</i>, 2022; Jia & Yao, 2024; Li & Chen, 2023); creators can embed agreements into NFTs through smart contracts (Li & Chen, 2023) - NFTs are digitally distinctive and scarce compared to traditional digital assets; NFTs can contain visuals and sounds (Chohan & Paschen, 2023) - NFTs are verifiable: ownership can be tracked as all sales are recorded as blockchain transactions (Joy <i>et al.</i>, 2022; Yang <i>et al.</i>, 2024), it is not possible to duplicate, alter or replace NFTs (Affini & Ndou, 2026; NFTGO, 2024) as it is undisputably clear if something is original (Nadini <i>et al.</i>, 2021) - NFTs can create an additional source of revenue (Affini & Ndou, 2026; Dwivedi <i>et al.</i>, 2022; Rezazadeh & Bohnsack, 2025; Wilson <i>et al.</i>, 2022): e.g., creators can automatically get royalties after each resale (Ante, 2023; Du <i>et al.</i>, 2023; Joy <i>et al.</i>, 2022) - NFTs can be sold on digital platforms (Affini & Ndou, 2026; Dwivedi <i>et al.</i>, 2022); creating and selling them does not depend on physical attributes (e.g., physical distribution) (Chohan & Paschen, 2023) - NFTs can be bought for collecting (Wilson <i>et al.</i>, 2022), investing into something, supporting someone or something (Affini & Ndou, 2026), improving the owner's status if the NFT is unique and rare (Joy <i>et al.</i>, 2022; Rezazadeh & Bohnsack, 2025) or proving their fan status (Zarifis & Cheng, 2022) - NFTs can be issued for proving that someone's work is unique (Affini & Ndou, 2026; Joy <i>et al.</i>, 2022; Rezazadeh & Bohnsack, 2025), differentiating products (Li & Chen, 2023), enhancing firms' business model innovations (Li & Chen, 2023), doing crowdfunding, e.g., raising capital for developing current or new ventures (Dwivedi <i>et al.</i>, 2022), building a community (Zarifis & Cheng, 2022), strengthening and diversifying company-customer relationships (Li & Chen, 2023), raising brand awareness and customer loyalty (Efendioğlu, 2023), attracting a wider audience (Affini & Ndou, 2026; Li <i>et al.</i>, 2025; Yilmaz <i>et al.</i>, 2023) – e.g., Gen Z (NFTGO, 2024) – or giving exclusive benefits (like discounts or free products or services) to customers (Dwivedi <i>et al.</i>, 2022; Rezazadeh & Bohnsack, 2025); NFTs can be given as rewards (Zarifis & Cheng, 2022) and to prove that someone attended an event (Dwivedi <i>et al.</i>, 2022) - NFTs allow new use cases to emerge (Li & Chen, 2023; Wilson <i>et al.</i>, 2022) - NFTs have supported the development of the digital goods market (Li & Chen, 2023), and when their market matures, it will reach better efficiency and stability (Kräussl & Tugnetti, 2024)	- NFTs' pricing model is not yet fully developed (Kräussl & Tugnetti, 2024), and determining fair pricing can be difficult (Razi <i>et al.</i>, 2024): the value of NFTs cannot be easily predicted as it depends on several factors, such as demand and supply, type, platform(s) where they are offered, and the fluctuating values of the cryptocurrencies in which they are traded (Affini & Ndou, 2026; Ante, 2023; Precedence Research, 2025) - NFTs are volatile (Kräussl & Tugnetti, 2024; Wilson <i>et al.</i>, 2022); it is hard to sustain long-term value due to market saturation and declining customer interest (Rezazadeh & Bohnsack, 2025) – e.g., due to temporary hype and influencer activities (Precedence Research, 2025), speculative bubbles (Kräussl & Tugnetti, 2024) and targeting narrow market niches (Zarifis & Cheng, 2022) – moreover, traders can artificially increase NFTs' value via trading between their own wallets and buying their own NFTs (Alshater <i>et al.</i>, 2025; Ante, 2023; Zarifis & Cheng, 2022) - NFT creation and exchange fees depend on the fees of the underlying blockchain, e.g., the increasingly higher gas fees* on the Ethereum blockchain** have led to higher costs (Wilson <i>et al.</i>, 2022); crypto gas war also poses challenges*** (Ko <i>et al.</i>, 2023) - NFTs are indivisible assets, forming ties between NFTs and physical goods can be ambiguous, and there can be restrictions on exchanging NFTs for different ones; moreover, transaction times can rise due to blockchain's limited scalability (Li & Chen, 2023) - platforms can be incompatible with each other, so it may be impossible to transfer NFTs from one system to another (Li & Chen, 2023; Razi <i>et al.</i>, 2024) - as NFTs are still a new phenomenon, many potential minters and traders lack expertise, and this delays their adoption: e.g., the NFT purchasing process takes several steps and requires trust in each step (Zarifis & Castro, 2022); moreover, selling NFTs can be challenging if the process is not well planned, as issuing them solely to generate profits can fail (Chohan & Paschen, 2023) as NFT projects typically need an active engagement from project leaders (Brahmstaedt, 2025) - due to intensive energy consumption, NFT transactions have been associated with a large carbon footprint (Affini & Ndou, 2026; Joy <i>et al.</i>, 2022)**** - there is a risk of criminal exploitation (Rezazadeh & Bohnsack, 2025) – e.g., hacking (Dwivedi <i>et al.</i>, 2022), insider trading, counterfeiting (Zarifis & Cheng, 2022), tax evasion and money laundering (Ante, 2023) – and, due to negative media coverage, NFTs' reputation is somewhat damaged (Du <i>et al.</i>, 2023) - NFT information (e.g., location and ownership) is stored on the blockchain, but data files are often not because of the file sizes (Ko <i>et al.</i>, 2023); moreover, once NFTs are stolen, it is almost impossible to recover them (Precedence Research, 2025) - NFT regulations and laws still need further development – e.g., NFTs are banned in some countries (Joy <i>et al.</i>, 2022) – and it is hard to predict how the regulatory environment will change in the future (Affini & Ndou, 2026; Alshater <i>et al.</i>, 2025; Zarifis & Cheng, 2022) - some consumers may question the firm's intentions, e.g., its connection to the NFT and motives for selling it (Chohan & Paschen, 2023) - NFTs are often viewed as being related to gambling (Zalan & Toufaily, 2024)

Note. * gas fee – the fee for transactions on the Ethereum blockchain (Razi *et al.*, 2024). ** a popular blockchain for deploying NFTs (Ko *et al.*, 2023). *** Ethereum's slow processing creates a major issue for NFTs: users often raise gas fees to get priority (Ko *et al.*, 2023). **** This has resulted in issuing more energy-efficient NFTs (Colamartino *et al.*, 2025).

Source: own study.

RESEARCH METHODOLOGY

We selected the case study method because it suits new or underexplored topics by combining new empirical findings, gathered in their natural context, with earlier studies, thereby developing new theoretical and practical insights (Christofi *et al.*, 2024; Eisenhardt, 1989; Yin, 2018). Moreover, the method was used for studying agricultural firms' internationalisation (Francioni *et al.*, 2017; Yang, 2025) and firms' experience with NFTs (Affini & Ndou, 2026; Du *et al.*, 2023; Rezazadeh & Bohnsack, 2025; Zarifis & Cheng, 2022).

This article draws on evidence from two Estonian SMEs (Table 2) that, besides their traditional products (eggs and apple juice), also issued NFTs: digital chickens and apple trees, respectively. Both firms had some international experience; but neither qualifies as a rapid internationaliser like born globals (Rumyantseva & Welch, 2023).

We used purposeful sampling: we chose these firms because the entrepreneurs agreed to share detailed information about their NFT experience, and because the cases contrasted (Patton, 2015) in their main activities and their NFT experience – one experience was relatively positive, the other relatively negative.

We identified potential interviewees via the media. We invited them by email and explained the purpose in detail. We told participants how their data would be collected and processed. They understood that the data would be used for research that would later be published in an academic journal. They gave consent in writing and verbally. Because the study examined firms as legal entities, all data collected were firm-level. In Estonia, firms' annual reports are publicly accessible and include general information about owners and responsible persons, along with their contact details. Although neither interviewee objected to non-anonymous use of the data, one preferred that their identity not be easily ascertainable. The interviewee accepted a solution whereby their identity may, in certain circumstances, be guessed, but their name and other attributes are not presented in a manner that would enable direct identification.

We first interviewed both firms' founding entrepreneurs in October 2024 in Estonian, the mother tongue of the interviewer K. E. Õim and the interviewees. We asked the interviewees how they got the idea to issue NFTs, why they issued them, if they thought of potential alternatives, how they evaluated their experience with issuing NFTs, and what they plan to do in the future. We interviewed the same entrepreneurs again in December 2025. We recorded and transcribed all interviews, then deleted the recordings in line with GDPR (Goberna Caride, 2021). The four interviews yielded 130 minutes of recordings and 28 pages of data. We asked clarifications and follow-up questions by email. In addition to the interviews, several public sources – newspapers, the firms' websites, annual reports, and social media – were used to collect additional data and achieve triangulation (Yin, 2018).

The research approach was inductive, which suits under-researched topics (Miles *et al.*, 2014). It moved from initial observations to more general patterns (Patton, 2015). Data analysis followed three stages suggested by Miles *et al.* (2014): condensing data, displaying the results, and drawing conclusions. To reveal patterns, we coded the data manually (Patton, 2015). We first analysed each interview separately, then compared them to detect differences and similarities between the studied firms. The following section begins with the advantages of NFTs and then analyses their disadvantages.

RESULTS AND DISCUSSION

Advantages of NFTs

The two Estonian agricultural SMEs issued NFTs to raise funds and generate additional income. Firm A reversed its difficult situation thanks to issuing the NFTs and, as a result, it overcame its challenges. This shows the applicability of the opportunity-based view (Ali *et al.*, 2023), as the firm both identified and exploited opportunities (see Table 3).

Table 2. Comparison of Firms A and B

Variable	Firm A	Firm B
Founding	2019	2016
Firm size	SME	SME
Origin	Estonia	Estonia
Entrepreneur	Male	Female
Industry	Agriculture (organic producer)	Agriculture (organic producer)
Field	Poultry farming; bread and pastry production; production of bakery products; production of seasonings and sauces	Production of fruit and vegetable juices; growing of apple and stone fruit trees
Participation of family members	Yes	Yes
International activity/experience	Currently not (some products have reached Finland in small quantities through distributors; the firm plans to enter the Finnish market in the coming years)	Yes, but not very actively (it has sold juice and apples to Finland)
Previously received funding	Yes (e.g., PRIA*, LEADER)	Yes (through PRIA*)
Learning about NFTs	Media coverage, friends, and a community member	Media coverage (firm A's owner as a role model)
Incentive	To raise capital to buy new chickens; to build and open a café; to create loyal customers (i.e., via a loyalty program); community building	To obtain capital for improving the apple storage facility; to raise awareness of Hiiumaa as a green and organic island**; loyalty program
NFT platform provider***	I?	I?
NFT name	Digital chicken	Digital apple tree
Active in (social) media	Yes	No (its website is mainly active in autumn; no active social media posting)****
Goal achievement	Achieved	Not achieved
NFTs issued	650 issued in the 1 st batch, 1000 issued in the 2 nd batch (total sold 1100)	300 (2 sold, 2 gifted)
NFT price	100 EUR	300 EUR
Intended target group for NFTs	Individuals	Mainly legal entities: existing clients like schools, kindergartens, restaurants****, and individuals
Intended benefits for NFT holders*****	Receive a percentage of the profits; receive more information about the firm's activities; belong to a community	Eat as many apples as they want on site; apple juice and other juice blends are 10% cheaper; self-picked winter apples are 50% cheaper; apple tree pruning training in Hiiumaa is free; pruned apple tree branches can be taken for free

Note: * As the interviewees are Estonians, they used the term PRIA, which corresponds to ARIB (Agricultural Registers and Information Board) in English, which provides funding to improve the quality of life in rural areas, see <https://www.pria.ee/en>. ** The interviewee wanted to sell apples to Deutsche Bahn and have them visit Hiiumaa. *** The platform provider that was utilised at the time to issue the NFTs. **** When the NFTs were issued, I? hosted an online stream with the interviewee. The interviewee also published a post on the company's website; however, there was no active engagement on social media. ***** Firm B highlighted a significant limitation of issuing NFTs: they could only be sold to individuals, not legal entities. ***** The holders have not yet redeemed the digital apple tree NFT benefits, but they remain valid.

Source: own study of interviews, media coverage, newspaper articles, and annual reports.

As the interviewee did not want to accept donations or raise funds through crowdfunding, NFTs offered a viable alternative: 'it was absurd that if I raised 100 000 euros, they would simply take 20 percent for themselves. That's why they didn't suit me conceptually at all' (Firm A, 2024). The second interviewee elaborated on additional drawbacks of crowdfunding: 'They would start imposing conditions on me. I have been my own employer for 15 years, and I don't want anyone telling me what to do, making demands, or having expectations' (Firm B, 2025).

The underlying properties of NFTs were also attractive. Firm A aimed to charge a fee on every NFT sale on the secondary market, an advantage highlighted by several authors (Ante, 2023; Du et

al., 2023; Joy *et al.*, 2022): ‘The goal was to raise money, as it was clear that people were ready. ... I?’s solution was that ... every secondary market transaction would give us a certain percentage of the transaction amount ... this NFT was just so much more fun, and it suited my personality’ (Firm A, 2024). I? is the firm through which companies could mint, issue, and manage NFTs. I? encountered problems and was subsequently acquired by C?, which is also experiencing difficulties. We do not use the full names of these firms.

Selling NFTs typically requires providing end users with unique value (Chohan & Paschen, 2023). Firm A noted that for NFTs to be effective, they must be accompanied by a compelling narrative that adds a personal dimension and fosters deeper buyer integration. Emotional value positively influences NFT purchase intentions, serving as a key motivator by enhancing perceived value and strengthening consumers’ purchasing decisions (Li *et al.*, 2025): ‘This playfulness and emotionality, that’s the thing. It makes this boring thing easily understandable and visually accessible for everyone’ (Firm A, 2024).

Yilmaz *et al.* (2023) agree that the emotional aspect of NFTs – specifically their fun nature – is an important factor for those owning NFTs. Moreover, the uniqueness of NFTs serves as a strong positive driver for customer purchase decisions (Efendioğlu, 2023). The interviewee further emphasised that creating hype, generating interest, and approaching NFTs thoughtfully are important for success. NFTs must have a story to motivate buyers: ‘It’s still a pure marketing element, that you have to appeal to people ... in today’s world it’s difficult to generate interest, and that interest doesn’t arise purely from the fact that today I’m starting a company, tomorrow I’ll sell NFTs, and I’ll be rich. That interest has to be generated’ (Firm A, 2025).

Marketing proves important for selling NFTs. Generating awareness of the NFTs remains key, followed by the creation of emotional connections to attract customers (Chohan & Paschen, 2023). Prior to launching the NFT, Firm A’s promotional campaign – which introduced the story behind the NFT – provided additional momentum and contributed to its success: ‘NFT was just, let’s say, an amplifier for all these things. ... It really touched people’s hearts’ (Firm A, 2024).

The interviewee rated his experience with NFTs very highly, mentioning such elements as ease of using the platform and overall NFT issuance process: ‘It’s extremely valuable that I’m probably one of the only people in Estonia who has such strong NFT experience behind me But since I am a farmer myself and have not had any technical support so far, it has been a bit complicated ... But I hope that we can develop this topic further and, for example, in the next couple of years, NFTs will still be a thing, and companies like mine, which are environmentally and animal-friendly, will be able to strengthen and grow their customer base through it’ (Firm A, 2024). Consequently, other agricultural businesses may consider issuing NFTs, as this story shows how some challenges can be overcome by using new (disruptive) technologies. A year later, the entrepreneur remained positive about NFTs but added that he currently lacks the tools (a platform) to bring his vision to life: ‘I believe it has potential, but we just need to find the right tool to exploit that potential’ (Firm A, 2025). However, NFTs can also benefit a firm through marketing, as they help it become more visible: ‘This is definitely one way to stand out from the crowd, also in terms of marketing’ (Firm A, 2025).

Non-fungible tokens opened opportunities for firm A to internationalise and sell its story through NFTs to the Estonians who live abroad or to citizens of other countries. Moreover, NFTs supported the firm in building a community of loyal customers via offering special benefits to loyal customers, a point noted by Zarifis and Cheng (2022) and Kramer *et al.* (2024): ‘it brings it together, it connects people, And if we finally go with English [as a language option], I think this story would appeal to a lot of people, and it could actually bring in investors from the US. ... and ultimately, people who invest in our company here’ (Firm A, 2024). This resonates with the resource-based view, as both firms sought to leverage digital solutions and issue NFTs to gain various benefits (Table 3). Both also offered distinct benefits to NFT buyers (Table 2), which further helped them differentiate themselves.

Table 3 provides a theoretical reinterpretation of the findings, outlining key themes of each theory and how the findings align with them.

Table 3. Theoretical reinterpretation

Quote	Fit with theory/study
Opportunity-based view (e.g., Alvarez & Barney, 2020; Schlichte & Junge, 2025). Themes: using NFTs to generate revenue and engage customers; leveraging NFTs for capturing value; early market entry; opportunity exploitation through early experiential learning	
‘NFTs were a hot topic ... at first, we just laughed it off ... in February or March, I wrote a public post about it, saying I was in this mess ... and then one of the so-called community members called me and said, “Hey, check out, this company [I?] might have something for you” (Firm A, 2024) (O) ‘thanks to NFTs, I was able to save my company and then expand it’ (Firm A, 2024) (O) ‘I heard about [Firm A] and saw that the fellow was doing really well. I thought, I’ll sell my apples too’ (Firm B, 2024) (O)	Although Schlichte and Junge (2025) suggest that resources enable opportunity exploitation and that small firms may struggle to exploit them, a near-bankrupt small firm exploited an opportunity, saved itself, and expanded, motivating the other firm. For Firm A, the revenue raised through NFTs proved crucial to survival. The bank refused it a loan, so the firm needed another way to raise funds.
‘We tried to do it with ... other companies, but they all had their own vision of things. They weren’t ready to listen to our vision at all, and their projects weren’t as successful as ours is now. They also thought that they would come and it would work out, but it didn’t really work out that way’ (Firm A, 2024) (C)	This illustrates Alvarez and Barney’s (2020) point that entrepreneurs make different decisions that lead to varied outcomes and opportunities. Learning from successful NFT issuers in this field matters, because success requires a clear vision and a willingness to act against one’s own wishes and expectations, while staying open to different approaches.
‘There was a story behind it ... that people were already fired up, and it [NFT] was just a tool, so to speak, for how to utilize or involve these fired-up people’ (Firm A, 2024) (O)	This is corroborated by Schlichte and Junge (2025), who note that entrepreneurs can identify and create opportunities. In this case, opportunity creation was supported through a story, following the issuance of an NFT, and creating hype.
Network theory (e.g., Johanson & Vahlne, 2009; Torres <i>et al.</i> , 2024). Themes: issuing NFTs via platform partners; partner-mediated NFT issuance; firm activities related to buyers; buyers asserting expectations on the firm	
‘there were problems with I?, in that they ran out of money, ... so it remained a problem for us’ (Firm A, 2024) (C) ‘Above all, I wanted companies that are my customers, schools, kindergartens, restaurants to be able to buy it, but it turned out that only individuals could buy it ... I did talk about my vision and everything, and they said yes and yes, but in the end, it didn’t work out’ (Firm B, 2025) (C)	Not all network relationships prove sustainable or beneficial, and collaboration may not work out (Johanson & Vahlne, 2009): e.g., Firm B wanted to sell NFTs mainly to existing customers, specifically schools, kindergartens, and restaurants. Although Firm B communicated this vision to I?, it proved unfeasible.
‘I trusted this provider [I?] too much’ (Firm B, 2025) (C) ‘They seemed like really innovative and super cool people, and they immediately took the lead ... I said that I wanted it in English, German, or Estonian, and they told me that I had to choose’ (Firm B, 2024) (C) ‘You are selling those NFTs, you get as much as you get, but at the same time, those NFT buyers are, to some extent, my PRIA’ (Firm B, 2025) (C) ‘some people are still kind of worried about it. I don’t know if they actually bought it as an investment’ (Firm A, 2025) (C)	Trust and network embeddedness can support opportunity development (Forsgren, 2016). Choosing the right partner matters, and incompatibility can create challenges (Moeller, 2010). Customers form part of the firm’s network and can hold certain interests in it; network members can exert some control over each other (Johanson & Vahlne, 2009). When issuing NFTs, firms must select a trustworthy and viable partner. Unfortunately, I? ran into problems.
‘those who have apparently purchased our products ... are our little brand ambassadors who talk about and promote our entire production and operations’ (Firm A, 2025) (O)	Customers also support the firm in marketing its products (Torres <i>et al.</i> , 2024)
Resource-based view (e.g., Barney, 1991; Barney <i>et al.</i> , 2021). Themes: NFTs used as value-creating firm assets; community-based value creation; creating loyal customers	
‘I was thinking more along the lines that all the schools in Hiiumaa would buy themselves a so-called “digital apple tree” ... so I’d have them as a regular customer, and they wouldn’t even bother looking for a new place next time’ (Firm B, 2024) (O)	Owning a specific NFT can be explained through Barney <i>et al.</i> (2021), as it can serve as a resource that may increase customers’ willingness to pay and make switching to other firms less attractive, thereby creating greater value
‘Our goal wasn’t to raise money, but a loyalty program’ (Firm B, 2024) (O) ‘our goal was to create this community, but we kind of failed at creating it’ (Firm A, 2025) (C)	This can be described through Barney (1991), as the loyal customer base and community built through NFTs may form valuable, imperfectly imitable resources. Although NFTs themselves are imitable, the nuances and communities they

Quote	Fit with theory/study
'If I throw a 10-page contract in front of you, that's boring. And after signing that contract, you don't feel anything. But as soon as you see that digital chicken image ... you choose the chicken that best fits your character. ... It's a reflection of yourself, and that ... creates all that emotional connection' (Firm A, 2024) (O) 'An Estonian living in New York who follows my activities can contribute. That creates a kind of globalism' (Firm A, 2024) (O) 'The most positive thing was that when the big Swedish banks told me that I couldn't even get a loan of 2 000 EUR this community invested 110 000 EUR in my company' (Firm A, 2025) (O)	support are hard to replicate. In a follow-up interview, the interviewee mentioned further advantages of funding through NFTs, noting that this approach let the firm reach different groups willing to finance it who felt more deeply and emotionally connected to the firm.

Note. O – Opportunity; C – Challenge.

Source: own study.

Disadvantages of NFTs

Existing literature emphasises the lack of interoperability between platforms, which can complicate the transfer of NFTs (Li & Chen, 2023; Razi *et al.*, 2024). When a platform operator faces difficulties, platform participants could lose their NFTs. One interviewee was not initially aware of this: 'They told me that those who had already bought NFTs would now lose them, that they would no longer exist' (Firm B, 2024).

This interviewee further elaborated on the importance of the right platform partner. She chose I? because she did not find others and as it was local. 'Maybe it was because they spoke Estonian ... maybe there should have been some foreign platforms' (Firm B, 2024). At the time, the team behind the platform was very cooperative, responsive, and motivated to implement the entrepreneur's plans. However, because she had an international mindset for issuing NFTs, the platform's limitations became significant: 'I wanted to promote it in Germany through my friends, and they told me that I had to choose between Estonian, English, or German, that it wasn't possible to change every website Estonia is a little too small for the NFT market to be exclusive' (Firm B, 2024). Both instances are consistent with network theory, as both firms relied on networks to conduct business on digital platforms (Table 3).

Issuing NFTs can also cause a financial loss when business risks materialise. Razi *et al.* (2024) emphasise that issuing NFTs can be costly: 'I ended up losing money because I paid them the monthly fee for about a year ... I gave 2 away and sold 2' (Firm B, 2024). Selling NFTs also proved difficult: 'I had people who wanted them, but couldn't get them' (Firm B, 2024). The latter problem was related to the legal aspects of doing NFT transactions. Trading requires the disclosure of certain personal data, which may hinder the sale of NFTs. For instance, the risk of money laundering, as Ante (2023) underlines, has complicated dealings with customers with honest intentions: 'Many people had already asked us: why do I have to show my ID card? Since it was still a product similar to a financial instrument, the Tax and Customs Board required it, and it was necessary ... it was, in some sense, a financial instrument, which made it more complicated in our legal framework' (Firm A, 2024).

The requirement to share personal data raised concerns about the ease of trading. This meant that foreigners could not easily gift NFTs through the platform, which limited the firm's opportunities: 'I made apple juice, and my potential clients were schools and municipalities ... and then it turned out that a legal entity couldn't buy this NFT. And then there was another problem: I told them that I had friends working at Deutsche Bahn in Germany ... it should have been that a lawyer at Deutsche Bahn would buy 100 of them and then ask a big Japanese businessman, "Hey, give me your personal code, I want to give you a gift." It became so absurd that it didn't work.' (Firm B, 2024) This, however, can be attributed to the intricate regulatory environment of NFTs (Razi *et al.*, 2024).

The valuation of NFTs can be difficult as it depends on various factors (Affini & Ndou, 2026; Ante, 2023). Depending on the company's products, the price level of NFTs is likely to vary, as several factors must be considered to ensure that buyers are not offered benefits that could ultimately result in losses for the company itself. 'I thought that maybe it was too expensive. I think I sold the apple tree for 300 euros. But at the same time, I didn't want these customers to pay, like, 10 euros ... I thought that 100 or 300, it doesn't matter, because they get it for life ... if I sell it to them for 100 euros, I myself would lose' (Firm B, 2024). Razi *et al.* (2024) also emphasise that determining the fair price of NFTs can be

challenging. The other interviewee stated that they contemplated various levels of NFTs with differing prices. However, making their offering overly complicated would drive away customers: 'We finally asked ourselves what we actually wanted to achieve. Because we saw from that how big a contribution people were willing to make before. And we decided on an average of 100 euros Those who want more, buy more If I had started explaining it, first explaining NFTs, then explaining the different levels, then people would have just been lost' (Firm A, 2024).

Non-fungible tokens can be subject to hype (cycles), which is exemplified by the fluctuating levels of interest in NFTs. As noted by Rezazadeh and Bohnsack (2025), sustaining long-term NFT value can be challenging due to market saturation and diminishing customer interest. Temporary hype can be a major driver of peak customer interest (Precedence Research, 2025). 'This NFT was just one specific tool for crowdfunding, and a completely new model that had never been used in the world before, but it kind of ran into a dead end because no one has really found a working solution that could currently work with NFTs. ... but NFTs as such could have more potential in the future' (Firm A, 2025).

An overly complicated platform can also become a challenge. As Zarifis and Castro (2022) indicate, purchasing NFTs is a multi-stage process, comprising cryptocurrency wallet setup, cryptocurrency purchase, and paying with cryptocurrency for an NFT. The interviewee mentioned OpenSea, noting the complex NFT purchasing process. In contrast, on the platform they used to issue NFTs the process was easier: 'We clearly wanted to make the purchase process as easy as possible, with as few clicks ... Buying OpenSea NFT would have been seven times more complicated' (Firm A, 2024). Both interviewees highlighted that if the purchasing process requires too many steps to complete, the firm can lose potential clients. However, the complicated purchasing process was also noted on I?: 'You had to create an account first ... it wasn't as easy as going to an online store, clicking a few times, and getting what you wanted' (Firm B, 2024).

I? was chosen due to its local presence and the simpler purchasing process. However, according to one interviewee, issuing and managing NFTs on a reputable platform, such as OpenSea, can be advisable, even if the initial setup process is more complex and time-consuming: 'Looking back, it was probably a poor choice, but they were willing to adapt to our plans, and onboarding, getting people on board, was much easier. If we had just gone straight to OpenSea, then people would have had to buy cryptocurrency and so on, then set up a wallet. I think we would have lost about 70% of our people right away because it would have become so complicated. Well, in hindsight, we would still have them [NFTs] now, and I would have worked with them, and they would have been on the secondary market, and we might already have been international' (Firm A, 2024). Thus, it is crucial to explore various options for issuing NFTs and assess each solution's advantages and disadvantages: 'You can't have everything, so you have to give something up somewhere' (Firm A, 2025).

Moreover, the platform provider eventually provided insufficient support, yet they received a percentage of the sales proceeds: 'I? was supposed to get a percentage of each sale, and that's where I got stuck, wondering why they weren't helping with promotion and advertising' (Firm B, 2024).

Issuing NFTs as an agricultural firm can also cause supply issues and delivery problems. As customers may want additional benefits due to purchasing NFTs, as noted by Chohan and Paschen (2023), this can make it logistically difficult to deliver products to everyone and everywhere: 'I can't deliver eggs to every store so that all fans across Estonia can get them. I don't have the means to do that, and on the other hand, if this person wants to contribute ... how do you give back, since I don't sell anything online' (Firm A, 2024).

Issuing NFTs should have a clear purpose. Additionally, understanding potential customers is crucial for success, as they must perceive some value in NFTs (Yilmaz *et al.*, 2023): 'I was very afraid of what would happen. What if I fail. ... And then I tried to talk to people or tried to take on clients ... and then I finally understood how it all has to work together' (Firm A, 2024).

Both firms failed to fully achieve the anticipated outcomes, but they learned from this experience: 'Well, there are various reasons why it turned out that way, that it should have been continued and done, but there's no point in being disappointed. You have to ... do better next time' (Firm A, 2025). Moreover, an important lesson for companies considering issuing NFTs was emphasised – they should

avoid being limited to just one platform: 'Consider all seven platforms, not like me, that [Firm A] succeeded, I'll take the same' (Firm B, 2025).

In the follow-up interview, the first interviewee also mentioned that forethought and planning are particularly important in the latter context. He emphasised the need for a backup plan: 'Even though I was in such a serious crisis at that moment, I could have thought a few steps ahead and used more traditional approaches, perhaps. ... Always consider what will happen if it all goes wrong' (Firm A, 2025).

When the other interviewee was asked what she would recommend when choosing between several fundraising options, such as NFTs, crowdfunding, or PRIA (ARIB), she stated that she prefers PRIA: 'I just wrote a project for a cold storage facility for storing apples ... I wrote a project, specifying the amounts and details of what I need. I know how much my own contribution is But if I want to invest and sell these NFTs, I don't know if I can get those twenty thousand together' (Firm B, 2025). However, she was also somewhat critical regarding PRIA: 'you get the money, and now you have to keep it for five years, and if it breaks, you have to make a new one, you have a lot of paperwork, and basically, you're tied to PRIA with strings attached' (Firm B, 2025).

The other entrepreneur also expressed a contrasting opinion about such funding: 'Well, it depends on the goal and the conditions, but in general, you could manage with your own money, because in the future it will make decision-making a lot easier for you. That one-time injection is nice, but it still limits you. PRIA money is a one-time thing in that sense, you take it once, fulfil the conditions, and then move on, but it's difficult for a start-up entrepreneur because things change so much' (Firm A, 2025). When money is raised through NFTs or crowdfunding, then buyers or financiers may start to excessively scrutinise the company if they want to know what has been done with their money and what they will receive in return, which may become an obstacle: 'At first it seems fine, but as the company develops, so many different aspects arise, and then it can become an obstacle, and at some point, the crowdfunding people ask, hey, what will happen to my money' (Firm A, 2025).

According to the interviewee, issuing NFTs requires certain personal traits: those who want to get involved need to seriously consider being actively visible and making themselves known to others. Otherwise, the project may fail: 'I myself believe that through NFT involvement, raising money would definitely be a very good opportunity. But, well, it doesn't suit many people because they are very closed, especially Estonians. /.../ They don't really understand it, and they don't want to show their face anywhere, but what are you doing in business if your face isn't representing your company?' (Firm A, 2024). This perspective is further substantiated by Brahmstaedt (2025) who emphasises that leaders need to stay actively engaged in NFT projects and by Efendioğlu (2023), who states that social media interactions exert a significant influence on consumers' purchase intentions.

The interviewee highlighted the challenges associated with internationalising NFTs: 'Well, if this platform could be set up properly, then I definitely see great potential in it. To do that, you have to create some kind of community first, so that it doesn't come out of nowhere. That means you have to do the groundwork, and people have to know and recognize you. So, I think that through the NFT community, it's definitely possible to do this because there's already a decent crowd gathered there, but again, the software behind it has to be there. The platform has to be ready' (Firm A, 2024). Zarifis and Cheng (2022) also emphasise NFTs' ability to build communities. Community engagement and bonding are essential for the sustainability of NFTs (Brahmstaedt, 2025).

Firm B expressed a pessimistic outlook on the future of NFTs, illustrating how an adverse experience can shape an overall unfavourable view of the technology and hinder its adoption, even when it holds potential for positive outcomes: 'I have such a shitty experience right now that I can't even see it. ... I guess people have also thought about doing it, and then, who sold cows and who sold goats, and what was there, and everyone had a taste of disappointment in their mouths' (Firm B, 2024). The interviewee also conveyed the perspective of what was expected to achieve from issuing the NFTs and the lessons learned from it: 'Perhaps my mistake was that I knew too little about them [NFTs]' (Firm B, 2025).

However, Firm A conveyed a positive future for NFTs: 'Well, I still see that NFT will one day be a very big part of our consumer world, that it will add such strong emotionality to it than some random [supermarket's] loyalty card or some app that you download and pay with I still want to see that

NFT is still very strongly connected to this company, and it creates this community, it creates this emotional connection to this product, so that we're not just consuming milk, flour, or eggs, but it becomes a very emotional consumption' (Firm A, 2024). In the follow-up interview, he articulated a broader perspective on various technologies and their implementation within entrepreneurship contexts: 'I strongly recommend using and testing different things, because in a small business, it is necessary to stand out and get by in today's world ... we need to constantly streamline our processes and understand everything, and digital solutions today definitely help us do that in the end. Sure, at some point, there will definitely be too many of them, but then you have to try them out to see what suits you and what doesn't. ... those who don't use these technologies and don't keep up with the times will have no choice. The end is near in that case' (Firm A, 2025).

Figure 2 summarises the main results of the article. Firm A (depicted on the left side of the Figure) was more successful than Firm B as it was more systematic and more active.

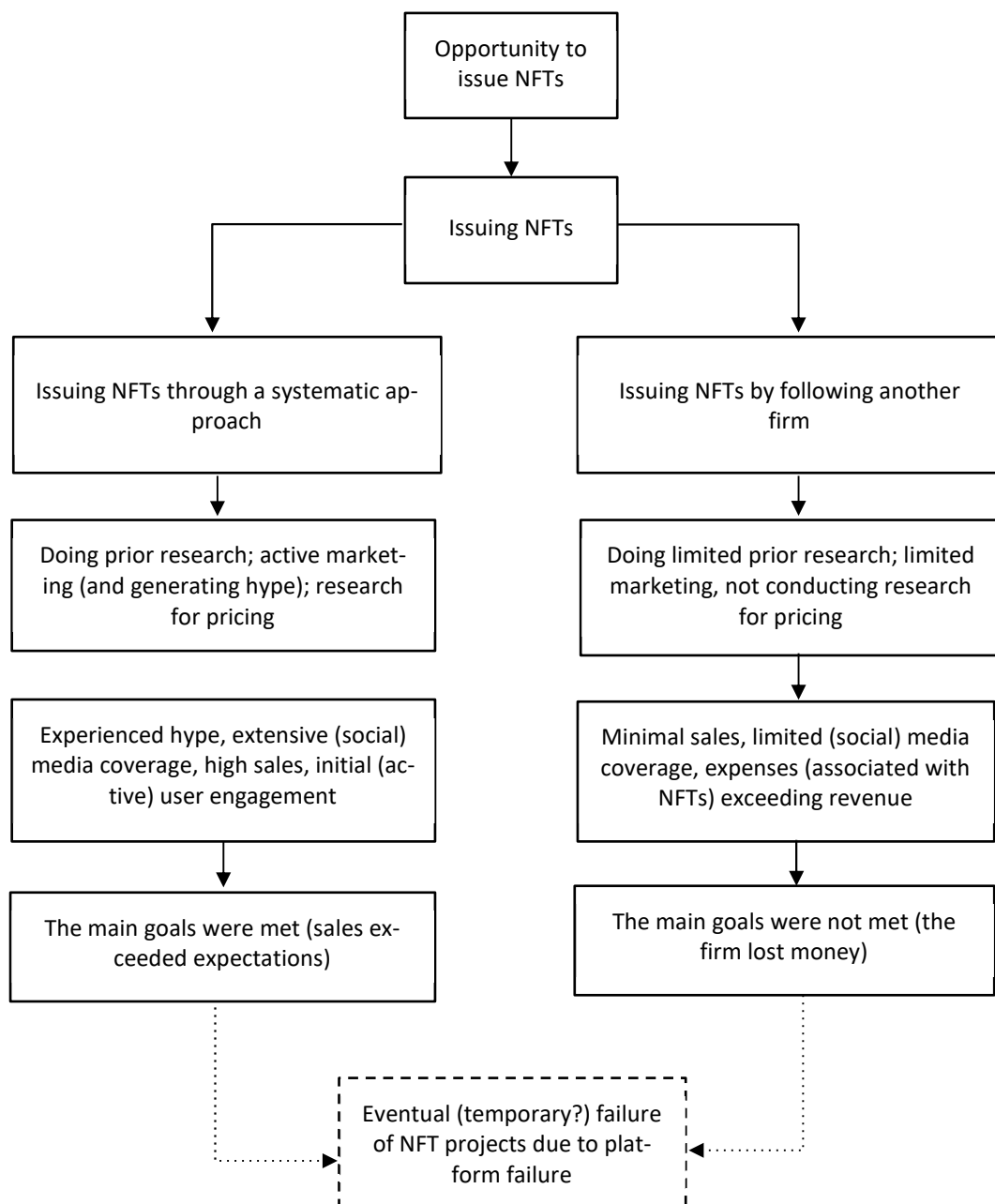


Figure 2. Issuing NFTs: achieving versus not achieving success

Source: own elaboration.

CONCLUSIONS

This study contributed to the (international agricultural) management literature – especially the network theory, opportunity-based view, and resource-based view – by overviewing the advantages and disadvantages of issuing NFTs and showing that firms' experiences and satisfaction with NFTs varied. One of the two studied Estonian agricultural firms – Firm A – benefited from issuing NFTs, thanks to which it increased visibility, found additional customers, and raised additional capital for developing new products and investing in production facilities and marketing activities. Notably, Firm A avoided bankruptcy. The results of the second company (Firm B) were modest: the expected goals were not achieved, and the project resulted in a financial loss. Firms' marketing and (social) media practices also varied. Firm A actively engaged in marketing and interacting with customers, successfully generating hype, while Firm B devoted less attention to these efforts. Consequently, the former performed better than expected, while the latter achieved modest results.

The results also showed that both firms stayed focused mainly on their main products and had not yet achieved considerable international success; both also stopped issuing NFTs. In 2024, Firm A announced plans to find a new partner and resume issuing NFTs. In 2025, the plan stalled due to a lack of communication from the new partner. Optimism towards NFTs remains, but the firms need a reliable, well-performing platform. Firm B has not fully abandoned the idea of NFTs, either. However, issuing them depends on a well-functioning platform built by people the interviewee knows. Both entrepreneurs want a platform built by Estonians, who would be easier to communicate with, as trust and cooperation are important for both.

Managers and business owners should consider issuing NFTs, which can help firms advertise themselves, increase sales, and raise capital. However, they must also recognise that issuing NFTs requires clear use cases and a well-defined purpose. Firms must understand what they need NFTs for and why (instead of other solutions, e.g., crowdfunding), what they aim to achieve, and how to achieve it (e.g., being active on social media or in the community). Issuing NFTs requires certain competencies, often demanding high activity and visibility to secure coverage in both social and traditional media. NFTs are often marketed through the stories behind them and the emotions they evoke. A compelling, emotion-driven narrative that resonates with people is therefore essential. For instance, in the case of Firm A, public interest was driven by the story that this firm was denied a loan to purchase new chickens, leaving it on the brink of bankruptcy. The owner actively engaged on social media, and traditional media amplified these activities, spreading awareness and ultimately generating hype around the NFT. When it was launched, many people wanted to acquire it.

Price must also be considered. Firm A researched the potential value of NFTs, while Firm B weighed different prices and finally issued NFTs at 300 EUR each. Customers may then find it harder to justify this price if the NFT lacks sufficient marketing support. Firms should balance the price-emotion-quality (e.g., benefits) ratio to issue and sell NFTs successfully, achieving or exceeding their goals.

Managers should choose a well-functioning platform for issuing NFTs. This study indicates that a failing platform can lead to failure. Because NFTs are often not cross-compatible across platforms, partnering with a well-established provider raises the chances of success and helps ensure that the NFTs issued by the firm will not 'disappear'. A simpler purchasing process also makes it easier to attract customers and sell NFTs. If the process is too complicated, many buyers may abandon it. The platform should therefore be reliable and reputable, while allowing a streamlined purchase. The more clicks (i.e., steps required to complete the purchase) a person has to make, the more likely they will decline the transaction.

Managers should also decide what benefits to offer NFT buyers. Geographically limited benefits that demand extra time and travel may not appeal to customers. To widen their appeal, firms should offer benefits to all NFT owners, regardless of location, or even extend them internationally. For example, offering a share of profits scales better than collecting products on site.

Finally, managers should not neglect the firm's main business activities; and they should recognise that internationalising requires more than issuing NFTs. Agricultural firms should consider whether to

export or also invest abroad. They should also value learning foreign languages, which not only builds trust and eases internationalisation (Vissak, 2023) but also simplifies issuing NFTs.

Because this study draws on only two Estonian cases, the generalisability of the results is limited. Future studies could examine the same topic across different countries and industries to see whether similar or, more interestingly, different challenges arise when issuing and using NFTs. Another important topic is how far the benefits offered to customers influence NFT purchasing behaviour. Future researchers could also examine how emotions shape NFT purchase decisions. They should also pay closer attention to the opportunities and problems of using NFTs to expand firms' local and international activities. They should collect interview and case study data from various countries to understand this phenomenon.

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Appendix 1: A comparison of the main theories

Comparison criteria	Network theory	Opportunity-based view	Resource-based view
Leading work(s)*	Johanson and Mattsson (1988); Johanson and Vahlne (1990)	Shane and Venkataraman (2000)	Barney (1991)
Main idea	Firms establish and develop networks and positions in them (Johanson & Mattsson, 1988)	Opportunities must be discovered and exploited; entrepreneurs exploit them differently (Shane & Venkataraman, 2000)	Firms create sustained competitive advantage through valuable, rare, imperfectly imitable, and non-substitutable resources (Barney, 1991)
Further studies	Forming networks (i.e., ties) with one another (Morrish & Earl, 2021) is useful for accessing resources, countering the liabilities of outsidership and foreignness (Forsgren, 2016; Safari, 2025), gaining knowledge (Hadley & Wilson, 2003), marketing (Torres <i>et al.</i> , 2024), growth (Dabić <i>et al.</i> , 2020) and building trust (Moeller, 2010)	Opportunities can be discovered/identified/recognised and created, this is followed by their evaluation and exploitation (Ali <i>et al.</i> , 2023; Dimitratos <i>et al.</i> , 2016; Schlichte & Junge, 2025); they can be local and international (Ali <i>et al.</i> , 2023); entrepreneurs' decisions lead to different opportunities (Alvarez & Barney, 2020)	Resources are used and controlled to gain an advantage (Ferreira & Ferreira, 2025; Kaur & Kumar, 2026), e.g., human and social capital (El Nemar <i>et al.</i> , 2025); benefiting from resources that have certain attributes (Chatterjee <i>et al.</i> , 2025) and their effective use enables firms to achieve a higher performance (Arbelo <i>et al.</i> , 2024)
Internationalisation	Leveraging and developing well-functioning networks supports internationalisation (Ahimbisibwe <i>et al.</i> , 2020)	Exploiting opportunities (Dimitratos <i>et al.</i> , 2016); supports rapid internationalisation (Chandra <i>et al.</i> , 2012)	Exploiting certain resources is important for internationalisation (Kaur & Kumar, 2026)

Note: * on which many further developments are based.

Source: own elaboration.

Authors

The contribution share of authors is equal and amounted to 50% for each of them. KEÕ – conceptualisation, literature review, methodology, making interviews, discussion, TV – conceptualisation, literature review, methodology, searching for additional information about the case firms, discussion.

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Use of Artificial Intelligence

The study is free of GAI usage. The Grammarly tool was used to check the spelling.

Conflict of Interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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Conceptualising African immigrant entrepreneurship in South Africa: Accessing financial capital

Bernard Lama Ngota, Elroy Eugene Smith, Ayanda Pamela Deliwe

ABSTRACT

Objective: The objective of the article is to comprehend the effectiveness of African immigrant entrepreneurs in acquiring the financial capital required to venture into entrepreneurship in the host country.

Research Design & Methods: The study's objectives were met using a qualitative research methodology based on an interpretive research paradigm. In a face-to-face interaction, personal interviews collected data from a purposive sample of 12 African immigrant entrepreneurs (owners/managers). The Gioia method systematically coded related interview extracts into first-order concepts, then grouped them into second-order themes and aggregate dimensions.

Findings: The results revealed that African immigrant entrepreneurs acquire the financial capital to start up their businesses from their personal savings. Moreover, the study found that family members play an important role in providing financial capital to assist African immigrant entrepreneurs in their venture creation. Contrastingly, the findings show that host country commercial banks, other microfinance institutions and persons other than family members offered no recourse to African immigrant entrepreneurs to turn to for financial assistance.

Implications & Recommendations: The research on African immigrant entrepreneurs' financial capital acquisition strategies yields important implications for entrepreneurial economic growth, offering transferable lessons for other entrepreneurs. Based on the empirical findings, we offered recommendations for the host country's monetary policies to include African immigrant entrepreneurial endeavours for effective business creation.

Contribution & Value Added: The study promotes understanding of African immigrant entrepreneurship by conceptualising access to financial capital in South Africa. Its emphasises financial challenges, alternative financial mechanisms, entrepreneurial support programmes, the role of social networks, offering insights for policy makers, and financial institutions.

Article type: research article

Keywords: African immigrant entrepreneur; financial capital; savings; financial institutions; loans

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INTRODUCTION

The global migratory trends have undoubtedly risen for the past three decades as documented in some studies (Malki *et al.*, 2022). The consequences of this increase in the immigrant population, as seen in the 2022 census, indicated that South Africa had roughly 2.4 million immigrants, depicting 3.9% of the total population, a progressive increase from 2.1% in 1996, are a push for policies that can address the socio-economic issues that this phenomenon brings into the host country (Malki *et al.*, 2022; StatsSA, 2025). Recent research shows that immigrant entrepreneurship significantly affects growth and development in host countries (Jones *et al.*, 2019; Ngota *et al.*, 2019; Asoba & Mefi, 2020; Malki *et al.*, 2022; Duan, 2023). The importance of immigrant entrepreneurship cannot be overemphasised in the economic growth and wealth contributions of many host

country's economies. Previous research (Hunt & Gauthier-Loiselle, 2010; Kerr & Lincoln, 2010) discovered that immigration boosts innovation in host countries.

Notwithstanding the recent research demonstrating the contributions of immigrant entrepreneurs, particularly African immigrant entrepreneurs, to the host country economies, few studies examined how African immigrant entrepreneurs obtain financial capital to launch their businesses. Identifying potential barriers to financial capital access for any group of small business owners also proves critical for avoiding economic productivity losses. According to Ashourizadeh (2016), the entrepreneurial process requires financial resources for the launch and daily operation of the business, as well as for the payment of expenses and the purchase of necessary stock.

Every entrepreneur requires financial resources to start a business, grow it, compete in the market, and maintain business operations and customer base (Ashourizadeh, 2016). Compared to other entrepreneurs, a lack of financial resources will harm an entrepreneur's entrepreneurial ambitions. As a result, entrepreneurs may seek funding either privately (via personal savings, families, and friends) or publicly (via bank loans, angel investors, venture capital funds, or public stock offerings). According to Ashourizadeh (2016), while accessing finance privately may be easier, the amount available may be limited. In contrast, public access to funds may result in larger sums of money. However, obtaining funding from a public institution poses some difficulties for both the entrepreneur and the financial institutions. Ashourizadeh *et al.* (2022) noted that funding small businesses is fraught with uncertainty due to the doubt involved in the development process and the limited understanding of the growth factors that new entrepreneurs experience. Accordingly, should external investors consider investing in an African immigrant entrepreneur's business, they may demand considerable equity, control, and managerial influence to alleviate possible risks associated with business instability and uncertainty (Ashourizadeh, 2016; Ashourizadeh *et al.*, 2022).

Despite the evolving body of knowledge on immigrant entrepreneurship, limited research has examined particular obstacles faced by African immigrant entrepreneurs in acquiring financial capital to start-up and develop their businesses (Ashourizadeh, 2016). This omission matters, given the unique economic, cultural and social contexts that African immigrant entrepreneurs manoeuvre in South Africa (Ashourizadeh *et al.*, 2022). By investigating the financial capital acquisition approaches of African immigrant entrepreneurs in South Africa, this research seeks to fill this knowledge gap and shed light on the unexploited prospects of this entrepreneurial group. The primary objective of this article is thus to investigate the effectiveness of how African immigrant entrepreneurs access financial capital to enable them to venture into entrepreneurship in South Africa. Hence, this article aims to answer the main research question: *How do African immigrant entrepreneurs in South Africa obtain the finances to drive their entrepreneurial ventures?*

LITERATURE REVIEW

Understanding the prevalence of African immigrant entrepreneurship requires a conceptualisation of immigrant entrepreneurs and entrepreneurship. An immigrant entrepreneur denotes a non-native of the host country who migrates from their home country to another country and starts a business there to benefit economically (Aaltonen & Akola, 2014). Immigrant entrepreneurship refers to the economic growth and development process facilitated by the immigrant entrepreneur. According to some authors (Sahin *et al.*, 2011; Tengeh *et al.*, 2011; Fatoki, 2017), self-employment or entrepreneurship usually requires buying an existing business or starting one from scratch. In this context, immigrant entrepreneurship refers to entrepreneurial activities undertaken by immigrants in a host country (Tengeh *et al.*, 2011; Fatoki, 2017).

Empirical studies (Cooper *et al.*, 1994; Ashourizadeh, 2016; Ashourizadeh *et al.*, 2022) highlighted that financial capital remains vital to business survival and venture for African immigrant entrepreneurs. Nonetheless, acquiring finances from financial institutions and banks involves strict requirements that businesspeople, specifically African immigrant entrepreneurs, cannot easily meet, so they turn to alternative sources to obtain financial assistance such as family members (Cooper *et al.*, 1994; Ashourizadeh, 2016). However, Min (1988) argue that when immigrant entrepreneurs want to venture

into entrepreneurship in the host country, they primarily rely on their savings for financial capital, as well as attaching to their ethnic groups to make social connections from which they benefit, and few, if any, receive financial assistance from the bank (Ashourizadeh, 2016; Ashourizadeh *et al.*, 2022). Boissevain *et al.* (1990) state that immigrant entrepreneurs typically hold limited savings to enable them to start their businesses, and as a result, they end up working longer hours or multiple jobs to accumulate sufficient funds to start their businesses.

Moreover, African immigrant entrepreneurs may seek financial support from friends to supplement what they already have, enabling them to venture into new businesses or expand their existing ones if the opportunity arises. According to Ashourizadeh *et al.* (2022), African immigrant entrepreneurs can obtain the necessary financial capital to start their businesses by connecting with other members of their social ethnic group and/or forming public-private partnerships. Ashourizadeh (2016) states that immigrant entrepreneurs who run businesses in the United Kingdom face unfair discrimination from banks and financial institutions, limiting their businesses' growth and development. The Rotating Credit Association, which Japanese and Chinese immigrants used to finance ethnic businesses, ranks among the most common financing methods for immigrants (Light, 1972; Ashourizadeh, 2016). According to Aldrich and Waldinger (1990), it rests on the ethical responsibility and sound judgment found in immigrant groups. Notwithstanding, Light (1984) believes that such strategies arose in response to discrimination in the host society's access to regular financing.

Intra-African immigration presents diverse obstacles for African immigrant entrepreneurs. One primary challenge involves navigating the complex and varied legal frameworks across diverse African nations. Moreover, besides the hurdles associated with African immigrant entrepreneurs securing funding from local financial institutions, language and cultural challenges can also create obstacles, as they need to overcome these obstacles to start up and grow their businesses (Radipere, 2012; Ngota & Rajkaran, 2016). Additionally, xenophobia and discrimination can prove inevitable for African immigrant entrepreneurs, making it critical for them to tackle these issues and foster a more welcoming environment (Ngota & Rajkaran, 2016). Ultimately, networking and integration remain crucial for success, as African immigrant entrepreneurs must establish relationships with governments, local businesses, and communities to thrive. Chrysostome (2010) indicates that SMMEs face the same challenges as larger businesses on a micro level. However, unlike larger firms, SMMEs often lack easy access to the financial resources they need to remain in business. Research by some authors (Asoba & Tengeh, 2016; Nkrumah, 2016; Omisakin, 2017; Ngota *et al.*, 2019) affirmed that it remains difficult for African immigrant entrepreneurs to access finance from traditional banks in host countries.

In South Africa, African immigrants are often regarded as a homogenous group, without distinguishing between the different nations of origin. Several factors contribute to this aggregation. Data limitation matters greatly, as statistical data of African immigrants in South Africa frequently lack a comprehensive breakdown by nation of origin, leading scholars to categorise them together. The policy frameworks also play a role. South African immigration laws and policies, including the Immigration Act of 2002, apply broadly to African nationals, without distinguishing between specific countries. Moreover, stereotypes and perceptions reinforced by media coverage and public narrative often perpetuate a homogenous view of African immigrants.

The study by Paul *et al.* (2007) suggests that African immigrant entrepreneurs utilise various sources of financial capital, including personal funds, reinvested profits, and bank loans. The notion focuses on information gaps between immigrant entrepreneurs and potential lenders, who often know more about the business's operations and prospects. Banks, on the other hand, rely on second-hand information from African immigrant entrepreneurs and financial statements. This information gap leads lenders to demand higher interest rates or more favourable terms to protect themselves from potential risks. As a result, immigrant entrepreneurs prefer to fund their ventures with their own money and profits, rather than relying on external investors and lenders.

Conceptual Framework of the Study

Figure 1 illustrates the conceptual framework of this study that seeks to illuminate the complex relationships between financial capital acquisition and entrepreneurial success among African immigrant entrepreneurs. By examining the interplay between internal sources of financial capital (savings), external sources (loans and family support), and barriers to financial capital (lack of access to financial networks), this framework provides a nuanced understanding of the factors that enable or hinder the acquisition of financial capital and its impact on entrepreneurial outcomes. By exploring these relationships, this framework seeks to contribute to the development of effective strategies for supporting African immigrant entrepreneurs in accessing the financial capital necessary to start-up and grow successful businesses.

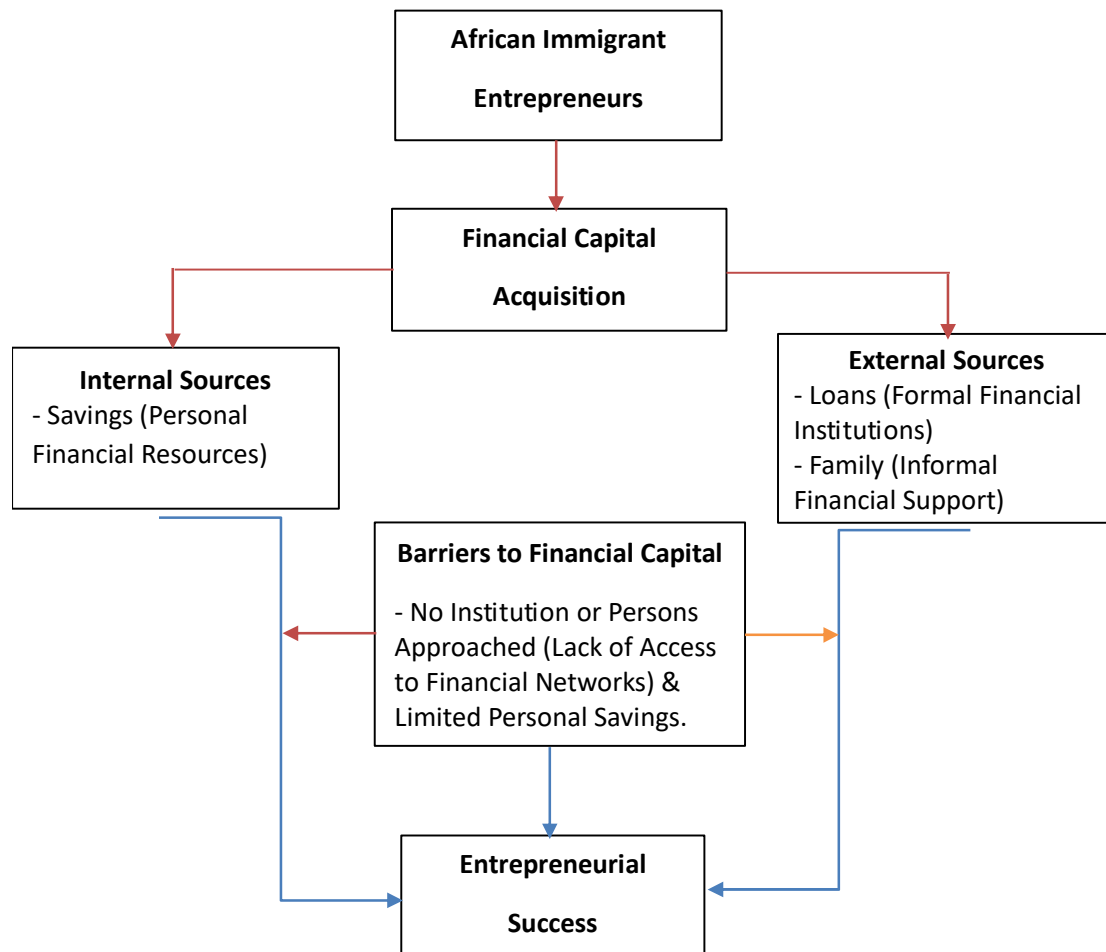


Figure 1. Conceptual framework of the study

Source: author's own construction based on the results of 2023 data analysis from personal interviews.

RESEARCH METHODOLOGY

An interpretative research paradigm (phenomenological research) served to meet the study's objectives. According to Hammersley (2013), the interpretivism paradigm rests on the idea that humans cannot comprehend knowledge in the social sciences in the same way as they can in the physical sciences because humans interpret their surroundings and take actions based on that understanding, whereas the rest of the world does not. Creswell (2013) indicates that qualitative research begins with an assumption and the use of a theoretical framework that guides the research problems, addressing the sense groups, social or human phenomena. Previous studies showed that a qualitative response to the primary research question was necessary. To obtain rich data, cases of African immigrant entre-

preneurs were selected, and subsequent personal interviews followed. We used an exploratory research strategy because few studies examined this topic in the field, and it allowed for an in-depth investigation of African immigrant entrepreneurs' access to financial capital for entrepreneurship in a host country (Creswell, 2014; Saunders *et al.*, 2019; Saunders *et al.*, 2023). We chose the qualitative approach to gain a broad understanding of participants' experiences and perspectives, and to explore the research questions in a nuanced and contextualised manner.

The study drew its sample from the population of all African immigrant entrepreneurs operating businesses in South Africa. Twelve (12) African immigrant entrepreneurs (owners/managers) in the Eastern and Western Cape provinces of South Africa were selected for the sample using non-probability sampling techniques, namely convenience and purposive samplings, because there exists no readily accessible database of all African immigrant entrepreneurs in South Africa. By adopting a non-judgemental and curious stance, the researcher created a safe space for open dialogue, encouraging respondents to share their genuine perspectives and insights. Participant inclusion criteria included:

- Participants were of African descent (i.e., born in an African country other than South Africa).
- Participants were owners/managers or partners in the business.
- Participants actively participated in the establishment or purchase of the business.
- The businesses have been in operation for at least one year.
- Participants were at least 18 years old and above.

The study collected both secondary and primary data. Secondary data sources comprised journals, the internet and books. We collected primary data from African immigrant entrepreneurs who have established and successfully operated businesses in South Africa using a semi-structured interview schedule. The purpose of the study instrument was to collect data from African immigrant entrepreneurs on how they acquired the financial capital necessary to establish their businesses effectively in South Africa. To collect data, we conducted in-depth semi-structured interviews to ascertain realities and expectations around the financial access of African immigrant entrepreneurs. Experts in entrepreneurship validated the themes and questions, and literature supported these themes.

Data Analysis

The data analysis of this study drew on the Gioia method (Gioia *et al.*, 2013), which emphasises exploring organisational processes through the diverse experiences of various stakeholders. This approach enables discovering novel insights by examining how different actors perceive and interpret events (Gioia *et al.*, 2013). To ensure qualitative rigour, the study adhered to the recommended practices outlined by Gioia *et al.* (2013). Consistent with inductive research, the analytical process iterated alongside data collection. Although the phases overlapped, distinct analytical stages emerge. Through these stages, the study repeatedly refined and validated theoretical mechanisms derived from the empirical data, ensuring a vigorous and grounded understanding.

Following semi-structured in-depth interviews, the data collected from African immigrant entrepreneurs were reduced and coded. A list of themes, categories, and preliminary codes were all included in the coding framework the researcher developed (Gioia *et al.*, 2013). The researcher began analysis by reading interview transcripts, assigning codes, and identifying patterns guided by the research question. Using constant comparison (Gioia *et al.*, 2013), the researcher discerned differences and similarities within the data. Table 1 outlines the relevant codes and content. During the second analytical stage, the researcher aggregated first-order codes into higher-level concepts, supplementing this process with extensive note-taking and memo making to track decisions and refine interpretations. Consistent with iterative research (Gioia *et al.*, 2013), the researcher's coding approach evolved as his understanding deepened. In stage three, the researcher examined how attention manifested within previously identified categories, yielding four theory-driven themes (Table 1).

To ensure research rigour and trustworthy interpretations, the researcher adhered to Lincoln and Guba (1985) guidelines for qualitative inquiry, enhancing credibility, transferability, dependability, and confirmability, as discussed in the subsequent section (Enworo, 2023). The four criteria – confirmability, credibility, transferability, and dependability – proposed by Johnson and Rasulo

(2016) assessed the reliability of the data acquired and ensure its trustworthiness. The theoretical, methodological, and analytical choices made throughout this study rested on logical justifications in its presentation. Audit logs that outlined each step taken in analysing the data for research purposes and served as the foundation for the findings established confirmability. Triangulation of data collection, long-term participation, consistent observations, and member checks all ensured the study's data credibility. By providing the phenomenon under study with an adequate thick description, the researcher ensured that the qualitative data collected and transcribed could be transferred. To ensure dependability, the collected qualitative data underwent an audit of inquiry (Shenton, 2004). To support the review and examination of the study's procedures as well as the data analysis method to ensure that the findings stayed consistent and that the study could be repeated, the researcher enlisted another experienced researcher in the faculty.

RESULTS AND DISCUSSION

This section summarises the findings of the analyses based on the participants' responses. The study found that African immigrant entrepreneurs require financing to establish and expand their businesses in the host country. However, the study investigated how African immigrant entrepreneurs attempted to obtain the financial capital they needed to start their businesses. Table 1 presents the codes and themes identified during the thematic data analysis process for financial capital acquisition, including internal and external sources, and barriers to obtaining financial capital, which structure the results below. Direct quotes or responses provided by participants do not all appear here, but remain available on request.

Table 1. Codes and themes identified in thematic analysis

Aggregate dimensions	Second-order themes	First-order themes
Financial capital acquisition	Primary source of finance	Funding is the most needed to start a business.
		Resources needed to start-up the business.
Internal sources	Savings (personal financial resource)	Keeping money as a habit
		Keeping money from income made
		Saving part salary
		Saving as a behavioural tendency
		Saving as a cultural tendency
		Saving to start up a business
		Personal savings
External sources	Loans from banks	Borrowing from others for start-up
		Prefer borrowing from others than the bank due to high interest rates
		Borrowing from banks has high financial risks
		Discriminating financial policies towards migrants
		Difficult borrowing from friends
		Did not borrow from bank
	Family members	Financial assistance from family
		Finance from retrenchment package
		Assistance from couples
Barriers to financial capital	No financial institution or person approached	Reluctant to approach banks or persons
		To reduce entrepreneurial debt
		Negative attitude by banks towards migrants
		Lack of business license
		Reluctance due to residential status
		Uncertain of business environment
		ID as bank requirement
	Limited personal savings	Not enough savings done to start-up a business

Source: own study based on data from interviews.

We briefly discuss the findings based on these codes and themes identified during the thematic analysis process and thus presented as a discussion of the main findings of this article.

Financial Capital Acquisition Findings

Access to adequate financial capital remains crucial in determining business success. Tengeh and Nkem (2017) discovered a significant correlation between initial startup capital and subsequent business growth among immigrant entrepreneurs. African immigrant entrepreneurs indicated that financial resources formed the most significant primary resource required during the start-up stage of their businesses in the host country.

Financial resources constitute essential assets for starting a new business or expanding an existing one. The findings agree with those of some authors (Evans & Jovanovic, 1989; Holtz-Eakin *et al.*, 1994; Blanchflower *et al.*, 2001), who posit that if African immigrant entrepreneurs have access to adequate financial resources, their entrepreneurial dream will easily materialise, leading to the establishment of a new business venture. Table 2 presents the coding process for African immigrant entrepreneurs' capital acquisition and provides examples of responses.

Table 2. Example of responses on financial capital acquisition findings

Aggregate dimensions	Second-order themes	First-order themes	Illustrative responses
Financial capital acquisition	Primary source of finance	Finance is the most needed to start a business	- 'I needed money to establish my business from the beginning.' (P#3) - 'The main resource that I needed at the time to start-up this business was finance.' (P#1)
		Resources needed to start-up the business	- 'I needed money to buy the tools and materials I needed to start the business, as well as the car I needed to transport the working tools and materials to the job site.' (P#1) - 'I believe that when you are talking about the finance as the primary resource, I think the rents should be first in it, then the materials and the most important thing to make sure that you have the tools also.' (P#3)

Source: own study based on data from interviews.

In contrast, this study has disputed these claims, arguing that some entrepreneurs successfully launched creative businesses with only a small amount of financial capital (Davidson & Honing, 2003; Hurst & Lusardi, 2004; Kim *et al.*, 2006). This study also discovered that starting a new business with adequate and sufficient capital resources strongly predicts entrepreneurial growth; however, others argue that finance provides no significant predictor of new business creation (Hurst & Lusardi, 2004).

Internal Sources of Finance Findings

Utilising personal savings remains a common internal source of finance for entrepreneurs, particularly during the startup phase (Radipere, 2012; Ngota & Rajkaran, 2016). This involves injecting personal funds into the business, either from savings accounts, emergency funds, or other personal assets. Personal savings provide an easily accessible and cost-effective means of financing, eliminating the need for external borrowing and associated interest payments. Additionally, using personal savings demonstrates the commitment and confidence of African immigrant entrepreneurs in their venture, which could potentially attract external investors. African immigrant-owned small businesses in South Africa often struggle to secure loans from formal financial institutions, making savings a vital alternative for accessing capital. African immigrant entrepreneurs demonstrate the spirit of savings to amass the necessary financial resources to start-up their businesses (Tengeh, 2007; Radipere, 2012; Ngota & Rajkaran, 2016). The savings spirit existing among African immigrant entrepreneurs originated from their cultural background emanating right from their home countries. This value-driven culture stems from the family values of these ethnic groups, which they have instilled in their businesses for generations. Table 3 shows the internal source of finance coding process and examples of responses.

This finding is consistent with a study by Tengeh (2007), who found that African immigrant entrepreneurs sourced their primary source of capital from their personal savings. This finding challenged the traditional intellect that entrepreneurs can only obtain financing to start a business from a financial institution. Although this matters for growing and developing an entrepreneurial idea to increase its success, it may particularly challenge an African immigrant entrepreneur in a host country. Therefore, African immigrant entrepreneurs have resorted to saving money to finance their entrepreneurial ventures when the opportunity arises.

Table 3. Example of responses on the internal source of finance

Aggregate dimensions	Second-order themes	First-order themes	Illustrative responses
Internal Source	Savings (personal financial resource)	Keeping money as a habit	'I was making some income and from that small income, I was making some savings bit by bit.' (P#2)
		Keeping money from income made	'I used to save the little money that I had at the time, so every little money that I earned had to be saved gradually. So, I had the finances from my savings.' (P#3)
		Saving part of the salary	- 'I was saving some income from my salary for raining days like this to see how I could survive through other means. That is why I was saving some little money from my little salary that I was getting there [previous employment].' (P#6) - 'I got the money from my savings, which I was doing while working. I was always saving a portion of my salary. That was part of the funding that enabled me to start this business.' (P#8)
		Saving as a behavioural tendency	'I got into the habit of saving money to start my own business from every little money that I made. I did such savings for about two years to enable me to get enough money to establish my business. So, I can say that the savings that I was doing was what gave me the financial capital that I used to establish my own business.' (P#4, P#5, P#10 & P#11)
		Saving as a cultural tendency	'This is like the culture I grew up with in West and Central African countries. We always live with the expectation of saving for the future, even though the future is uncertain. That is how I was able to obtain the funds with which I began this business.' (P#3)
		Saving to start up a business	'That is how I managed to save money so that I could get enough capital to start-up my own business.' (P#4)
		Personal savings	'I can say that the savings I was doing were what provided me with the financial capital I needed to start my own business.' (P#1)

Source: own study on data from interviews.

External Sources of Finance Findings

Banks and loans represent a primary external source of finance for businesses, offering various financing options to support growth and expansion (Markova & Perkovska-Mircevska, 2009). Commercial banks offer term loans, overdraft facilities, and lines of credit, enabling entrepreneurs to access the necessary funds for investments, working capital, or debt refinancing. Specialised loan programmes, such as small business loans, venture capital loans, and asset-based loans, cater to specific business needs. Banks also offer competitive interest rates, flexible repayment terms, and expert financial guidance. However, for African immigrant entrepreneurs to access bank finance requires a solid business plan, collateral, and a good credit history. Loan applications involve rigorous evaluation, and entrepreneurs must prepare to provide financial statements, business projections, and risk assessments to secure approval. Discriminatory financial policies may hinder banks' ability to provide financial assistance to African immigrant entrepreneurs. As a result, African immigrant entrepreneurs face significant obstacles in securing traditional banking services, forcing them to explore alternative financing options, or rely on personal savings to fund their business ventures. Some examples of responses regarding external sources of finance appear in Table 4.

For many African immigrant entrepreneurs, family members and relatives serve as a vital external source of finance, providing crucial capital for startups or business expansions. According to research (Basu & Parker, 2001; Nee & Sanders, 2001), many family members, whether at home or abroad, play a significant role in the financial assistance of family members' business ventures. Informal loans or investments from loved ones often come with flexible repayment terms and minimal collateral requirements, bridging the financing gap created by traditional banks' stringent lending criteria. This familial support not only addresses financial needs but also offers emotional encouragement and business advice, leveraging the family's collective networks and expertise. In African cultures, familial ties and social obligations foster a sense of responsibility and trust, making family financing a viable option.

Table 4. Example of responses on an external source of finance

Aggregate dimensions	Second-order themes	First-order themes	Illustrative responses
External source	Loans from banks	Borrowing from others for start-up	- 'I did approach some people to ask for financial assistance. I spoke to some people around for financial assistance because the finance that I had was not enough to start-up the business.' (P#4) - 'I decided to rather borrow the money from my friends.' (P#5)
		Prefer borrowing from others than the bank due to high interest rates	- 'The reason why I did not want the bank loan is because the bank will impose a very high interest rate during payment, so that is why I did not need a bank loan.' (P#11) - 'I did not want a bank loan because the bank would charge a very high interest rate during payment.' (P#4)
		Borrowing from banks has high financial risks	'You see, starting a business that you have not done before, it is risky to start going to the bank to get a loan.' (P#9)
		Discriminating financial policies towards migrants	- 'When I approached the bank, they told me I wasn't qualified for their assistance.' (P#7) - 'The bank stated that I was not a citizen and lacked the necessary documentation, such as a South African ID, to obtain a bank loan.' (P#6)
		Difficult borrowing from friends	'Although it was difficult to obtain a loan from some of the people I approached, some of them did believe in my vision and loaned me the money.' (P#4)
		Did not borrow from bank	- I did not approach any financial institution or other person to request a loan or financial assistance of any kind.' (P#1) - 'No, I didn't need to go to the bank for a loan at the time because I had enough money saved up. In addition, I did not seek financial assistance from any other financial institution or individual.' (P#3)
	Family members	Financial assistance from family	- 'I received some financial support from my family back from my home country which assisted me a lot to start-up the business.' (P#5) - 'I had to approach my family back home and ask for some financial assistance to inject into my business.' (P#12)
		Finance from retrenchment package	'I used my retrenchment package to add to my savings to enable me purchase this business.' (P#1)
		Assistance from spouses	- 'My wife provided financial assistance to help me launch my business.' (P#1) - 'I did approach my husband with my business ideas and asked for financial support.' (P#8)

Source: own study based on data from interviews.

Moreover, cultural financing models like 'njangi,' 'susu,' or 'esusu' – rotational savings and credit associations common among African diaspora communities – provide mutual financial support and reassurance (Ngota *et al.*, 2019). Through these informal financing networks, family members and friends pool resources, share risk, and celebrate successes together. By tapping into family networks, African immigrant entrepreneurs can access essential funds, mitigate risk, and build a foundation for sustainable business growth. When African immigrant entrepreneurs encounter difficulties during the start-up phase of their businesses, they often turn to their families for financial assistance.

Barriers to Obtaining Financial Capital Findings

African immigrant entrepreneurs face significant obstacles when seeking financial assistance from commercial banks. Banks' attitudes, stringent requirements, and biases create barriers that deter entrepreneurs from seeking loans. 'Lack of business licences,' 'residency status,' and 'non-indigenous status' further limit access, making it challenging for African immigrant entrepreneurs to secure funding. Additionally, 'uncertainty about business prospects' and concerns about 'debt repayment' discourage African immigrant entrepreneurs from seeking bank financing. Banks' emphasis on security and collateral requirements also hinders financing, forcing African immigrant entrepreneurs to rely on

Table 5. Example of responses to barriers to financial capital

Aggregate dimensions	Second-order themes	First-order themes	Illustrative responses
Barrier to financial capital	No financial institution or person approached	Reluctant to approach banks or persons	- 'No, I was reluctant to approach the bank to ask any loan.' (P#4) - 'The answer is a big no; I didn't bother to approach the bank for financial assistance.' (P#7)
		To reduce entrepreneurial debt	- 'How will you repay the loans if the business fails, and you have taken on so much debt? So, I didn't want to go down that path at all.' (P#5)
		Negative attitude by banks towards migrants	- 'As for the bank, I knew I was not going to have any help from them as a foreign national.' (P#5) - 'I didn't approach any banks for money because I knew the outcome would be negative as a foreigner in this country. So, I didn't have to bother myself or waste my time with it.' (P#12)
		Lack of business license	- 'I didn't approach anyone because my company was not yet registered [licensed] when I started it. So, I knew that if I approached the bank for a loan at that point, it would be requested as a requirement.' (P#9)
		Reluctance due to residential status	- 'I did not approach the bank because I knew that because my residency status was an asylum permit, the bank would not grant me a loan even if I applied.' (P#10)
		Uncertain of business environment	- 'but I didn't want to borrow money and start a business because I wasn't sure about the business's future.' (P#6) - 'I don't think it's a good idea to take loan money to start-up a business; instead, I think it's a good idea to do that after the business has already been in operation, because you never know if the business will fail or survive.' (P#12)
		ID as bank requirement	- 'If you are a foreigner in South Africa and do not have a South African ID, do not go to a bank for a loan; they will never give you one.' (P#5) - 'even if you have the ID and do not have a job that pays you money into a bank account or an already existing business that is doing well and has a bank account with the said bank, they will not grant you a business loan.' (P#3)
	Limited personal savings	Not enough savings done to start-up a business	- 'although the money was not enough to cover the capital for the business, but it went a very long way, and it was the foundation of the establishment of my business.' (P#1)

Source: own study based on data from interviews.

alternative funding sources, such as personal savings. As a result, many African immigrant entrepreneurs prioritise self-funding and cautious growth, opting to avoid debt and potential financial risks. This cautious approach stems from concerns about repayment difficulties and the potential consequences of business failure. Moreover, the complexity of application processes, coupled with cultural barriers, exacerbates the challenge. Banks' lack of understanding of African immigrant entrepreneurs' unique needs and circumstances perpetuates financial exclusion. Consequently, African immigrant entrepreneurs must often explore informal financing options, such as family and friends, diaspora networks, or microfinance initiatives, namely everywhere where necessary. Table 5 presents examples of responses derived from barriers to financial capital, as reported by African immigrant entrepreneurs.

Financial capital acquisition can thus come from internal and external sources, both of which are likely to boost entrepreneurial success, as access to financial capital remains essential for starting and growing a business. On the other hand, barriers to financial capital are likely to undermine entrepreneurial success, as a lack of access to financial networks and resources can hinder business growth and development (Chimucheka & Mandipaka, 2015). By highlighting these relationships, the conceptual framework emphasises understanding the various factors that influence the acquisition of financial capital and its impact on entrepreneurial success among African immigrant entrepreneurs.

Entrepreneurial Success Findings

Access to financial capital remains critical to entrepreneurial success, as it enables entrepreneurs to invest in their businesses, manage cash flow, and respond to market opportunities (Emami *et al.*, 2023). Despite facing formidable challenges, many African immigrant entrepreneurs achieve remarkable success, driven by resilience, determination, and innovative spirit (Mason & Brown, 2014). By leveraging their unique cultural perspectives and diaspora networks, African immigrant entrepreneurs tap into previously unexplored markets, create jobs, and stimulate economic growth. From thriving small businesses to scalable startups, African immigrant entrepreneurs excel in various sectors, including technology, agriculture, and retail. However, their entrepreneurial journey often features financial hurdles, as traditional banking systems frequently deny them loans due to a lack of credit history, collateral, or residency status. Undeterred, African immigrant entrepreneurs navigate the financial landscape by relying on alternative funding sources, such as personal savings, family members, and ethnic community networks. Informal financial systems, like rotational savings groups and ethnic-based credit unions, also provide vital support. By manoeuvring through these financial channels, African immigrant entrepreneurs demonstrate exceptional adaptability and resourcefulness. Their success stories inspire a new generation of entrepreneurs, fostering a culture of entrepreneurship and community empowerment. The study showed that financial capital acquisition would lead to entrepreneurial success through the establishment of a business as explained by Participant #2: 'so, I used this small money that I had saved to establish my own small business.' This was corroborated by Participant #8 who explained: 'that was part of the finance that assisted me to start-up this business.' Likewise, Participant 3 said: 'yeah, my savings assisted me to acquire all the other assets that I needed for the business. The money that I was saving assisted me with all that I needed to start-up the business.'

Ethnicity can be a double-edged sword for African immigrant entrepreneurs, acting both as an approach to maximising profit and as a challenge to business growth (Andrejuk, 2016). On the one hand, ethnic uniqueness can provide access to valuable resources, markets, and networks, enabling entrepreneurs to tap into niche opportunities and cater to co-ethnic clients. This proves particularly useful in businesses where cultural skills and relationships are crucial, such as fashion, traditional, and food services. Ethnic connections can also facilitate access to mentorship, information, and capital, and help African immigrant entrepreneurs overcome challenges during the initial start-up stages. Additionally, exploiting ethnic identity can serve as a marketing approach, enabling entrepreneurs to differentiate their businesses and appeal to clients seeking reliable cultural expertise. On the other hand, ethnicity can also offer challenges to business growth. African immigrant entrepreneurs may encounter biases, xenophobia, and stereotypical attitudes from host societies, limiting their access to bigger resources and markets. Overdependence on co-ethnic connections can also hinder business success, as entrepreneurs may strive to expand beyond their ethnic niche (Andrejuk, 2016).

CONCLUSIONS

Generally, African immigrant entrepreneurs face significant challenges in acquiring financial capital, a crucial element for business success. The study reveals that the primary source of finance for these entrepreneurs is often internal, relying heavily on personal savings, which serve as a vital financial resource. However, limited personal savings can pose a substantial barrier to acquiring financial capital, hindering business growth and development. Moreover, the findings indicate that external sources of finance, such as bank loans and support from family members, also play a crucial role. Nevertheless, accessing these external sources proves daunting. Many African immigrant entrepreneurs report that no financial institution such as banks or person was approached due to concerns about rejection, high interest rates, and stringent collateral requirements. This highlights the need for alternative funding options and more inclusive financial systems. The barriers to financial capital acquisition carry significant implications for African immigrant entrepreneurs. Without access to sufficient finance, businesses may struggle to scale, innovate, or even survive. This article has contributed to the theoretical and empirical body of knowledge about how African immigrant entrepreneurs obtain financial capital to start businesses in the host country.

According to the results of this research, African immigrant entrepreneurs can build a savings culture as a primary source of funding for their business ventures. This strategy allows them to maintain control over their finances and reduce dependence on external financial sources. Moreover, African immigrant entrepreneurs can explore other financial options, for instance informal funding networks, involving family and friends or diaspora networks. Moreover, to advance access to financing, African immigrant entrepreneurs should cultivate relationships with financial institutions and develop a strong business plan that demonstrates the validity and prospects for growth of their business. Furthermore, acquiring knowledge in financial management, budgeting, and cash flow management proves crucial for making informed financial decisions. African immigrant entrepreneurs can also benefit from seeking mentorship and support from networks and organisations that cater to immigrant entrepreneurs. Microfinance entities that simply provide low-cost financing and flexible repayment terms offer a viable financing alternative. Engaging in funding education programmes tailored to immigrant entrepreneurs can also improve their financial literacy and management skills. By embracing these approaches, African immigrant entrepreneurs can develop the financial management skills essential to effectively embark on entrepreneurship in South Africa. Eventually, unlocking access to financial capital remains critical for African immigrant entrepreneurs to foster economic integration, social change and innovation. By recognising the primary sources of finance, addressing barriers to financial capital, and developing inclusive financial solutions, policymakers can foster a more vibrant entrepreneurial ecosystem that benefits both immigrant communities and the broader society. Hence, the study suggests that host countries' financial policies accommodate immigrant entrepreneurs, particularly African immigrant entrepreneurs, who wish to pursue entrepreneurship in the country. To address these challenges, policymakers and financial institutions must develop culturally sensitive and inclusive financial solutions. This includes streamlined application processes, flexible collateral requirements, and personalised financial services tailored to the distinct needs of African immigrant entrepreneurs. By bridging the financing gap, such measures can empower these entrepreneurs to drive economic integration, innovation, and job creation. Additionally, through strategic partnerships, mentorship initiatives, and targeted support programmes, organisations and policymakers can further accelerate the entrepreneurial success of African immigrants, bridging the gap between entrepreneurial goals and economic integration.

The research carries some limitations, including the small sample size of 12 African immigrant entrepreneurs and the focus on only two provinces in South Africa, which may limit the generalisability of the results. The aggregation of African immigrant countries and their nationals' experiences in South Africa may disregard significant differences, possibly covering unique obstacles and opportunities facing particular citizen groups.

Future studies could use a larger sample size, a quantitative or mixed-methods design, and a wider geographic area. Comparative research between diverse immigrant cohorts or between immigrants and indigenous entrepreneurs could offer valuable insights. Moreover, longitudinal research could help trace the financial capital acquisition approaches of African immigrant entrepreneurs over time, and a study on policy involvement and financial integration initiatives could provide guidance on strategies and support these groups.

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Use of Artificial Intelligence

The authors declare that the text is free of AI/GAI usage.

Conflict of Interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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Navigating the digital transition: Work flexibility, organisational trust, and remote work disadvantages

Katarzyna Woźniak-Jasińska, Katarzyna Mierzejewska, Michał Chomiczki

ABSTRACT

Objective: The objective of the article is to identify the relationship between work flexibility and organisational trust, as well as the moderating role of remote work disadvantages in this relationship. Specifically, this study explores how work flexibility influences trust between organisations and remote workers and the role that remote work disadvantages play in this dynamic.

Research Design & Methods: The study employed survey data gathered by a professional research firm that used the Computer-Assisted Web Interviewing (CAWI) method and involved a randomly selected sample of 322 Polish remote employees. The Ordinary Least Squares regression analysis and a Confirmatory Factor Analysis were used.

Findings: The findings indicate that work flexibility positively affects organisational trust, and reveal that remote work disadvantages, such as excessive monitoring and communication challenges, negatively impact organisational trust. Interestingly, our findings suggest that in challenging remote work environments, employees may place greater value on work flexibility as a mechanism for maintaining trust.

Implications & Recommendations: These insights hold practical implications for policies, suggesting that employers aiming to enhance organisational trust should focus on fostering a culture of mutual trust rather than relying excessively on monitoring mechanisms. Additionally, employers should implement flexible work arrangements that support employees in managing remote work-related challenges.

Contribution & Value Added: The findings of this study contribute to a deeper understanding of the relationship between work flexibility and organisational trust, emphasising the moderating role of remote work disadvantages. Our results confirm that work flexibility positively influences organisational trust, aligning with prior research indicating that remote work environments necessitate a higher level of trust due to the shift in responsibility from employers to employees.

Article type: research article

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INTRODUCTION

The social restrictions imposed in response to the COVID-19 pandemic forced many individuals to work from home (European Commission, 2022), producing a rapid increase in remote and hybrid work (Adrian *et al.*, 2025). This growth has fundamentally reshaped how employees organise and experience work. In practice, these arrangements bring greater flexibility and job autonomy, as employees typically gain more freedom to manage their time and allocate energy across tasks (Aksoy *et al.*, 2022). Work flexibility, reflected in the ability to adjust working hours, choose work location, and exercise autonomy in task management, has become one of the most significant advantages of remote work

(Coenen & Kok, 2014). A key feature of remote and hybrid work also lies in the shift in how employees structure and regulate their work, particularly in terms of when and where work is performed. Remote work may also be less physically demanding, as it eliminates commuting time (Bloom *et al.*, 2024). Remote work brings both benefits and challenges. While it offers greater flexibility, remote work also brings limited communication, social isolation, reduced face-to-face interaction, and increased employer monitoring, which may undermine trust between employees and employers (Aloisi & De Stefano, 2022; Chafi *et al.*, 2022). The expansion of remote and hybrid work has also blurred the boundaries between professional and private life (Eddleston & Mulki, 2017), weakening employees' ability to detach from work. This may pressure employees to remain 'always available,' particularly given reduced visibility outside the office (Gerich, 2022), and produces longer working hours, partly driven by difficulty separating work and personal life (Possenriede *et al.*, 2016; Toniolo-Barrios & Pitt, 2021). Consequently, despite its flexibility, remote work can contribute to communication inefficiencies, work-home interference, and loneliness (Wang *et al.*, 2021). In addition, physical distance from supervisors may reduce trust (Sewell & Taskin, 2015) and increase monitoring (Abgeller *et al.*, 2024), which itself may further extend working hours in telework settings (Awada *et al.*, 2021).

In this context, organisational trust proves critical, as remote work reduces direct supervision and face-to-face interaction, raising uncertainty in employee-manager relationships. Consequently, remote work and its characteristics may significantly shape organisational trust. Although remote work provides greater flexibility and autonomy, organisations still need to ensure performance and development, creating tension between autonomy and control (Sewell & Taskin, 2015). Flexibility in remote work can strengthen organisational trust by signalling that employers value employee autonomy and respect their professional and personal needs (Bueechl *et al.*, 2023). Greater autonomy and work control may also foster positive emotions and well-being (Hair *et al.*, 2010), encouraging self-regulation processes like goal-setting and self-reward, which enhance job satisfaction (Müller & Niessen, 2019) and work enjoyment (Niebuhr *et al.*, 2022). Organisations may also respond with increased monitoring, as managers often struggle to trust remote employees (Abgeller *et al.*, 2024). At the same time, organisational trust itself constitutes an important determinant of job performance (Bai *et al.*, 2024; Jaiswal *et al.*, 2024). Without face-to-face interaction, conflicts between employees and managers may arise from working hours or unpredictable schedules (Henly & Lambert, 2014), potentially raising control, stress, or opportunistic behaviour (Gilli *et al.*, 2022), although flexible schedules can sometimes reduce psychological strain (Jiang *et al.*, 2023). The complexity of hybrid and remote work arrangements appears in evidence that the effects of flex-time and remote work on productivity depend on employees' ability to balance scheduling flexibility, work-family conflict, and productivity (Zappalà *et al.*, 2024).

Within this framework, remote and hybrid work constitute flexible working arrangements that allow employees to deviate from their regular work location and working hours (Iga & Lipowska, 2021). Remote work refers to any arrangement where employees perform tasks remotely, outside an employer's premises or a fixed location, using digital tools like laptops, mobile phones, networks, and the internet (Eurofound, 2020), whereas hybrid work combines remote and on-site work, with employees dividing their time between the office and remote settings (Vartiainen, 2024). As hybrid arrangements have become the dominant form of flexible work for many employees (Adrian *et al.*, 2025) and may prove particularly relevant for understanding the role of organisational trust, this study focuses primarily on hybrid employees.

Therefore, the purpose of the article is to examine the relationship between work flexibility and organisational trust, as well as the moderating role of disadvantages of remote work in this relationship. Our research contributes to explaining how workplace flexibility affects trust between organisation and remote workers, and the role remote work disadvantages play in this relationship, as previous studies have not provided clear evidence on the impact of work flexibility on organisational trust in remote work. The article addresses the following questions:

RQ1: What role does work flexibility play in shaping organisational trust in remote work?

RQ2: Do remote work disadvantages moderate the relationship between work flexibility and organisational trust?

LITERATURE REVIEW AND HYPOTHESES DEVELOPMENT

The Role of Organisational Trust in Remote Work Environments

Despite the rapid advancement of information technologies, the prevalence and adoption of telework remain lower than expected due to organisational factors like managers' lack of trust in remote workers and the perceived need for face-to-face communication. A remote work environment, characterised by leadership at a distance, typically demands greater organisational trust (Jon *et al.*, 2017). Reduced visibility of employees in remote settings has prompted employers to implement various techniques and tools to monitor performance, reflecting a lack of full confidence in their ability to fulfil their responsibilities independently. These practices include documenting working hours and tasks, tracking attendance at meetings (Ruiller *et al.*, 2025), using digital tools for employee supervision, and raising the frequency of online meetings to maintain oversight (Aloisi & De Stefano, 2022; Chafi *et al.*, 2022). The use of these monitoring devices is inherently linked to expanding indirect work control in remote settings, which plays a significant role in shifting the responsibility for productivity and organisational outcomes from supervisors to employees (Gerich, 2022).

In light of these emerging transformations driven by the advancement of remote work and indirect work control, many organisations foster a culture of mutual trust, assuming fair treatment and responsible flexibility, shown to enhance employee satisfaction, even during the COVID-19 pandemic (Bueechl *et al.*, 2023). Empirical research highlights that both employees' trust in their organisations and managers' trust in their employees correlate positively with remote work outcomes (Vyas & Butakhieo, 2021). Findings also suggest that employees' trust in their supervisors significantly shapes self-reported productivity, job satisfaction, perceived career opportunities, and perceived benefits of telework (Nakrošienė *et al.*, 2019) while a lack of trust produces dissatisfaction and frustration among workers (Varshney, 2021).

The literature also highlights that fostering social relationships can effectively improve workers' trust both during remote work and on-site, while reducing workplace conflicts (Hafermalz & Riemer, 2021). Building trust between employees and employers in remote work settings has also faced challenges in achieving effective communication (Longmuir, 2023). All in all, remote work often requires a higher level of trust between workers and employers than traditional office settings. Yet employers still need to monitor tasks, activities, and overall progress. From the employers' perspective, such oversight, whether through meetings or check-ins, serves as a necessary means of ensuring productivity. However, from the employees' point of view, these actions may sometimes be interpreted as a lack of trust.

Work Flexibility as an Antecedent of Organisational Trust in Remote Work

Against this backdrop, work flexibility constitutes a critical organisational resource that fosters organisational trust in remote work settings. Flexible work arrangements foster organisational trust by creating reciprocity, perceived support, and reduced strain. By enabling better work-life balance, flexibility strengthens employees' sense of organisational care and support, which strengthens trust and loyalty towards the employer (Çemberci *et al.*, 2022). This mechanism aligns with commitment-trust theory (Morgan & Hunt, 1994), emphasising that supportive and resourceful work environments foster durable trust relationships, as well as with social cognitive theory (Khuram *et al.*, 2025), which posits that employee attitudes and behaviours reflect the interaction of environmental conditions, individual perceptions, and behavioural responses. Work flexibility may thus function as a key environmental resource shaping employees' perceptions of organisational trust.

Notably, flexible work practices strengthen trust in management, alleviating job-related anxiety (Yunus *et al.*, 2022), while also reinforcing organisational trust when embedded within a supportive organisational culture and effective leadership (Iddrisu, 2025; Kloepper & Carbon, 2025). Teborg *et al.* (2024) indicate that flexibility in organisation constitutes an important element of organisational structures that shape trust relations and broader trust-building conditions. High-autonomy flexible working arrangements, like trust-based working time systems, signal a positive organisational stance toward employees, thereby fostering development of mutually trusting relationships (Viète & Erdsiek, 2020). More-

over, findings from research in digitally work contexts indicates that flexibility enhances organisational commitment, closely associated with trust and the quality of workplace relationships (Singh *et al.*, 2024).

The evidence indicates that work flexibility directly or indirectly fosters organisational trust. Findings consistently point to a positive relationship between flexibility and trust. Therefore, we formulated the following hypothesis:

- H1:** There is a positive relationship between work flexibility and organisational trust in remote work settings.

The Moderating Role of Remote Work Disadvantages

Although flexibility is often cited as one of the greatest advantages of remote work, this form of work also brings drawbacks. Remote work often produces longer working hours (Possenriede *et al.*, 2016) primarily due to difficulty separating work from personal life (Toniolo-Barrios & Pitt, 2021). Monitoring systems designed to improve and control productivity also extend working hours. Furthermore, employer-employee conflict is driven by the unpredictability of work schedules (Henly & Lambert, 2014). Unpredictable work schedules set by employers may result in greater control over employees, leading to increased stress (Kniffin *et al.*, 2021). Moreover, the erosion of trust is considered one of the more significant drawbacks of remote work. Workplace isolation undermines trust by weakening the quality of organisational communication and information exchange (Zoonen *et al.*, 2024). Limited face-to-face interaction weakens trust development within supervisor-employee relationships (Hanz & Mckinnon, 2026). Similarly, workplace isolation diminishes the quality of interactions needed to maintain trust among colleagues (Urrila *et al.*, 2025).

Under challenging remote work conditions, the importance of work flexibility increases. Kesenheimer *et al.* (2025) indicate that employees 'generally value flexibility more than potential declines in workplace relationships' (Kesenheimer *et al.*, 2025). Flexibility plays a crucial role in enhancing work-life balance, fostering autonomy, and strengthening perceptions of organisational support, factors that grow particularly important when remote work conditions generate strain. Flexibility can also buffer stress and sustain employee well-being when remote work disadvantages are more pronounced (Çemberci *et al.*, 2022).

Together, remote work disadvantages may erode trust, whereas work flexibility can act as a compensatory resource, fostering autonomy, support, and commitment. From a conservation-of-resources perspective, flexibility may serve as a critical resource enabling employees to cope with strain and maintain positive work-related outcomes under demanding conditions (Omar *et al.*, 2024). This reasoning is consistent with prior research (Fateh *et al.*, 2024) showing that the effects of individual and contextual resources depend on situational conditions, with stronger effects observed when employees face greater remote work disadvantages. Flexibility should accordingly exert a stronger positive effect on organisational trust when employees face greater remote disadvantages. On this basis, we formulated the following hypothesis:

- H2:** The positive impact of work flexibility on organisational trust is higher when employees experience higher disadvantages in remote work.

RESEARCH METHODOLOGY

Data Collection and Sampling

The survey data were collected by a professional research firm using the CAWI method. The study involved a randomly selected sample of 322 Polish employees working in remote settings (77.33% hybrid, 22.67% fully remote). The gender distribution was nearly balanced, with men slightly outnumbering women (51.86% men, 49.14% women). Most respondents held at least a bachelor's degree (69.25%), and the most common role was specialist/independent (59.63%). Managers accounted for 23.91% of the sample. Most participants worked in the services sector (83.85%), indicating a predominantly service-based sample.

The data were collected in March 2024 and verified by two independent experts before coding and analysis. We conducted the analysis using Jupyter Notebook (version 6.4.5) and Python (version

3.9.7) with the following packages: NumPy (1.22.4), pandas (2.1.4), SciPy (1.13.1), statsmodels (0.14.1), and semopy (2.3.9).

Measures

To define and quantify the variables, we employed measurement scales derived from previously validated research (Grant *et al.*, 2019; Ingusci *et al.*, 2023). All scales, originally in English, were translated into Polish via the back-translation method.

For organisational trust (*ewor_trust*) and work flexibility (*ewor_flex*), we adopted the framework proposed by Grant *et al.* (2019). Each construct corresponds to one of the four scales of the E-Work Life Scale tool. The remaining two constructs (work-life interference and productivity) were not the subject of this study. Both scales representing *ewor_trust* and *ewor_flex* comprise three items. In terms of remote work disadvantages (*disadv*) we adopted the proposal by Ingusci *et al.* (2023). The Remote Working Benefits and Disadvantages Scale examines two constructs: the benefits and disadvantages of remote work. For this study, we used only one of the two scales of this tool, the one on disadvantages. The questionnaire is available from the corresponding author upon reasonable request.

We conducted CFA to evaluate the reliability and validity of the measurement model, which included four key constructs assessed from different perspectives, including factor loadings ($FL > 0.6$) (Awang, 2012; Hair *et al.*, 2010), Cronbach's alpha, composite reliability ($C\alpha$ and $CR > 0.70$) (Hair *et al.*, 2010), and Average Variance Extracted ($AVE > 0.50$; Table A3 in Appendix 1) (Chau, 1997). All constructs demonstrated strong internal consistency, evidenced by the Cronbach's alpha ($C\alpha$) and composite reliability (CR) values, both of which meet or exceed the commonly accepted threshold of 0.7, except for *ewor_trust*, with a lower $C\alpha$ value (0.633) and a CR value of 0.705. Two constructs, *disadv* and *ewor_flex*, exhibited adequate convergent validity with AVE values above 0.5. Although the AVE for *ewor_trust* (0.469) falls slightly below the recommended threshold of 0.50, we retained the construct for several reasons. Firstly, the composite reliability ($CR = 0.705$) exceeds the recommended minimum of 0.70, indicating acceptable internal consistency despite the lower AVE . Previous research suggests that when CR exceeds 0.60, convergent validity may still be considered adequate even if AVE falls below 0.50 (Fornell & Larcker, 1981). Secondly, the construct is theoretically central to the model and derived directly from a previously validated scale (Grant *et al.*, 2019), supporting its content validity. Thirdly, the scale contains only three indicators, and removing the lowest-loading item would substantially narrow the conceptual domain of organisational trust in e-working contexts. Given these considerations, we retained the construct, although the results involving *ewor_trust* warrant cautious interpretation. Future research should refine the measurement by revising or expanding the item pool.

RESEARCH METHODOLOGY

The conceptual framework for the analysis is presented in Figure 1¹.

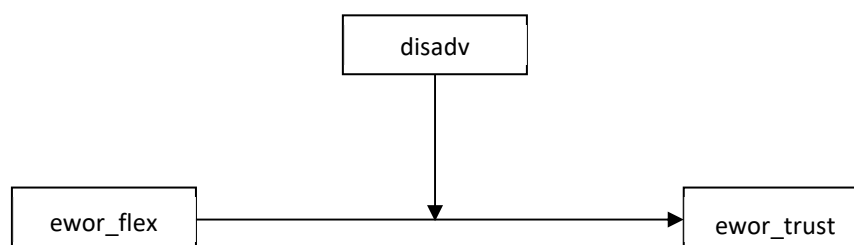


Figure 1. Conceptual framework for basic moderation analysis

Source: own elaboration.

¹ The descriptive statistics, normality assessment metrics, and correlation matrix are available from the corresponding author upon reasonable request.

The analysis treats *ewor_trust* as the dependent variable, *ewor_flex* as a predictor, and *disadv* as a moderator. Table 1 summarises the moderation analysis results, highlighting the relationships between *ewor_trust*, *ewor_flex*, and *disadv*, and their interactions across different model specifications.

Table 1. Regression models underlying moderation analysis

Identified category	Estimate	SE	z	p	Confidence Interval	
					Lower	Upper
ewor_trust ~						
Intercept	1.8823	0.154	12.189	<0.001	1.579	2.186
ewor_flex	0.4774	0.040	11.872	<0.001	0.398	0.556
ewor_trust ~						
Intercept	2.3609	0.201	11.760	<0.001	1.966	2.756
ewor_flex	0.4712	0.040	11.929	<0.001	0.393	0.549
disadv	-0.1951	0.054	-3.635	<0.001	-0.301	-0.089
ewor_trust ~ (centered variables)						
Intercept	3.6639	0.037	99.393	<0.001	3.591	3.736
ewor_flex_c	0.4866	0.039	12.504	<0.001	0.410	0.563
disadv_c	-0.2352	0.054	-4.384	<0.001	-0.341	-0.13
ewor_flex_c:disadv_c	0.1914	0.051	3.778	<0.001	0.092	0.291
ewor_trust ~						
Intercept	4.0657	0.492	8.259	<0.001	3.097	5.034
ewor_flex	0.0396	0.121	0.329	0.743	-0.198	0.277
disadv	-0.9471	0.206	-4.600	<0.001	-1.352	-0.542
ewor_flex:disadv	0.1914	0.051	3.778	<0.001	0.092	0.291

Source: own study.

In the base model, *ewor_flex* positively predicts *ewor_trust*, indicating a strong, significant direct effect. The model explains 30.6% of the dependent variable's variability. Adding *disadv* to the model introduces a significant negative effect on *ewor_trust*, suggesting that *disadv* correlates with lower *ewor_trust*. The positive association between *ewor_flex* and *ewor_trust* remains robust in the full model.

In the model assessing moderation effects between *ewor_flex* and *disadv*, the interaction term (*ewor_flex_c:disadv_c*) emerges significant, indicating a moderating effect. This suggests the relationship between *ewor_flex* and *ewor_trust* strengthens at higher levels of *disadv*. The main effects of *ewor_flex* and *disadv* remain significant, with confidence intervals supporting the stability of these estimates. The estimates of the coefficients in the model with centred variables show their effects relative to deviations from their mean values. The alternative specification shows that the main effect of *ewor_flex* becomes non-significant owing to multicollinearity and the dominance of the interaction term, while *disadv*'s negative impact remains substantial. Despite its limitations, we retained the alternative specification to enable Johnson–Neyman intervals and pick-a-point analyses shown below. The moderated model explains 36.2% of the variance in the dependent variable, with the interaction term raising explanatory power by 5.6 percentage points.

The results reveal a complex interplay among flexibility, disadvantages, and trust. *Ewor_flex* consistently predicts *ewor_trust* positively, while *disadv* negatively affects it. The significant interaction between *ewor_flex* and *disadv* highlights that the positive effect of *ewor_flex* on *ewor_trust* amplifies under higher *disadv*, underscoring the contextual dynamics of workplace trust. The results of the Johnson–Neyman probing, conducted at 0.5 intervals appears in Table 2. The conditional effect of *ewor_flex* on *ewor_trust*, given the value of *disadv*, follows the formula: $0.0396 + 0.1914 \times \text{disadv}$. The conditional effect of *ewor_flex* on *ewor_trust* intensifies as the level of *disadv* increases, as illustrated in Figure 2.

The findings show a strong positive correlation between organisational trust and work flexibility. Second, our results highlight that work flexibility positively shapes workplace trust. These findings align with previous studies indicating that remote work due to its specificity usually requires a higher level of organisational trust (Jon *et al.*, 2017). As indicated, this increased trust is largely influenced by the

development of indirect work control, which shifts responsibility for organisational outcomes from employer to employee in remote work (e.g. Gerich, 2022).

Table 2. Johnson-Neyman interval analysis for conditional moderation effects

Value of disadv	Effect	SE	z	p	Confidence Interval	
					Lower	Upper
1.0	0.231	0.0744	3.10	0.002	0.085	0.377
1.5	0.327	0.0544	6.00	<0.001	0.220	0.434
2.0	0.422	0.0408	10.35	<0.001	0.342	0.503
2.5	0.518	0.0406	12.75	<0.001	0.438	0.598
3.0	0.614	0.0541	11.35	<0.001	0.507	0.720
3.5	0.709	0.0740	9.59	<0.001	0.564	0.855
4.0	0.805	0.0965	8.34	<0.001	0.615	0.995

Source: own study.

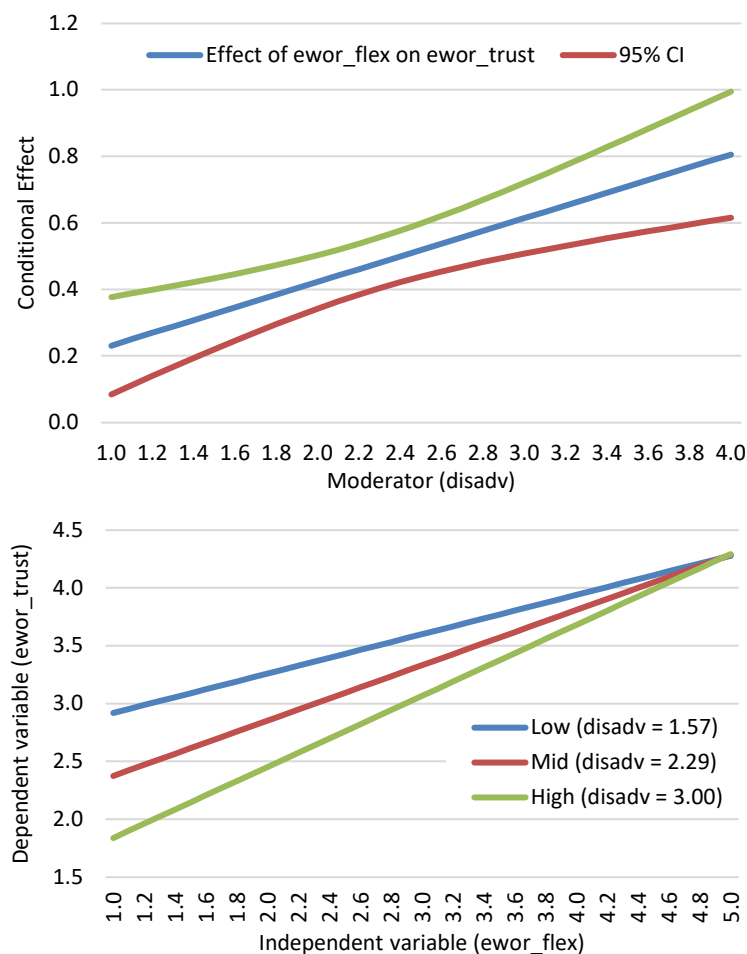


Figure 2. Conditional Effect and its Visualization at Selected Percentiles of the Moderator

Source: own elaboration.

These findings provide direct support for H1 and offer a clear answer to RQ1. This result aligns with prior theoretical arguments that flexibility operates as a key organisational resource fostering reciprocity, perceived support, and reduced strain (Çemberci *et al.*, 2022). From the perspective of commitment-trust theory (Morgan & Hunt, 1994), flexible arrangements signal organisational goodwill and strengthen relational bonds, while social cognitive theory suggests that such environmental conditions shape positive employee perceptions and trust-related attitudes (Khuram *et al.*, 2025). Our findings are also consistent with research showing that high-autonomy flexibility, like trust-

based working time systems, acts as a signal of organisational trust toward employees, thereby reinforcing mutual trust relationships (Viète & Erdsiek, 2020).

Our results indicate that the disadvantages of remote work significantly harm workplace trust. Previous studies suggest that managers often overuse monitoring tools during remote work (e.g., documenting working hours and tasks, tracking attendance at meetings) to maintain oversight (Aloisi & De Stefano, 2022; Chafi *et al.*, 2022). This excessive surveillance may signal a lack of trust, ultimately producing dissatisfaction and frustration among employees (Varshney, 2021). Organisational trust can also serve as a substitute for direct control reducing the need for monitoring tools and lowering employee stress (e.g. Chafi *et al.*, 2022).

This negative association aligns with prior literature emphasising that remote work disadvantages, like isolation, communication barriers, and blurred work-life boundaries, erode trust by weakening relational quality and increasing strain (Hanz & Mckinnon, 2026; Toniolo-Barrios & Pitt, 2021; Zoonen *et al.*, 2024). Our findings thus further substantiate the view that trust in remote contexts is particularly vulnerable to structural and interactional limitations inherent in digitally mediated work.

Interestingly, our findings suggest that the relationship between workplace flexibility and organisational trust strengthens when the disadvantages of remote work intensify, highlighting the contextual nature of workplace trust. In such conditions, employees may value flexibility more as a mechanism for sustaining trust. When remote work involves challenges like occasional overtime (Bloom *et al.*, 2015; Possenriede *et al.*, 2016) or work-family conflict, access to flexible arrangements such as breaks, days off, greater autonomy, or flexible scheduling can sustain trust between employees and organisations. Similarly, when remote work produces communication difficulties from reduced face-to-face interaction, organisational trust may depend on how effectively flexibility is managed. Prior research shows that physical distance between supervisors and employees can reduce trust through infrequent face-to-face contact (Sewell & Taskin, 2015) and ineffective communication (Longmuir, 2023), reinforcing the importance of managing flexibility in remote work environments.

This result provides crucial empirical support for H2 and directly addresses RQ2, demonstrating that remote work disadvantages act as a significant moderator of the flexibility-trust relationship. In line with conservation-of-resources theory, flexibility can be interpreted as a compensatory resource that becomes particularly valuable under conditions of increased strain (Omar *et al.*, 2024). When employees experience higher remote work disadvantages, the value of flexibility intensifies, strengthening its positive effect on organisational trust. This aligns with prior evidence suggesting that the impact of organisational and contextual resources depends on situational demands, with stronger effects under more adverse conditions (Fateh *et al.*, 2024). Our findings also echo arguments that employees tend to prioritise flexibility even at the expense of relational drawbacks in remote work (Kesenheimer *et al.*, 2025), indicating that flexibility not only mitigates strain but also sustains trust by reinforcing perceptions of autonomy, organisational support, and work-life balance.

CONCLUSIONS

This study's findings contribute to a deeper understanding of the relationship between work flexibility and organisational trust, emphasising the moderating role of remote work disadvantages. Our results confirm that work flexibility positively shapes organisational trust, aligning with prior research indicating that remote work environments necessitate a higher level of trust due to the shift in responsibility from employers to employees. Importantly, the study highlights that disadvantages associated with remote work, like excessive monitoring, work-family conflicts, and communication challenges, negatively affect organisational trust. This underscores the delicate balance between managerial oversight and employee autonomy in fostering trust-based work environments.

Furthermore, our findings reveal an intriguing dynamic: the positive link between work flexibility and organisational trust becomes even stronger when the disadvantages of remote work are more pronounced. This suggests that in challenging remote work conditions, employees may value workplace flexibility more as a mechanism for maintaining trust. The ability to adjust work schedules,

take breaks as needed, and exercise autonomy in task management proves crucial in sustaining trust between employees and their organisations.

Our results provide important insights into managing employees in remote and hybrid work settings, particularly the role of organisational trust. A key implication for managers is to foster trust in hybrid environments, as work flexibility positively shapes organisational trust. This proves especially relevant given that responsibility for performance is partially shifted from managers to employees due to reduced direct supervision. Another implication is the need to balance employee autonomy with appropriate control, shifting the focus from monitoring working hours toward managing performance outcomes. Given the identified challenges of remote work for trust–flexibility relationships, managers should also support employees in managing blurred work–life boundaries and encourage the use of technology in a way that avoids an ‘always-on’ culture. Strengthening trust also requires improving communication quality in hybrid settings. Finally, ensuring adequate equipment and IT support for remote work proves essential, as technical issues may affect both employee well-being and productivity.

Our study also has limitations that suggest directions for future research. Firstly, the study’s generalisability remains limited by its sample size and focus on the Polish service sector. To enhance representativeness and enable cross-sector comparisons, future research should expand the sample to include remote workers from various industries and countries. Secondly, our survey provides only a snapshot of remote workers’ experiences at a specific point in time. A longitudinal study could offer deeper insights into how perceptions of remote work benefits and drawbacks, alongside well-being, evolve over time. Thirdly, the reliance on self-reported measures may introduce common method bias and social desirability effects. Future research could benefit from incorporating multi-source data (e.g., supervisor ratings or objective indicators). Fourthly, the use of OLS regression, although appropriate for the tested relationships, cannot fully capture more complex interdependencies between variables. Future research could employ more advanced analytical approaches, like structural equation modelling, to simultaneously assess direct and indirect effects. Finally, the study focuses on selected aspects of remote work disadvantages, organisational trust, and work flexibility. Future research could expand the model by adding individual (e.g., digital competencies) and organisational factors (e.g., leadership styles) to provide a more comprehensive understanding of employee functioning in digitally mediated work environments. Despite these limitations, our findings contribute to a growing body of knowledge in studies on remote work, organisational trust and work flexibility.

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Entrepreneurial exit in manufacturing firms: The role of export performance, firm attributes, and founder characteristics

Muhammet Mustafa Akkan

ABSTRACT

Objective: The objective of the article is to identify the multi-level determinants that influence the exit route preferences of founders and partners in the Turkish manufacturing sector. Beyond a binary success-failure narrative, the study employed an integrated three-block framework to examine how international performance, organisational attributes, and individual human capital jointly shape strategic exit decisions.

Research Design & Methods: This study used a quantitative methodology, and I tested the hypotheses developed from the study's objectives using data from 210 individuals surveyed by questionnaire. The analysis comprised a t-test, correlation analysis, and hierarchical multiple linear regression run in Jamovi 2.3.28.

Findings: Export performance correlates significantly and positively with IPO preference, while education level is the strongest predictor of professionalised exit routes. Family business status and industry experience correlate strongly with family succession preference, which reflects the tension between financial value realisation and socio-emotional legacy.

Implications & Recommendations: The study underscores the need for exit literacy among entrepreneurs, stressing that exit planning should be proactive and integrated into the firm's growth phase. For policy-makers, the findings point to institutional frameworks that support transparent M&A markets preserving productive knowledge during ownership transitions.

Contribution & Value Added: This is the first quantitative study in the Turkish context to analyse entrepreneurial exit through a multivariate lens. Its novelty lies in identifying international market integration as a critical factor in professionalised exit strategies, thereby reframing the discourse from business closure as failure to exit as a strategic mechanism for value realisation.

Article type: research article

Keywords: entrepreneurial exit; exit intention; exit experience; export performance; international trade

JEL codes: F14, L25, L26

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INTRODUCTION

Researchers have shown that individuals start and manage businesses for diverse reasons, including the wish to capitalise on opportunities, the pursuit of autonomy, the desire for self-actualisation, or a lack of alternative employment (Carter *et al.*, 2003; Shane & Venkataraman, 2000). Plausibly, individuals possess diverse motivations for exiting entrepreneurship (Wennberg *et al.*, 2010).

The literature addresses exit at both the firm and individual levels. Entrepreneurs can leave the companies they founded, while those companies keep operating. Conversely, firms may close while entrepreneurs continue through a new venture (Parastuty, 2018). DeTienne (2010) and Wennberg

et al. (2010) lay the theoretical foundations of entrepreneurial exit, distinguishing it from firm exit. According to DeTienne (2010), entrepreneurial exit means severing ownership ties and ceasing any management function within the company.

This issue is critical because the exit process starts with initial thoughts and intentions to leave the venture (DeTienne & Cardon, 2012). Furthermore, exit route preference refers to the entrepreneur's strategic inclination towards specific ways of leaving the venture (Sardeshmukh *et al.*, 2021). These range from founder exit to complete closure of the firm.

Understanding and adopting entrepreneurial exit is an essential element of the entrepreneurial process (DeTienne, 2010). Theory-oriented research is still needed on the methods entrepreneurs use to exit their ventures, the factors shaping exit route choice and its antecedents (DeTienne & Wennberg, 2013; Wennberg & DeTienne, 2014). Thus, an important gap remains in how entrepreneurs conceptualise their exits and what shapes their distinct route preferences.

The literature extensively investigates many factors that influence entrepreneurs' intentions to exit (Chirico *et al.*, 2020). However, surprisingly, the impact of a firm's exposure to international markets, and more precisely its export performance, on the founder's exit horizon remains overlooked. I address this gap by treating export performance as more than another control variable, by framing export activity as a structural catalyst for the firm's evolution. My study focused on exporting rather than other internationalisation modes because in the context of emerging-market manufacturing SMEs, exporting is the primary and often only viable means of international market engagement.

A central theoretical challenge lies in distinguishing its role as a marker of organisational maturity from its role as an active mechanism of change. From a selection mechanism perspective (Melitz, 2003; Wagner, 2007), only the most productive and institutionally robust firms successfully enter and sustain export markets. Taken alone, this would suggest that export performance merely reflects pre-existing firm quality, rather than an independent driver of strategic outcomes.

However, the above interpretation ignores what happens after firms enter export markets. Substantial evidence on learning-by-exporting shows that international market engagement actively transforms firms beyond their pre-entry characteristics (De Loecker, 2013; Salomon & Shaver, 2005; Beleska-Spasova, 2014). Exposure to foreign buyers, regulators, and competitors imposes coercive and normative pressures (DiMaggio & Powell, 1983) that compel firms to adopt formalised governance structures, transparent financial reporting, and standardised operational processes that go beyond what pre-entry productivity can explain (Fernandes & Isgut, 2015; Greenaway & Kneller, 2007). Selection and learning are therefore not competing explanations but complementary processes: firms enter export markets because they are productive, and participation in those markets further transforms them.

The empirical pattern observed in this study further supports this interpretation. If export performance were purely a marker of pre-existing organisational quality, I would expect it to correlate broadly with all professionalised exit routes. The findings, however, tell a more specific story: export performance is associated with initial public offering (IPO) preference but not with financial sale. A marker logic alone struggles to explain this differentiation. It fits better with the argument that export engagement generates specific organisational characteristics, including greater public visibility, financial transparency, and compliance with international standards, which align more naturally with the institutional requirements of public market exits than with private financial transactions (Cumming, 2008; Poulsen & Stegemoller, 2008).

This article answers the call for further theoretical development on entrepreneurial exit (Wennberg & DeTienne, 2014) by examining how export performance, the human capital of founders, and firm-specific characteristics relate to preferences for five exit routes.

LITERATURE REVIEW AND HYPOTHESES DEVELOPMENT

Entrepreneurial exit is not merely a binary event in which the firm either succeeds or fails but rather an increasingly complex and strategic process (DeTienne, 2010; Wennberg & DeTienne, 2014). Entrepreneurs compare their firm's performance against personal reference points shaped by their experi-

ence, education, age, and other factors (Gimeno *et al.*, 1997; Pinkovetskaia *et al.*, 2020) when evaluating whether to persist or exit, and consistent with this perspective, Koladkiewicz *et al.* (2023) stress that exit is not a yes or no decision, but a continuum of exit options.

Methodologically, it is important to distinguish between entrepreneurial exit as an observed behaviour and exit-related cognitions such as intentions or preferences. While exit refers to the actual discontinuation of ownership and managerial involvement (DeTienne, 2010), exit intentions capture the conscious plan or desire to leave the venture (Sardeshmukh *et al.*, 2021). In contrast, this study focused on exit route preferences, which reflect the entrepreneur's evaluation of alternative exit strategies rather than a committed intention to exit. These preferences are conceptualised as indicators of strategic orientation and cognitive readiness towards different exit options.

The Strategic Logic of Exit Route Differences

Not all exit routes carry equivalent strategic implications, and understanding why founders may prefer one over another requires a clear theoretical distinction between them. Drawing on DeTienne (2010) and Wennberg *et al.* (2010), exit routes can be broadly organised along two dimensions. The first dimension concerns the degree of market intermediation: professionalised routes such as IPOs and financial sales involve external market actors, require formal valuation processes, and depend on the firm's institutional legibility – that is, its capacity to be evaluated by parties with no prior knowledge of the firm. The second dimension concerns the underlying objective of the exit: value-maximising routes prioritise financial value realisation, whereas legacy-preserving routes prioritise continuity, identity, and intergenerational transfer over financial return.

Initial public offerings and financial sales both occupy the professionalised quadrant but differ in important ways. An IPO requires compliance with public market regulations, audited financial statements, and a level of organisational transparency that goes beyond what most private transactions demand (Cumming, 2008). A financial sale involves negotiated due diligence and may tolerate a somewhat lower degree of formalisation. While also market-based, partner purchase typically involves parties who already possess inside knowledge of the firm, reducing the information asymmetry problem considerably. On the other hand, family transfer and liquidation operate outside market mechanisms entirely: the former prioritises relational and emotional considerations over financial optimisation (Gomez-Mejia *et al.*, 2007), while the latter represents the complete dissolution of firm value rather than its transfer.

This taxonomy allows the factors examined in this study to be linked to specific exit routes through distinct theoretical channels, rather than as uniform predictors of a generic exit preference. The hypotheses developed below follow this logic explicitly.

Export Performance and Strategic Readiness

Financial returns usually count as the primary motivation for entrepreneurial exit (Bhawe *et al.*, 2017; Shepherd & DeTienne, 2005). Beyond purely financial metrics, export performance serves as a critical structural catalyst for organisational maturity. Before developing this argument, I address one concern: whether export performance functions as an active mechanism shaping exit preferences, or merely as a marker of firms that are already more developed and institutionally mature. I argue that while the selection mechanism perspective (Melitz, 2003; Wagner, 2007) rightly establishes that only the most productive firms sustain export markets, this does not reduce export performance to a passive indicator. The learning-by-exporting literature shows compellingly that international market engagement actively transforms firms after entry, generating organisational changes that go beyond pre-entry characteristics (De Loecker, 2013; Greenaway & Kneller, 2007; Fernandes & Isgut, 2015). Therefore, selection and learning are complementary rather than competing processes, and export performance gains its explanatory power over exit route preferences through this learning channel.

The literature establishes exporting as both a selection mechanism (Melitz, 2003; Wagner, 2007) and a source of learning-by-exporting (De Loecker, 2013; Salomon & Shaver, 2005; Silva *et al.*, 2012). Exposure to various partners and competitors in foreign markets confronts exporting companies with new norms, practices, and rigorous expectations (Cieslik *et al.*, 2015; Cicic *et al.*, 2002). Thus, international engagement drives organisational institutionalisation, encouraging manufacturing

firms to move from highly personalised, founder-centric entities to more standardised, professional organisations (Lu & Beamish, 2001; Zahra, 2003; Kostova *et al.*, 2008). This process also brings broader shifts in structural governance (Lu *et al.*, 2012).

This export-driven institutionalisation serves as the theoretical bridge to specific exit route preferences. In traditional manufacturing firms, reliance on the founder's tacit knowledge creates severe information asymmetry for external buyers, often steering the founder to informal family succession (DeTienne & Chirico, 2013). However, the standardised processes and transparent governance that high export performance requires significantly reduce this information asymmetry, and make the firm highly legible and attractive to external acquirers. Building on Cumming (2008) and Poulsen and Stegemoller (2008), I propose that this institutionalised readiness favours professionalised exit routes that prioritise financial value realisation, such as IPOs or structured financial sales.

H1a: A firm's export performance is significantly and positively associated with the preference for financial sale.

H1b: A firm's export performance is positively associated with the preference for an IPO.

H1c: A firm's export performance is negatively associated with the preference for transferring the firm to family members.

Firm Attributes and Structural Boundaries

Organisational characteristics define the structural boundaries of possible exit strategies (Van Teefelen & Uhlaner, 2013; Sanguineti *et al.*, 2022). While factors such as firm size and age capture accumulated resources and structural complexity – and are thus included as baseline controls in our empirical models – the primary explanatory variable in this block is the family nature of the firm.

Drawing on socio-emotional wealth (SEW) theory (Gomez-Mejia *et al.*, 2007), a firm's family status strongly shapes both emotional and financial exit thresholds, particularly in emerging markets such as Turkey. Firm reputation matters greatly to family firms, which seek to pass the firm to the next generation and preserve their socio-emotional wealth (Deephhouse & Jaskiewicz, 2013; Akhter *et al.*, 2016). Thus, selling the firm is not only a financial decision but also a severe break with family heritage (Miller *et al.*, 2016).

H2a: Family business status is positively associated with the preference for transferring the firm to family members.

H2b: Family business status is negatively associated with the preference for a financial sale.

Human Capital and Individual Vision

Grounded in human capital theory (Becker, 2009), founders' knowledge and skills closely shape their cognitive abilities and strategic decision-making quality (Leroy *et al.*, 2015). I include individual-level factors such as founder age and general industry experience strictly as control variables to account for baseline risk appetite and emotional attachment to the business (Kammerlander, 2016; Lau & Busenitz, 2001), our primary explanatory focus in this block is formal education and specific prior exit experience.

Formal education theoretically strengthens the founder's capacity to process complex information, access external finance, and set ambitious exit goals (Cooper *et al.*, 1994; DeTienne & Cardon, 2012; Koladkiewicz *et al.*, 2022). Drawing on the serial entrepreneurship literature, previous exit experience provides a specific strategic template. Unlike general industry experience, empirical evidence suggests that prior exit experience aligns with ventures created for personal wealth generation, thus aligning with preferences for value-maximising strategies like financial sales (Ucbasaran *et al.*, 2003; Davidsson & Wiklund, 2001).

H3a: Founder or partners' education level is positively associated with the preference for a financial sale.

H3b: Founder or partners' education level is positively associated with the preference for an IPO.

H3c: Previous exit experience is positively associated with the preference for a financial sale.

H3d: Previous exit experience is positively associated with the preference for an IPO.

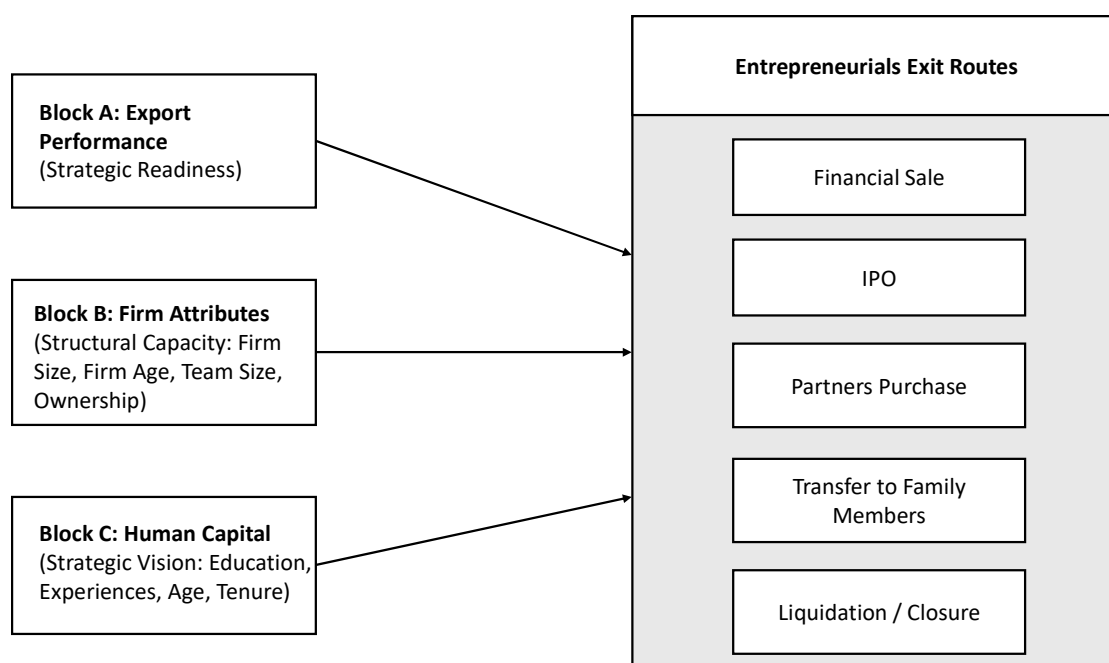


Figure 1. Research model

Source: own elaboration.

Figure 1 illustrates the proposed research framework. The model groups the primary explanatory variables into three thematic blocks: strategic readiness, socio-emotional boundaries, and strategic capacity. I include baseline factors such as firm age, firm size, and industry experience as control variables. Moreover, I treat export performance as an independent explanatory variable, not as a proxy for institutionalisation; I theorise the underlying mechanisms as unobserved intermediaries linking global market engagement to exit route preferences.

RESEARCH METHODOLOGY

Sampling Process and Participant Profile

This study used a cross-sectional design, drawing on primary data from the founders or partners of companies operating in the manufacturing sector in Türkiye. I collected the data with a structured questionnaire aimed at companies identified through records of chambers of industry and commerce. I administered the questionnaire electronically through an online survey platform. Analyses drew on 210 valid surveys.

For this study, I defined the ‘founders and partners’ (the central target group) by two criteria. Firstly, they have been involved in the founding of the firm and, secondly, they possess current strategic management control and ownership of the firm. Therefore, respondents are not just financial investors but the firm’s owners, who make and implement exit decisions. The sample includes entrepreneurs at different business life-cycle stages, spanning a broad range of strategic perspectives on future exit options. Table 1 presents the detailed demographic and firm-level characteristics of these respondents, together with the key descriptive statistics.

Survey Structure and Measurement Tools

The survey form had three main sections adapted from established studies. The first section covered firm-level characteristics and export readiness. As the primary explanatory variable for the firm’s socio-emotional structure, the study examined family business status (Justo & DeTienne, 2008; Deephouse & Jaskiewicz, 2013). Additionally, serving as the indicator of strategic readiness, Export Performance

was measured by the firm's export share and volume relative to its general performance over the last three years (Beleska-Spasova, 2014; Sanguineti *et al.*, 2022).

Table 1. Descriptive statistics

Category	Characteristic	n	%
Firm Size (Employees)	5-10 Employees	13	6.2
	10-20 Employees	45	21.4
	20-30 Employees	73	34.8
	30+ Employees	79	37.6
Firm Type	Family Business	105	50.0
	Non-Family Business	105	50.0
Export Mode	Direct Export	174	82.9
	Indirect Export	36	17.1
Founder Gender	Male	187	89.1
	Female	23	11.0
Founder Age	26-35	25	11.9
	36-45	88	41.9
	46-55	92	43.8
	56 and above	4	1.9
	Note: Under 25	1	0.5
Education Level	Primary/Middle School	6	2.9
	High School	51	24.3
	Bachelor's Degree	128	61.0
	Master's/PhD	25	11.9
Exit Experience	Has prior exit experience	88	41.9
	No prior exit experience	122	58.1
The idea of implementing an exit strategy	Yes	108	51.4
	No	102	48.6

Source: own study.

Survey Structure and Measurement Tools

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The second section covered entrepreneurial human capital and experience. The founder's formal education level (Robinson & Sexton, 1994; Koladkiewicz *et al.*, 2022) and specific prior exit experience (DeTienne & Cardon, 2012) served as the core theoretical predictors of strategic capacity.

The third and final section measured exit route preferences. The dependent variables were operationalised through the following survey item: 'Please evaluate the likelihood of preferring each of the following exit routes.' Respondents rated five alternative exit routes – financial sale, IPO, partner purchase, family transfer, and liquidation/closure – independently on a five-point Likert scale ranging from 'would definitely not prefer' to 'would definitely prefer.' This approach treats each exit route as a separate attitudinal dimension rather than a forced ranking, which is consistent with the operationalisation adopted in prior research (DeTienne & Cardon, 2012; Koladkiewicz *et al.*, 2022).

Moreover, I clarified the role of an additional item included in the survey: 'Have you ever considered implementing an exit strategy? (Yes/No).' I did not use this item as a dependent variable. I included it solely to describe the sample and show how far exit planning is on the agenda of Turkish manufacturing founders. As shown in Table 1, 51.4% of respondents indicated that they had considered implementing an exit strategy, underscoring the relevance of exit planning within this sample.

Data Analysis Strategy

I analysed the data with a stepwise procedure along with independent-samples t-tests to examine group differences in exit route preferences and correlation analysis to identify initial relationships among continuous variables. I built two-step hierarchical regression models for each exit route, entering baseline structural controls in Step 1 and theoretical predictors in Step 2, thereby enabling assessment of incremental explanatory power (ΔR^2). Multicollinearity was controlled using Variance Inflation Factor (VIF) values (Hair *et al.*, 2010; O'Brien, 2007), and Harman's single factor test (Harman, 1976; Podsakoff *et al.*, 2003) was applied to mitigate the risk of Common Method Bias.

RESULTS AND DISCUSSION

To test the hypotheses, correlation analysis, t-tests and hierarchical multiple linear regression were applied using Jamovi 2.3.28.

Bivariate Analysis: Relationship and Differentiation Tests

Before proceeding to regression analysis, I performed correlation and t-test analyses to determine the raw relationships between variables and differences between groups.

Correlation Analysis Results

Findings from the correlation matrix presented in Table 2 indicate that company and entrepreneur's characteristics are significantly associated with exit route preferences.

Table 2. Correlation matrix for variables and exit routes

Variables	Financial Sale	IPO	PartnersPurchase	Transfer to Family Members	Liquidation / Closing
Control Variables					
Firm Size	0.126	0.376***	0.013	-0.238***	0.240***
Firm Age	-0.040	0.153*	0.070	-0.022	0.088
Industry Experience	-0.196**	-0.182**	0.054	0.243***	0.042
Main Predictors					
Export Performance	0.230***	0.442***	-0.065	-0.136*	0.218**
Education Level	0.478***	0.562***	-0.134	-0.439***	0.209**

Source: own study in Jamovi.

High export performance is significantly and positively correlated with professionalised routes, specifically financial sale ($p = 0.230$) and IPO ($p = 0.442$), while showing a negative correlation with transfer to family members ($p = -0.136$). Higher education levels of the founder show a strong positive correlation with the preference for financial sale ($p = 0.478$) and IPO ($p = 0.562$). Firm size shows a significant positive correlation with IPO preference ($p = 0.376$) while extensive industry experience correlates positively with family transfer ($p = 0.243$) and negatively with market-based sales channels.

Differentiation Analysis

The results of the independent samples t-test presented in Table 3 reveal how entrepreneurs past experiences and the firm's ownership structure differentiate their exit preferences.

Table 3. Independent samples t-test results for group differences in exit routes

Variables	Financial Sale	IPO	Partners Purchase	Transfer to Family Members	Liquidation / Closing
Family Firm (Yes/No)	-2.25*	0.00	1.14	3.63***	-1.35
Exit Experience (Yes/No)	-3.90***	-2.39**	1.33	4.18***	-4.71***

Note: Values represent t-statistics. * $p < .05$, ** $p < .01$, *** $p < .001$.

Source: own study in Jamovi.

Family firms report a significantly higher preference for family transfer ($t = 3.63$, $p < 0.001$) and a lower inclination towards financial sales ($t = -2.25$, $p < 0.05$), consistent with SEW theory. Founders with prior exit experience show a stronger preference for financial sales ($t = -3.90$, $p < 0.001$) and IPOs ($t = -2.39$, $p < 0.01$).

Multivariate Analysis: Regression Results

Structural control variables (firm size, firm age, and industry experience) were entered in Step 1 to establish a baseline. In Step 2, the main predictors representing the three theoretical blocks were entered simultaneously to evaluate their joint effect on exit route preferences, as shown in Table 4.

Table 4. Results of hierarchical multiple linear regression analysis on entrepreneurial exit routes

Variables	Financial Sale (Step 1)	Financial Sale (Step 2)	IPO (Step 1)	IPO (Step 2)	Partners Purchase (Step 1)	Partners Purchase (Step 2)	Transfer to Family Members (Step 1)	Transfer to Family Members (Step 2)	Liquidation / Closing (Step 1)	Liquidation / Closing (Step 2)
Step 1: Structural Control Variables										
Firm Size (Employees)	0.132 [†]	-0.041	0.349** [*]	0.177**	-0.043	-0.002	-0.283***	-0.219**	0.239**	0.169*
Firm Age	-0.091	-0.037	0.023	0.052	0.077	0.063	0.075	-0.024	-0.012	0.039
Industry Experience	0.018	-0.010	-0.053	-0.058	0.150*	0.103	0.182	0.222***	0.154*	0.134 [†]
Step 2: Theoretical Block Predictors										
I. Export Performance and Strategic Readiness										
Export Performance	–	0.083	–	0.120 [†]	–	-0.052	–	0.064	–	0.134 [†]
II. Firm Attributes and Structural Boundaries										
Family Business (Yes=1)	–	-0.153*	–	-0.057	–	0.069	–	0.249***	–	0.073
III. Human Capital and Individual Vision										
Education Level	–	0.433***	–	0.461***	–	-0.020	–	-0.279***	–	0.233**
Prior Exit Experience (Yes=1)	–	0.219***	–	0.085	–	-0.096	–	-0.236***	–	0.256***
Model Fit and Incremental Power										
R ² (Step 1)	0.039	–	0.173	–	0.015	–	0.146	–	0.062	–
R ² (Step 2 – Full Model)	–	0.289	–	0.385	–	0.032	–	0.339	–	0.191
ΔR ² (R-Square Change)	–	0.251***	–	0.212***	–	0.017	–	0.194***	–	0.129***

Note: Standardised coefficients (β) are reported for the full model (Step 2). Statistical significance levels: (†) $p < 0.10$ (marginally significant); * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$.

Source: own study in Jamovi.

The results strongly justify hierarchical specification. The inclusion of theoretical blocks in Step 2 yielded a highly significant increase in explanatory power (ΔR^2) for Financial Sale ($\Delta R^2 = 0.251$, $p < 0.001$), IPO ($\Delta R^2 = 0.212$, $p < 0.001$), Transfer to Family Members ($\Delta R^2 = 0.194$, $p < 0.001$), and Liquidation ($\Delta R^2 = 0.129$, $p < 0.001$). This shows that my core predictors collectively serve as robust indicators of exit route preferences beyond basic structural controls.

Regarding the specific hypotheses:

- **Export Performance:** Export performance exhibited a marginally significant positive association with the preference for an IPO ($\beta = 0.120$, $p < 0.10$), providing support for H1b. H1a and H1c are not

supported. The model also revealed a marginally positive association with liquidation ($\beta = 0.134$, $p < 0.10$), suggesting a polarisation dynamic among exporting firms.

- **Firm Attributes:** Family business status is significantly and positively associated with the preference for Transfer to Family Members ($\beta = 0.249$, $p < 0.001$), fully supporting H2a, while exhibiting a significant negative association with market-based Financial Sales ($\beta = -0.153$, $p < 0.05$), fully supporting H2b.
- **Human Capital:** Education level shows highly significant positive associations for both Financial Sale ($\beta = 0.433$, $p < 0.001$) and IPO ($\beta = 0.461$, $p < 0.001$), supporting H3a and H3b. Prior exit experience is a significant positive indicator for Financial Sale ($\beta = 0.219$, $p < 0.001$), supporting H3c. Both education ($\beta = -0.279$, $p < 0.001$) and prior exit experience ($\beta = -0.236$, $p < 0.001$) are significantly negatively associated with family succession preference. The hierarchical structure of the analysis allows for an assessment of how the inclusion of theoretical predictors changes the effects of the baseline structural controls across the two steps. In Step 1, firm size shows a marginally significant positive association with the preference for financial sale ($\beta = 0.132$, $p < 0.10$) and a significant positive association with IPO preference ($\beta = 0.349$, $p < 0.001$), while being significantly and negatively associated with family transfer ($\beta = -0.283$, $p < 0.001$) and positively associated with liquidation ($\beta = 0.239$, $p < 0.01$). Upon the inclusion of the theoretical predictors in Step 2, the association between firm size and financial sale becomes non-significant ($\beta = -0.041$), while its association with IPO preference weakens but remains significant ($\beta = 0.177$, $p < 0.01$). This pattern suggests that the initial association between firm size and financial sale is largely explained by the human capital characteristics of founders in larger firms, particularly education level and prior exit experience, rather than by firm size itself.

Similarly, industry experience shows a significant positive association with partner purchase ($\beta = 0.150$, $p < 0.05$), family transfer ($\beta = 0.182$, $p < 0.01$), and liquidation ($\beta = 0.154$, $p < 0.05$) in Step 1. These associations remain largely stable in Step 2, indicating that industry experience retains its explanatory power even after accounting for the theoretical predictors. This stability suggests that the relationship between industry experience and traditional exit routes reflects a relatively independent mechanism, likely associated with deeper emotional identification with the venture over time, rather than being an artifact of other founder or firm characteristics.

DISCUSSION

This study investigated how international performance, firm-level characteristics, and individual human capital are jointly associated with exit route preferences among Turkish manufacturing founders. The findings extend the existing exit literature empirically within the specific context of an emerging market.

The results suggest that high export performance is positively associated with founders' preferences for IPOs, which agrees with the premise that exposure to global markets is associated with normative isomorphism and the adoption of more formalised governance structures (Cumming, 2008; Beleska-Spasova, 2014). Importantly, this association is specific to IPO preference and does not extend to financial sale, which is consistent with the theoretical argument that export-driven institutionalisation generates particular organisational characteristics, namely greater public visibility and financial transparency, that align more naturally with the requirements of public market exits than with private transactions. This differentiated pattern is also difficult to reconcile with a pure marker interpretation, lending further support to the view that export performance operates as an active mechanism rather than merely reflecting pre-existing firm quality.

An unhypothesised finding emerged regarding liquidation: export performance shows a marginally positive association with liquidation preference, possibly reflecting a polarisation dynamic where founders of exporting firms face a more polarised set of strategic options. This interpretation is speculative given the cross-sectional nature of the data (DeTienne & Cardon, 2012).

Larger firms lean more towards IPO preference and less towards family succession, consistent with a resource-based interpretation (Beckman *et al.*, 2007; Aldrich & Kim, 2007). The initial association between firm size and financial sale becomes non-significant in Step 2, which the human capital of founders in larger firms largely explains.

The most pronounced structural differentiation is associated with family business status. The findings fit the SEW theory: family owners place significant value on legacy and emotional attachment to the firm. Family business status is strongly and positively associated with a preference for transferring the business to family members, while showing a significant negative association with market-based financial sales (Deephouse & Jaskiewicz, 2013; Miller *et al.*, 2016). This pattern suggests that, in the Turkish manufacturing context, cultural and relational considerations remain closely intertwined with exit decision-making, while purely financial motivations account only partly for exit route preferences of family firm founders. This finding is particularly relevant given the predominance of family businesses in the Turkish manufacturing sector, where informal governance structures and intergenerational continuity remain central to firm identity.

The founder's personal attributes – particularly formal education and prior exit experience – show the strongest and most consistent associations with professionalised exit preferences. Higher education correlates positively with both financial sale and IPO preferences, suggesting it builds the analytical capacity and financial literacy needed to evaluate complex ownership transitions (Koladkiewicz *et al.*, 2022). Prior exit experience similarly shows a strong positive association with financial sale preference, which is consistent with the argument that serial entrepreneurs develop a strategic template oriented towards value-maximising exit routes (Ucbasaran *et al.*, 2003). However, these findings warrant some caution as the observed relationships may partly reflect the specific sample. Turkish exporting SMEs that participated in this study tend to be relatively well-educated and experienced, and the strength of the human capital effects may therefore not be directly generalisable to broader entrepreneurial populations.

Industry experience shows stable associations with family transfer and liquidation preferences across both regression steps, suggesting an independent relationship likely linked to deeper emotional identification with the venture over time.

CONCLUSIONS

Focusing on the Turkish manufacturing sector, this study treated exit as a strategic value-realisation process rather than a binary success-failure outcome. The findings suggest that exit route preferences track venture maturity, structural characteristics, and founder human capital.

The central contribution integrates international performance into the entrepreneurial exit discussion within an emerging-market context. Export performance is positively associated with IPO preference and marginally with liquidation, suggesting a dynamic polarisation among exporting firms. Cultural and relational considerations continue to shape exit preferences strongly in the Turkish context, highlighting the role of socio-emotional wealth. The study offers a context-dependent perspective that complements largely Western exit models.

For entrepreneurs, the findings suggest that exit planning works best as a long-term strategy rather than a late-stage reaction. Founders who aim for professionalised exit routes may benefit from building international exposure and investing in human capital throughout their ventures' growth phase, as these factors show the strongest associations with market-based exit preferences in this study. Therefore, exit should be considered an integral part of the entrepreneurial journey from an early stage.

For policymakers, the findings highlight the value of building exit literacy within broader entrepreneurship support, including strengthening transparent M&A markets and incorporating exit strategy content into entrepreneurship education. Several limitations should be acknowledged. The cross-sectional design and convenience sample rule out causal claims, and the Turkish manufacturing focus limits generalisability. Future research could use longitudinal designs or qualitative approaches to examine how preferences evolve and translate into realised exits and could use psychological scales to more directly test the cognitive mechanisms proposed in this study.

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Conflict of Interest

The author declares that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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Value investing in emerging markets: The effectiveness of the Piotroski F-score strategy in Poland as a Central and Eastern European case study

Krzysztof Podgórski

ABSTRACT

Objective: The aim of this article is to verify the investment effectiveness of a long-only strategy based on the Piotroski F-score indicator on the Polish equity market, relative to the passive ‘buy and hold’ strategy tracking the broad WIG index.

Research Design & Methods: The study used data from the Warsaw Stock Exchange for the full investment cycle covering the years 2006-2025. The study deployed a long-only strategy variant (selection of companies with a score of 7-9 points), incorporating real trading frictions: brokerage commissions (0.39%), capital gains tax (19%) with a loss deduction mechanism, and annual rebalancing deferred to 31 May to preclude look-ahead bias. The non-parametric Wilcoxon signed-rank test verified the repeatability of the market advantage.

Findings: The F-score-based strategy generated a CAGR of 15.22% compared to 4.36% for the WIG index, yielding a cumulative return of 1 376.19% (compared to 124.78% for the WIG). Although the Wilcoxon test did not confirm the statistical regularity of excess returns year-on-year, the portfolio exhibited a highly right-skewed payout profile and a risk-adjusted return (Sharpe ratio of 0.37) almost four times higher than the broad market’s.

Implications & Recommendations: The lack of unconditional statistical regularity does not negate the high economic utility of the model. The results prove that investors on the Polish market should accept increased portfolio volatility and a lack of return linearity in exchange for an asymmetric risk premium. The Polish capital market still exhibits the characteristics of an emerging market, favouring classic value investing strategies. Treating Poland as a representative case study for the Central and Eastern European (CEE) region, these results provide useful guidance for international investors allocating capital in markets with lower informational efficiency.

Contribution & Value Added: Including rigorous transaction and tax costs significantly improves the realism of the results compared to the existing literature. The article first demonstrates the option-like payoff profile of Piotroski’s payout strategy over a long, twenty-year horizon on the Polish market, confirming that simple fundamental filters have not yet eroded here, as is typical of highly developed markets.

Article type: research article

Keywords: Piotroski F-score; fundamental analysis; value investing; market efficiency; Warsaw Stock Exchange

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INTRODUCTION

The classic efficient market hypothesis (Fama, 1970) remains a primary point of contention in contemporary finance theory. The hypothesis posits that financial asset prices immediately reflect all available information, which by definition renders any systematic attempt to achieve above-average returns futile. However, the literature describes numerous anomalies that undermine the assumption of a fully rational and immediate response by investors to incoming market data. A key phenomenon in this

domain is the post-earnings-announcement drift (PEAD), described by Bernard and Thomas (1989), whereby share prices continue to move for many months in line with the market surprise contained in corporate financial results, suggesting that the market discounts this information belatedly. Another example is the accruals anomaly, whereby Sloan (1996) shows that investors focus on net profit and ignore its components, leading to mispricing of companies with a high proportion of accruals. The overreaction and underreaction effect completes this picture: De Bondt and Thaler (1985) highlighted the psychological aspects of investing, pointing out that the market often overreacts to dramatic events, thereby creating opportunities for contrarian strategies.

Documented inefficiencies underpin value investing strategies rooted in fundamental analysis. These methods aim to achieve above-average returns by purchasing undervalued stocks and exploiting the divergence between their market price and intrinsic value (Frankel & Lee, 1998). However, a major challenge arises from the risk of a 'value trap', which occurs when an attractive valuation ratio reflects a permanent erosion of a company's financial fundamentals (Penman & Reggiani, 2018).

In response to this problem, Joseph Piotroski (2000) developed the innovative F-score indicator. The simple yet effective tool draws on nine publicly available accounting signals used to assess the fundamental condition of companies. By testing this method on the US market (1976-1996) within a group of 20% of companies with the lowest price-to-book ratio, Piotroski proved its strong predictive power. Piotroski further demonstrated that selecting and buying companies with high scores (8-9 points) yields an average annual return 7.5 percentage points higher than that of the entire portfolio of analysed value companies. Furthermore, applying a full long-short strategy, consisting of buying entities with strong fundamentals and short selling the weakest ones (0-1 points), generated a substantial 23% per annum above the return on the broad market.

Researchers have verified the F-score model over many time intervals and across global markets. Most international studies confirm the model's ability to deliver higher rates of return, although the final results depend on the period and geography studied. Studies report positive results in Europe, including Germany (Pătări *et al.*, 2022) and the Nordic countries (Brindelid & Nilsson, 2021), as well as in emerging markets (Hyde, 2014; Walkshäusl, 2020), including Vietnam (Ho *et al.*, 2023), Taiwan (Lin *et al.*, 2021), and India (Shah *et al.*, 2025; Tripathy & Pani, 2017). However, researchers also note limitations. For example, in the British market, the strategy was effective in the broad market but insignificant for the value segment itself (Rathjens & Schellhove, 2011), while post-1997 data from the USA suggest that this anomaly has gradually disappeared (Woodley *et al.*, 2011).

Regarding the Warsaw Stock Exchange (WSE), previous publications – notably those of Kusowska (2021) and Pilch (2023) – indicate the considerable potential of this method in selecting reliable companies; however, their narrow scope and comparisons mainly with proprietary models call for much broader empirical verification. To address these shortcomings, this article examines the effectiveness of Piotroski's strategy as a tool for active allocation across a broad spectrum of WSE-listed entities.

The aim of this study was to analyse the effectiveness of Piotroski's long-only strategy on the Polish equity market. The study used data from the Warsaw Stock Exchange. In this research, effectiveness means the strategy's ability to generate higher rates of return over the adopted period than investment in the broad WIG index on a 'buy-and-hold' basis. To achieve this objective, the study posed the following research questions:

- RQ1:** Does the Piotroski F-score strategy generate above-average rates of return compared to the broad market index on the Warsaw Stock Exchange?
- RQ2:** What is the risk-adjusted performance and payoff profile of the F-score portfolio over a long-term investment horizon in a developing market setting?

Deliberate reasoning guided the choice of the WSE. The study treated the Polish equity market as an international case study, representative of developing capital markets in the Central and Eastern Europe (CEE) region. Through this approach, the results transcend the local context and serve foreign investors seeking risk premiums in markets with delayed discounting of fundamental information. From a broader perspective of entrepreneurial finance, the effectiveness of fundamental analysis in emerging markets underscores the critical role of rational capital allocation. Rewarding

companies with sound financial health and operational stability – as captured by the F-score – lowers the cost of capital for well-managed enterprises, thereby stimulating sustainable business development and entrepreneurial resilience in the CEE region.

LITERATURE REVIEW AND HYPOTHESES DEVELOPMENT

Before turning to empirical evidence, we must understand how the F-score is constructed to properly interpret the study results. The strength of Piotroski's (2000) strategy lies in its simplicity and reliance on readily available public financial data. The feature makes the F-score a universal preliminary selection tool that suits a wide range of investors in different markets without advanced models or paid analytical services.

The F-score is computed as the sum of points awarded for meeting nine binary criteria grouped into three analytical categories: profitability, financial stability and operational efficiency. A company receives one point for meeting each criterion; otherwise, it receives zero. Table 1 details the individual F-score components.

Table 1. Components of the Piotroski F-score indicator (theoretical framework)

Category	Signal	Criterion for awarding points (1 point)
Profitability	ROA (Return on Assets)	Positive return on assets ($ROA > 0$) in the current year.
	CFO (Cash Flow from Operating Activities)	Positive cash flow from operating activities ($CFO > 0$) in the current year.
	ΔROA (Change in return on assets)	Increase in ROA compared to the previous year ($\Delta ROA > 0$).
	ACCRUAL (Earnings quality)	Cash flow from operating activities (CFO) is higher than net profit ($CFO > \text{Net Profit}$).
Financial stability	$\Delta LEVER$ (Change in financial leverage)	Decrease in the long-term debt ratio compared to the previous year ($\Delta LEVER < 0$).
	$\Delta LIQUID$ (Change in current liquidity)	Increase in current liquidity ratio compared to the previous year ($\Delta LIQUID > 0$).
	EQ_OFFER (Share issue)	No new shares issued during the last year.
Operational efficiency	$\Delta MARGIN$ (Change in gross margin)	Increase in gross margin compared to the previous year ($\Delta MARGIN > 0$).
	$\Delta TURN$ (Change in asset turnover)	Increase in asset turnover ratio compared to the previous year ($\Delta TURN > 0$).

Source: own study based on Piotroski (2000).

The sum of these points determines the final F-score, which ranges from 0 (indicating the weakest fundamentals) to 9 (representing the strongest fundamentals). Piotroski (2000) originally defines firms with robust financial health, and consequently a high F-score, as those achieving a score of 8 or 9. However, contemporary research frequently broadens this threshold to include scores of 7 to 9, permitting more diversified and realistic portfolios, particularly within smaller capital markets. Conversely, entities with deteriorating fundamentals typically score 0 to 1, or occasionally 0 to 2.

Piotroski's initial investment methodology involved constructing a long-short portfolio. The preliminary step required selecting companies from the highest quintile of the book-to-market (B/M) ratio. Within this cohort, the strategy took long positions in high F-score companies, and short positions against low F-score firms, followed by complete annual portfolio reallocation (Piotroski, 2000). While this foundational application proved highly specific, later studies have shown that the predictive power of the indicator extends far beyond this original framework; nevertheless, as the review below shows, its efficacy remains subject to certain market conditions. Numerous empirical studies have assessed the Piotroski F-score strategy across diverse international markets. The literature offers mixed evidence; however, most studies confirm the utility of fundamental analysis in value stock selection, notwithstanding certain exceptions. While studies in emerging and European markets, such as those by Hyde (2014) and Walkshäusl (2020), indicate a premium for fundamental quality, findings from the post-1997 US market by Woodley

et al. (2011) suggest a temporal decay of this anomaly. Other scholars corroborate the strategy's diminishing effectiveness in highly efficient markets; Koutoupis *et al.* (2022) documented a negative premium across a sample of 21 European markets, where firms with weak indicators outperformed those with robust fundamentals, and Baschieri and Hunziker (2025) identified a marginally negative risk premium in the Italian market. Furthermore, as Krauss *et al.* (2015) argue, even when the strategy yields theoretical profits in the USA, it becomes practically unviable once investors incorporate liquidity constraints and transaction costs. Researchers frequently attribute these limitations to analytical neglect – the F-score performs optimally where accounting information is assimilated slowly by the market, thereby favouring smaller entities. In the Australian market, for instance, Hyde (2015) demonstrated that Piotroski's strategy generates peak rates of return predominantly within the small-cap segment. Bülow (2017) echoes this finding in the US market, highlighting arbitrage barriers for smaller-capitalisation companies.

In this context, studies of the WSE hold particular significance. Despite employing varied time horizons and methodological approaches, these studies yield consistent conclusions regarding the potential of the F-score indicator under Polish market conditions. Kusowska's (2021) pivotal study on the Polish market, which spanned the years 2014–2020 and concentrated on the largest entities comprising the WIG30 index, demonstrated the defensive characteristics of Piotroski's strategy. During the review period – marked by pandemic-induced market contractions – the portfolio of high F-score firms fell less (–37.32%) than the broader market (–40.82%) and posted a substantially lower loss than the portfolio of companies with weak fundamentals (–83.37%). The outcome implies that on the Polish market, the F-score functions as an effective capital preservation filter during economic downturns, even if it fails to generate absolute positive returns amid a severe bear market. Pilch's (2023) more expansive study complements these findings, examining a broader cross-section of companies between 2012 and 2022. There, the F-score strategy yielded an average annual market-adjusted return of +1.35%. Notably, Pilch (2023) demonstrated that Piotroski's foundational model outperformed proprietary adaptations (such as the X-Score and Y-Score) tailored specifically to the Polish market, which ultimately incurred losses.

Comparing these domestic outcomes with international research, such as the work of Pătări *et al.* (2022) on Germany or Ho *et al.* (2023) on Vietnam, situates Poland as a market where fundamental metrics continue to exert a substantial influence on corporate valuation, in contrast to markets with peak informational efficiency. Analyses of the Vietnamese and Indian stock exchanges illustrate this paradigm; there, researchers documented exceptional rates of return, occasionally reaching several dozen per cent annually (Ho *et al.*, 2023; Shah *et al.*, 2025). Furthermore, these investigations underscore that the profitability of the F-score in emerging economies systematically improves when the horizon extends to two years.

Recent literature further enriches this narrative by examining its robustness amidst shifting macroeconomic environments and its capacity for methodological modification. Anderson *et al.* (2025) emphasise the cyclicity of returns, indicating that the F-score's effectiveness fluctuates over time; during recessionary phases, monetary policy variables can overshadow fundamental signals, so deploying the method during slumps requires caution. Despite these macroeconomic constraints, empirical support for the indicator's usefulness remains robust across emerging markets. Within the Indian equity market, Tripathy and Pani (2017) and Shah *et al.* (2025) validated the effectiveness of Piotroski's model for stock screening. The latter study, via sensitivity analysis, revealed that profitability drivers – most notably ROA – are key determinants of portfolio performance, whereas other components (such as new share issuance) exert a negligible impact.

Lin *et al.* (2021) also identified scope for improving the original model in the Taiwanese market. Their research demonstrated that augmenting the F-score with supplementary screening criteria, such as price momentum or the P/E ratio, yields superior returns to the basic version. Modifications extend beyond the inclusion of alternative financial metrics to encompass advanced statistical frameworks; for example, Gimeno *et al.* (2020) show that deploying artificial neural networks (Neural F-score) markedly improves investment outcomes relative to the classical method in both the eurozone and the USA. Nevertheless, Rathjens and Schellhove (2011) report equivocal results for the British market. While their study corroborated the strategy's general effectiveness for the broad market, it failed to show its significant advantage among undervalued value stocks, thereby contradicting Piotroski's foundational hypothesis.

Synthesising empirical research findings from disparate markets poses challenges, primarily because of the profound heterogeneity of the evaluation methodologies used. As illustrated in Table 2, authors investigating the effectiveness of the F-score apply diverse performance metrics – from discrete monthly rates (Koutoupis *et al.*, 2022), through annualised risk premiums (Walkshäusl, 2020), to heavily aggregated cumulative rates (Shah *et al.*, 2025; Kusowska, 2021). Such discrepancies stem from different investment time horizons and the different benchmarks used (e.g. value portfolios, portfolios with the lowest F-score or general market indices). Although these results resist direct arithmetic comparison, their synthesis points unambiguously to a premium for fundamental quality, the magnitude and persistence of which depend on the informational efficiency of a given trading venue.

Table 2. Summary of international empirical research on the effectiveness of the F-score indicator (selected studies, 2000-2025)

Author and year	Market and period studied	Rate of return achieved using the strategy	Rate of return from the benchmark	Difference in p.p.
Ho <i>et al.</i> (2023)	Vietnam (2009-2019)	31.1% (annual raw)	18.4% (high B/M companies)	12.7
Shah <i>et al.</i> (2025)	India (2007-2024)	1 695.86% (cumulative)	approx. 250% (Nifty 100)	1445.86
Pätäri <i>et al.</i> (2022)	Germany (2000-2015)	12.17% (annual raw)	4.81% (sample average)	7.36
Rathjens & Schellhove (2011)	United Kingdom (1991-2008)	15.77% (annual average)	10.70% (market average)	5.07
Lin <i>et al.</i> (2021)	Taiwan (2001-2020)	26.78% (annual – modification)	22.18% (original F-score)	4.6
Kusowska (2021)	Poland (2014-2020)	-37.32% (cumulative)	-40.82% (WIG30 index)	3.5
Pilch (2023)	Poland (2012-2022)	+1.35% (mkt-adj)	0% (market benchmark)	1.35
Bülow (2017)	USA (2003-2015)	18.3% (mkt-adj)	4.0% (low F-score)	14.3
Koutoupis <i>et al.</i> (2022)	Europe – 21 countries (1989-2016)	0.30% (monthly)	1.30% (low F-score)	-1.00
Walkshäusl (2020)	35 markets (2000-2018)	~10% (annual premium)	(High-Low spread)	approx. 10.0
Gimeno <i>et al.</i> (2020)	Eurozone (2006-2017)	+3.53% (excess NF-score)	(relative to F-score)	3.53

Source: own study.

A comparative synthesis of international research indicates that the effectiveness of the F-score strategy is not uniform but depends largely on the degree of market efficiency and the prevailing phase of the business cycle (Anderson *et al.*, 2025). While highly developed markets, such as the US and the UK, exhibit a gradual erosion of extraordinary returns (Rathjens & Schellhove, 2011; Woodley *et al.*, 2011) or require methodological modifications incorporating additional filters (Gimeno *et al.*, 2020; Lin *et al.*, 2021), emerging and European markets continue to offer a premium for deploying fundamental analysis in corporate selection (Ho *et al.*, 2023; Hyde, 2014; Walkshäusl, 2020).

Drawing on this literature, which suggests that emerging and European markets persistently offer a premium for fundamental-based screening, our study hypothesised that the Polish capital market will exhibit a similar pattern. Therefore, we formulated the following hypothesis:

- H1:** While Piotroski's F-score strategy may lack unconditional statistical predictability year-on-year on the Polish stock market, it delivers substantial economic usefulness by generating asymmetric, risk-adjusted excess returns.

RESEARCH METHODOLOGY

The research period spans the years 2004 to 2025. The underlying financial statement data, sourced from the Biznesradar database (n.d.), derive from annual reports published between 2004 and 2024. The study subsequently calculated the F-score components for the years 2005 to 2024; this timeframe accounts for the inclusion of dynamic indicators (Δ ROA, Δ LEVER, Δ LIQUID, Δ MARGIN and Δ TURN), which require two

consecutive years of data. Consequently, the strategy executed purchases between 2006 and 2024, while corresponding sale transactions occurred from 2007 to 2025. Thus, the full investment cycle covers allocation decisions made from 2006 onwards, culminating in the sale of the final assets in 2025. All calculations used daily closing prices obtained from the Stooq financial portal (n.d.), strictly adjusted for corporate actions including stock splits, dividends, pre-emptive rights and subscription rights.

The study designated 31 May as the date for annual portfolio rebalancing, entailing full liquidation of existing holdings and simultaneous purchase of new ones. Aligning with the Polish corporate reporting cycle, this date fulfils Piotroski's requirement of ensuring the public availability of annual financial disclosures. The date provides investors with a safe time buffer to preclude inadvertent use of non-public data when making investment decisions, thereby minimising the risk of look-ahead bias (Daniel *et al.*, 2008).

The research sample comprised WSE-listed entities, with the broad WIG stock market index serving as a benchmark. The study implemented an extended F-score methodology, which involves buying shares with an F-score of 7-9 points. The approach mirrors the framework adopted in the two most recent studies for the Polish market by Kusowska (2021) and Pilch (2023). The study deliberately excluded the classic 'short leg' of Piotroski's original model, which involves taking short positions in shares of companies with the weakest fundamentals. The adjustment stems from the idiosyncratic constraints of the Polish capital market – notably, the stringent liquidity and capitalisation requirements on the WSE preclude the short selling of shares of smaller companies, a limitation compounded by regulatory restrictions on trading. Furthermore, given the limited number of companies listed on the Polish bourse, Piotroski's foundational constraint of restricting analysis to the lowest quintile based on the P/BV ratio – a standard practice in broader emerging market research – was omitted to maintain a viable sample size. The study weighted each year's final portfolio equally.

The primary analytical framework relied on statistical analysis of return time series. To ascertain the statistical significance of the observed excess returns, the study deployed the Wilcoxon signed-rank test (Barber & Lyon, 1997). Extreme outliers in the dataset necessitated this non-parametric test, because such outliers inherently violate the assumption of normal distribution required for classical parametric assessments, such as the paired-samples Student's t-test (Hsu & Lachenbruch, 2014).

To ensure real-world applicability, the study rigorously adjusted returns for transaction costs on equity purchases and sales; specifically, it incorporated a standard 0.39% brokerage commission (Alior Bank, n.d.). Furthermore, returns bore a 19% capital gains tax. Crucially, the empirical model integrated the statutory mechanism allowing incurred losses to offset income from the same capital source, subject to a limit of 50% of the loss reported in a given tax year. The adjustment follows the Polish Personal Income Tax Act (Ustawa z dnia 26 lipca 1991 r., Art. 9(3) and (3a)).

The empirical investigation proceeded as follows:

1. Collection of the raw financial data necessary to calculate the individual components of the Piotroski F-score from the Biznesradar database for all listed companies.
2. Processing of the aggregated data and computation of the constituent indicators and the final F-score (for the years 2006 to 2024).
3. Identification and selection of companies achieving an index value of 7 to 9 points across the respective annual periods (for the years 2006 to 2024).
4. Extraction of historical share prices for selected entities from the Stooq portal.
5. Assigning of precise entry and exit share prices for each selected company corresponding to the designated transaction dates.
6. Calculation of annual rates of return for individual companies, aggregated annual portfolios, and the benchmark WIG index, followed by derivation of mean rates of return.
7. Adjustment of gross rates of return to reflect brokerage transaction fees – applied annually for the actively rebalanced Piotroski F-score strategy and restricted to the initial and terminal year for the passive 'buy and hold' WIG benchmark.
8. Subsequent adjustment of the net returns to account for the 19% capital gains tax and the loss-deduction mechanism – levied annually on the F-score portfolio and at the culmination of the investment horizon for the WIG index.

9. Verification of the statistical significance of the resulting risk premiums utilising the Wilcoxon signed-rank test.
10. Final compilation, synthesis, and economic interpretation of the empirical findings.

RESULTS AND DISCUSSION

Table 3 compares the rates of return from the Piotroski F-score strategy and investments in the broad WIG index on a buy-and-hold basis in 2006-2025, after accounting for brokerage commissions and capital gains tax.

Table 3. Comparison of rates of return from the Piotroski F-score strategy and investments in the broad WIG index on the Warsaw Stock Exchange in 2007-2025

Year	Piotroski F-score	WIG Index	Difference
2007	190.99%	59.76%	131.23 p.p.
2008	-28.23%	-26.65%	-1.58 p.p.
2009	-36.89%	-37.11%	0.22 p.p.
2010	0.19%	41.63%	-41.44 p.p.
2011	11.15%	20.46%	-9.31 p.p.
2012	-20.59%	-24.45%	3.86 p.p.
2013	6.94%	26.49%	-19.55 p.p.
2014	20.76%	8.91%	11.85 p.p.
2015	102.13%	6.65%	95.48 p.p.
2016	3.30%	-17.45%	20.75 p.p.
2017	35.54%	31.08%	4.46 p.p.
2018	-11.69%	-4.68%	-7.01 p.p.
2019	0.76%	1.09%	-0.33 p.p.
2020	89.93%	-16.89%	106.82 p.p.
2021	85.99%	37.73%	48.26 p.p.
2022	-14.01%	-13.36%	-0.65 p.p.
2023	19.14%	8.45%	10.69 p.p.
2024	16.15%	38.58%	-22.43 p.p.
2025	-7.35%	3.61%	-10.96 p.p.
Arithmetic mean	24.43%	7.57%	16.86 p.p.
CAGR	15.22%	4.36%	10.87 p.p.

Source: own study.

The average annual rate of return including reinvestment of profits (CAGR) for the Piotroski F-score strategy reached 15.22%, while the broad WIG index returned only 4.36%. Therefore, the Piotroski strategy's result exceeded the broad-market average by 10.87 p.p. The rates of return from the Piotroski F-score-based strategy exceeded those from the 'buy and hold' strategy in 10 out of 19 periods (52.63%), while in nine periods (47.37%) the WIG index returned more.

Despite this notable outperformance in cumulative and average returns, the Wilcoxon signed-rank test did not reveal a statistically significant advantage of the F-score strategy over the broad market index at the conventional $\alpha = 0.05$ level. The result indicates a lack of systematic, year-on-year predictability. However, one must distinguish between statistical regularity and economic utility. As subsequent risk and distribution analyses will demonstrate, the strategy's impressive aggregate performance stems from a highly right-skewed, option-like payoff profile rather than consistent annual outperformance (Bessembinder, 2018).

Table 4 presents measures of the volatility of returns for the compared strategies.

The Piotroski F-score strategy yielded an arithmetic mean return (24.43%) more than three times that of the WIG index (7.57%). The strategy exhibited a comparable maximum drawdown risk (-36.89% against -37.11%) yet demonstrated substantial upside potential (+190.99% against +59.76%). Consequently, the strategy incurred more than twice the annual volatility (standard deviation of 54.54%

against 26.05%). Nonetheless, the markedly lower coefficient of variation (223.24% compared to 344.07% for the broad market) signifies a superior risk-reward profile. In essence, while the fundamental strategy entails higher absolute volatility, it generates disproportionately higher returns per unit of risk, making it suitable for investors resilient to market fluctuations.

Table 4. Measures of return volatility for the Piotroski F-score strategy and investment in the broad WIG index on the Warsaw Stock Exchange in 2006-2025

Volatility measure	Piotroski F-score	WIG index
Arithmetic mean	24.43%	7.57%
Min	-36.89%	-37.11%
Max	190.99%	59.76%
Range	227.88%	96.87%
Standard deviation	54.54%	26.05%
Average deviation	40.25%	21.57%
Coefficient of variation	223.24%	344.07%
Sharpe ratio	0.37	0.12
– more favourable value – less favourable value		

Source: own study.

To fully verify the effectiveness of the strategy under review, the study extended the volatility analysis with a Sharpe-ratio assessment of risk-adjusted returns. The study defined the risk-free rate as the historical average yield on ten-year government bonds for the analysed period 2007-2025, amounting to 4.36% (Stooq, n.d.). According to the calculations, the Sharpe ratio reached 0.37 for the F-score portfolio, against only 0.12 for the broad WIG benchmark. The result proves that despite more than twice the total volatility (standard deviation of 54.54% compared to 26.05% for the broad market), Piotroski's fundamental strategy generates almost four times the excess return per unit of risk. The finding strongly supports the economic usefulness of the model on the Polish market, confirming that the generated risk premium more than compensates for the portfolio's high variance.

Figure 1 presents a comparison of cumulative rates of return from the Piotroski F-score strategy and investments in the broad WIG index.

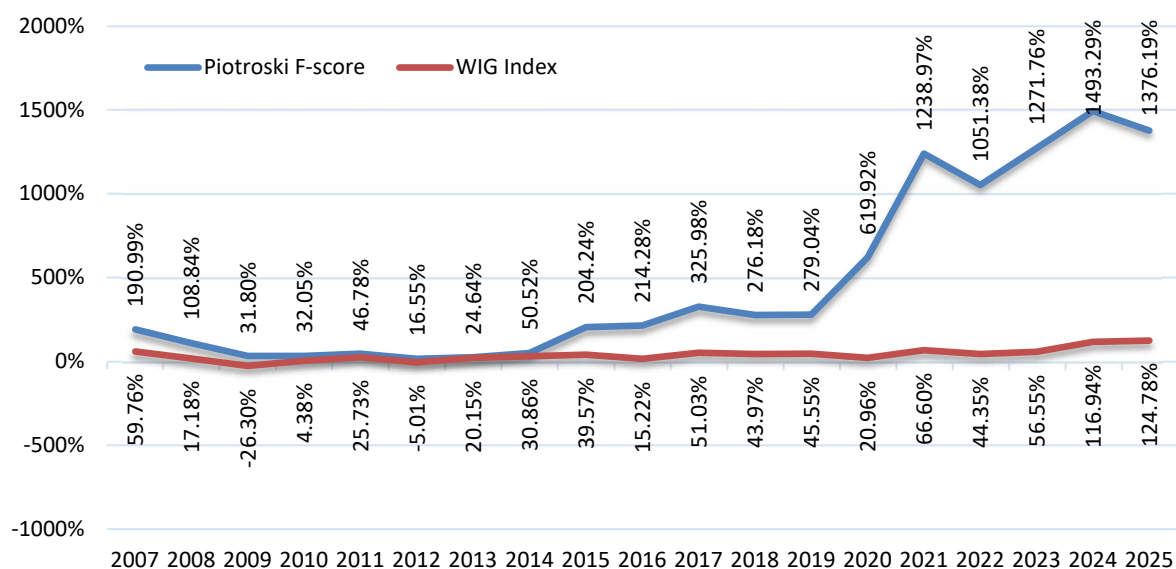


Figure 1. Comparison of cumulative rates of return from the Piotroski F-score strategy and investments in the broad WIG index on the Warsaw Stock Exchange in 2006-2025

Source: own elaboration.

The results indicate a clear advantage of the Piotroski strategy in cumulative return. The Piotroski strategy generated a cumulative rate of return of 1 376.19% compared to 124.78% for the strategy

of investing in the WIG index. Thus, the Piotroski strategy multiplied capital almost 15 times more effectively than passive market replication. The trajectories diverged decisively in 2020, when the rate of return generated by the Piotroski F-score strategy turned strongly positive. In this period, the market rebounded from declines driven by investors' reaction to the COVID-19 pandemic, but the broader market's rebound came later and proved weaker.

Figure 2 presents the distribution of rates of return for companies selected using the F-score indicator.

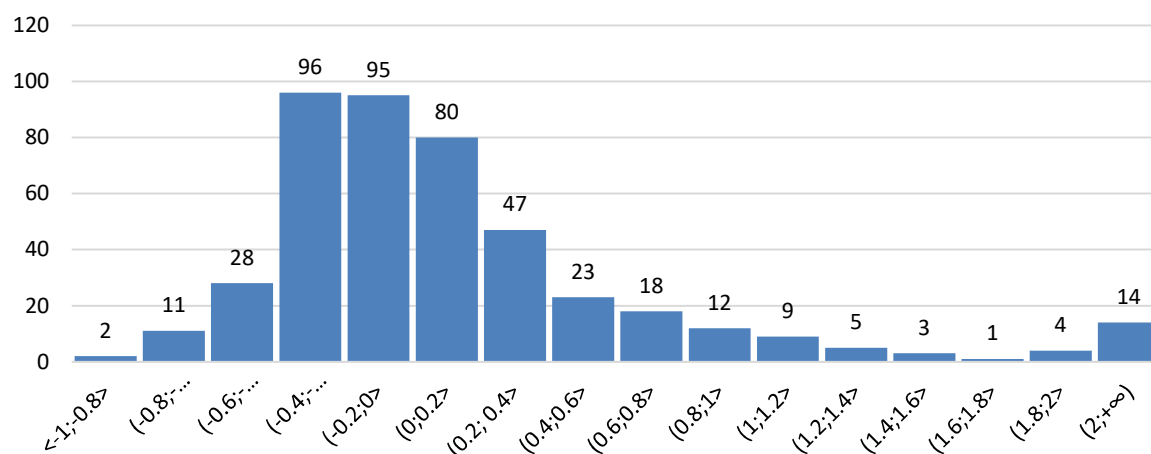


Figure 2. Histogram of the frequency of annual rates of return for companies selected using the F-score indicator on the Warsaw Stock Exchange in 2007-2025

Source: own elaboration.

The histogram of annual rates of return for individual companies reveals a clearly right-skewed, leptokurtic distribution with a strong concentration in the range of -40% to +40% (a maximum of 96 observations in the class from -40% to -20%). Most rates of return (approximately 71%) fall between -40% and +40%, reflecting the typical volatility of WSE shares. The significant asymmetry results from the long right tail: 89 rates of return exceeded 40%, and in 14 cases surpassed +200% (including an extreme of +3 003.45%). The distribution indicates high risk and the potential for extraordinary gains, typical of selective stock picking – most results hover around zero, but the few 'winners' significantly outweigh the losses.

Figure 3 presents the distribution of industries represented by companies selected using the F-score indicator.

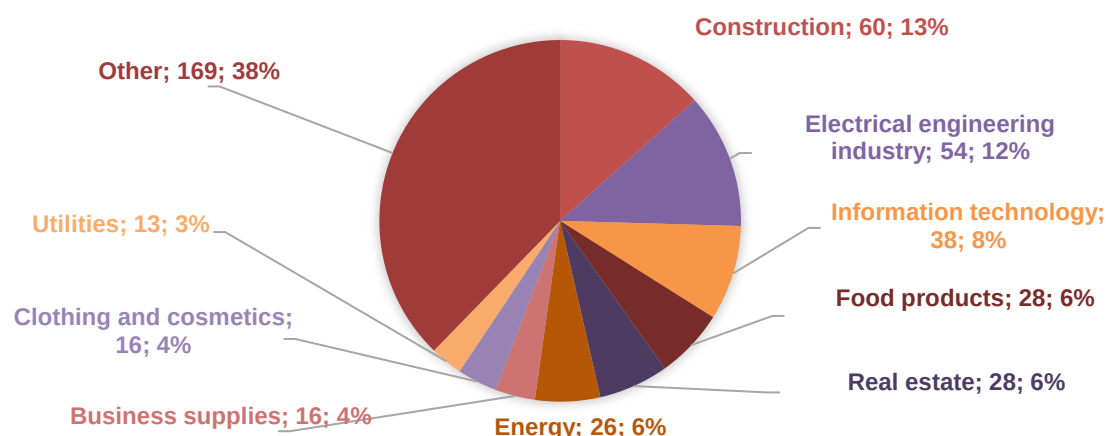


Figure 3. Distribution of industries represented by companies selected using the F-score indicator on the Warsaw Stock Exchange in 2007-2025

Source: own elaboration.

Among the companies selected using the F-score indicator, the most numerous came from construction (60 cases, 13%), electrical engineering industry (54 cases, 12%) and information technology (38 cases, 8%).

Table 5 presents the highest and lowest average rates of return generated by individual companies by industry. The left side shows extreme values for all industries, while the right side shows extreme values for industries with above-average company counts (minimum 13 occurrences).

Table 5. Highest and lowest average rates of return generated by companies selected using the F-score indicator by industry on the Warsaw Stock Exchange in 2007-2025

Industry name	Number of occurrences	Average rate of return	Industry name	Number of occurrences	Average rate of return
New technologies	4	778.57	Energy	26	65.57
Business services	6	228.38	Business supplies	16	34.04
Games	12	70.77	IT	38	26.50
Energy	26	65.57	Electrical machinery industry	54	17.85
Receivables	4	-13.52	Clothing and cosmetics	16	11.07
Financial intermediation	5	-16.79	Food products	28	9.64
Mining	7	-21.81	Real estate	28	7.04
Medical equipment and supplies	5	-28.48	Utilities	13	3.71

Source: own study.

Of all the industries analysed, the new technologies industry recorded the highest average return (778.57%) and the medical equipment and materials industry the lowest (-28.48%). Among the industries occurring more frequently than average (minimum 13 occurrences), the highest rate of return was recorded for the energy industry (65.57%) and the lowest for the media industry (3.71%). Interestingly, among these more frequent industries, even the lowest average returns proved positive.

Figure 4 shows the number of companies selected using the F-score indicator in individual years.

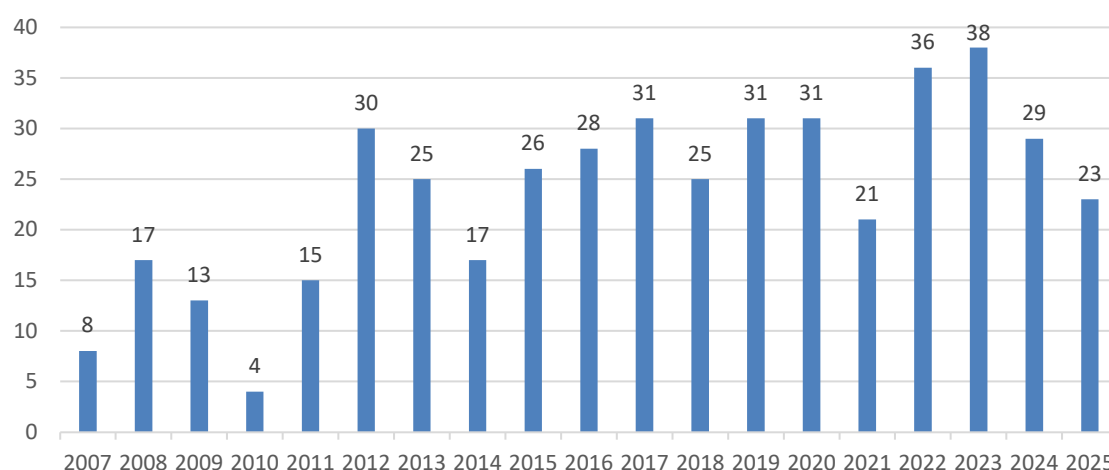


Figure 4. Number of companies selected using the F-score indicator in the portfolio on the Warsaw Stock Exchange in 2007-2025

Source: own elaboration.

The number of companies in the portfolio over the review period ranged from four (May 2009-May 2010) to a maximum of 38 entities in May 2022-May 2023. On average, the portfolio held 23.58 companies per year.

Figure 5 presents the number of individual companies selected using the F-score indicator.

Among all companies selected using the F-score indicator, the most frequently represented were: KPPD (seven times) and Ulma, Mobruk, Sunex and Stalexp (five times each).

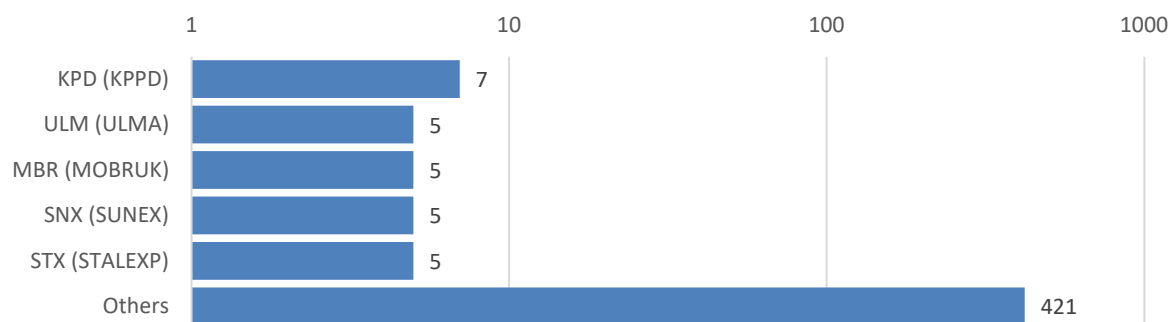


Figure 5. Number of individual companies selected using the F-score indicator on the Warsaw Stock Exchange in 2007-2025

Source: own elaboration.

Table 6 presents the highest and lowest average rates of return generated by individual companies. The left part shows extreme values for all companies, while the right part shows extreme values for companies appearing more often than average (minimum two occurrences).

Table 6. Highest and lowest average rates of return generated by companies selected using the F-score indicator on the Warsaw Stock Exchange in 2007-2025

Company name	Number of occurrences	Average rate of return	Company name	Number of occurrences	Average rate of return
CLD (CLOUD)	1	3 003.45%	CLC (COLUMBUS)	2	777.16%
NXG (NEXITY)	1	1 311.11%	AAT (ALTA)	2	208.72%
CLC (COLUMBUS)	2	777.16%	PAS (PASSUS)	2	196.52%
AGT (AGROTON)	1	429.84%	ULM (ULMA)	5	122.47%
LES (LESS)	1	-67.32%	AST (ASTARTA)	2	-38.81%
IMP (IMPERIO)	1	-68.86%	KDM (KDMSHIPNG)	2	-43.62%
SGR (SADOVAYA)	1	-71.67%	EQU (EQUNICO)	2	-51.94%
SFG (SILVANO)	1	-81.90%	08N (08OCTAVA)	2	-65.47%

Source: own study.

Among all the companies analysed, Cloud recorded the highest average return (3 003.45%) and Silvano the lowest (-81.90%). Among the companies appearing more often than average (minimum two occurrences), Columbus recorded the highest return (777.16%) and 08Octava the lowest (-65.47%).

These findings situate the WSE within the paradigm of emerging markets, where fundamental quality continues to command a substantial premium. The 15.22% CAGR aligns with evidence from other markets with lower informational efficiency, such as Vietnam (Ho *et al.*, 2023) and India (Shah *et al.*, 2025). The pattern contrasts sharply with highly developed equity markets (*e.g.*, the USA or the UK), where the original anomaly has largely eroded (Rathjens & Schellhove, 2011; Woodley *et al.*, 2011). Furthermore, the elevated volatility of the Polish portfolio and its sharp post-crisis rebound in 2020 corroborate Anderson *et al.*'s (2025) observations on the macroeconomic sensitivity and cyclicity of the F-score model.

Relative to prior domestic studies, this article considerably expands the analytical perspective. While Kusowska (2021) highlights the defensive properties of the F-score among WIG30 constituents during the pandemic-induced downturn, the present long-horizon analysis across a broader corporate spectrum reveals a distinctly offensive profile, enabling nearly 15-fold capital appreciation against a passive benchmark. The magnitude of this advantage – substantially exceeding the modest +1.35% market-adjusted return reported by Pilch (2023) – stems primarily from capturing the strategy's specific payout profile: a strongly right-skewed distribution where the extraordinary gains of a few accurately selected companies dictate the portfolio's ultimate success.

Ultimately, the disparity between the lack of unconditional statistical significance and the strategy's spectacular economic success underscores a pivotal attribute of fundamental investing on the WSE. The superior Sharpe ratio confirms that Piotroski's strategy adequately compensates investors for assuming

increased portfolio variance. Thus, in contrast to highly efficient global exchanges where augmenting algorithms are increasingly required (Gimeno *et al.*, 2020; Lin *et al.*, 2021), Piotroski's foundational selection criteria remain a self-sufficient and highly effective capital allocation framework in Poland.

CONCLUSIONS

The empirical investigation yields the following principal conclusions:

- **C₁**: The F-score strategy generated a CAGR of 15.22%, significantly outperforming the broad WIG index, which yielded merely 4.36% over the analysed period.
- **C₂**: The rates of return from the Piotroski F-score strategy outperformed the passive 'buy and hold' approach on the broad WIG index in 10 out of 19 evaluated periods (52.63%).
- **C₃**: Although the F-score strategy carries higher absolute volatility than the broad market benchmark, it delivers superior rates of return per unit of assumed risk.
- **C₄**: Over the analysed period, the rolling average rates of return showed strong positive skewness, yielding positive outcomes in 72.22% of two-year investment horizons (13 out of 18), 87.50% of five-year horizons (14 out of 16), and 100% of ten-year horizons (11 out of 11).
- **C₅**: The fundamental portfolio consisted of an average of 23.58 companies annually, with the number of selected constituents ranging from four to 38 entities.
- **C₆**: Among the companies selected using the F-score indicator, construction firms were the most prevalent, accounting for 13% of all cases (60 occurrences).
- **C₇**: Across all analysed industries, the new technologies sector recorded the highest average return (778.57%), and medical equipment and materials the lowest (-28.48%). However, when considering only industries that appeared more frequently than average, the energy sector generated the highest return (65.57%) and media the lowest (3.71%).
- **C₈**: Among all analysed companies, Cloud generated the highest average return (3 003.45%), and Silvano the lowest (-81.90%). Conversely, within the group of companies appearing in the portfolio more often than average, Columbus achieved the highest return (777.16%), and 08Octava the lowest (-65.47%).

Although formal statistical verification requires caution in generalising the results, the analysis confirms the investment utility of the strategy. The efficacy of Piotroski's model in generating excess returns lies not in linear profit generation but in effectively selecting undervalued companies with substantial growth potential. Because the Wilcoxon test showed no statistical significance, the hypothesis of the strategy's unconditional capacity to effectively predict prices year-on-year has not been fully confirmed. However, one must distinguish between statistical regularity and economic viability. As evidenced by the risk-return ratio (Sharpe ratio of 0.37) and the impressive cumulative return, this strategy serves as a highly effective practical capital-allocation tool, capturing asymmetric fundamental risk premiums. From an international perspective, these findings substantiate the rationale for global investors allocating capital in Central and Eastern Europe. While classic fundamental filters are gradually eroding in highly developed Western markets, the CEE region – as exemplified by Poland – still offers highly asymmetric fundamental risk premiums. Notably, this study provides the first long-horizon analysis in the CEE region confirming the strategy's viability under real-world trading constraints, fully incorporating rigorous transaction costs and capital gains taxes.

The main limitations of the study include the lack of unconditional statistical significance at the $\alpha = 0.05$ level and the risk of survivorship bias within the sample (Baquero *et al.*, 2009). The bias arises because historical data obtained from external aggregating services (Biznesradar, n.d.) may not encompass the full history of all entities withdrawn from stock exchange trading (e.g. as a result of bankruptcy) over such a prolonged, twenty-year horizon. In classic market tests, survivorship bias typically inflates historical portfolio returns artificially. However, the stringent design of the Piotroski ratio significantly mitigates this impact. The requirement to obtain 7-9 points acts as a restrictive filter, which by definition rejects entities with deteriorating fundamentals, typical of companies approaching delisting. Nevertheless, one cannot claim that this phenomenon has been completely eliminated. Sudden bankruptcies, often masked

by creative accounting, also occur in entities with previously high F-score results. For this reason, although the distortion of results is much smaller here than in strategies based solely on market valuation multiples (e.g. P/E or P/BV ratios), survivorship bias remains a limitation of this study.

Given the findings, the study proposes the following directions for future research:

- Testing the effectiveness of the Piotroski F-score strategy in a variant assuming both long and short positions, including extended company selection criteria (e.g. 7-9 points and 0-2 points instead of the classic 8-9 points and 0-1 points).
- Analysing the application of Piotroski's strategy in combination with other factors, such as price momentum, to determine whether such hybrid strategies can provide more stable and higher risk-adjusted returns.

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Use of Artificial Intelligence

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Conflict of Interest

The author declares that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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Green public procurement as a research field in period 2005-2025

Marina Stojanov, Blaženka Knežević

ABSTRACT

Objective: The objective of the article is to identify the scope and development of green public procurement as a research field over the last two decades. The article aims to provide a conceptual structure of literature in the field through identifying elaboration of research sub-areas and key words occurring in published papers on the topic of green procurement. In addition, based on the findings, article aims to suggest certain future directions of research.

Research Design & Methods: Methods of bibliometric literature and co-occurrence network were applied to identify the most important topics and trends in green public procurement and discuss directions for further research in the field. In addition, primary pilot research was conducted using semi-structured interviews with public procurement managers to complement the theoretical part of the research and to emphasise areas of green public procurement which are important from the practical point of view.

Findings: Results of the bibliometric analysis show that scientific interest for the field of green public procurement is significantly growing over the past twenty years. Based on the bibliometric analysis, the main six topics occurring within the green public procurement field are: (1) sustainability, (2) public procurement policies and process, (3) life cycle, (4) supply chain management and decision making, (5) cost analysis and (6) supplier selection. While the pilot research reveals significant scope to add more specific topics into the future research in the field.

Implications & Recommendations: The literature review together with described bibliometric analysis results can serve as a reference for understanding how the field of green public procurement literature has recently evolved. Elaborated co-occurrence network of keywords indicates research gaps in the field. Based on that, we offer suggestions and recommendations for future research directions based on which academics in the field can develop and design their future research projects in the field of green public procurement. Moreover, based on practical insights into managers' opinions from the pilot research, academics can develop new questions for more complex quantitative research in the field.

Contribution & Value Added: This article addresses some limitations of previous bibliometric studies by broadening the period of research and by using a different bibliographic database as the data source: Scopus instead of Web of Science. Moreover, the article adds new practical knowledge based on the conducted pilot research on the sample of public procurement managers, which was suggested to be done in several previously published papers based only on bibliometric method. Both methods enabled recognition of new research gaps which can be investigated in future research in green public procurement field.

Article type: research article

Keywords: green public procurement; bibliometric analysis; co-occurrence; interview; public procurement managers

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INTRODUCTION

Green public procurement is defined as a procedure in which public administration bodies procure goods, works and services which have a lower impact on the environment during their lifetime than

goods, works and services with the same basic function that they would otherwise order (MEPZ, 2015). Green public procurement (GPP) can serve as a voluntary instrument that encourages environmental protection and sustainable consumption as well as production. International and European strategic documents emphasise GPP because it facilitates how contracting authorities seek to order goods, services, or works that have less impact on the environment during their life cycle but with the same basic function and quality that would otherwise be ordered (Kordos *et al.*, 2022). Moreover, considering the types of sustainable public procurement, GPP is one of the most frequently mentioned types of public procurement. Most studies in the field of sustainable public procurement examine sustainability factors only in the context of one type of sustainable public procurement – usually that of green procurement (Grandia & Voncken, 2019).

Furthermore, as a fiscal policy tool for environmental governance, GPP plays a crucial role in achieving sustainable production and consumption. Wang and Shen's (2025) findings reveal that green public procurement significantly improves firms' environmental, social, and governance (ESG) performance. Beyond its environmental impact, GPP matters economically thanks its contribution to supply chain management, life cycle and cost analysis.

A quick insight into the bibliographic database Scopus, shows that the first scientific article on this topic was published by Spence in 1981, in the USA. In 1993, Berman published the scientific article with 'green products' in the title, and since then, the research interest in topics of green procurement and green public procurement has grown to the present day. The current article focuses on the last two decades 2005-2025. The Scopus database held five relevant articles in 2005, 19 in 2015, and 129 in 2025 – all dealing with green public procurement as a subject of research. In addition, there is a notable prevalence of areas or approaches applied in the field. For instance, in the early 2000s, articles focused on environmental aspects, from 2015 to 2020 the common topics were life cycle and sustainability, and in past few years green public procurement appears mainly in the context of business operations, small and medium-sized enterprises, along with procurement practice and specific industries.

As research in GPP continues to evolve, bibliometric analysis provides a valuable tool for tracking progress, recognising field sub-topics, and shaping the trajectory of research (Bunescu & Serban, 2025). Scholarship recognises bibliometric analysis as the method for examining the structure and impact of research in a field by using metrics such as the number of publications, citations, and collaboration networks (Donthu *et al.*, 2021). This enables scholars to identify influential authors, high-impact journals, emerging topics, and future research directions (Zupic & Cater, 2015). Bibliometric methods are widely used to analyse scientific production, providing an objective perspective on the distribution of knowledge and academic networks (Aria & Cuccurullo, 2017). Bibliometric studies are applied in various fields, including public policy (Hussain *et al.*, 2024), environmental management (Letunovska *et al.*, 2021), and sustainability (Nobanee *et al.*, 2021), highlighting their usefulness in evaluating research trends (Bunescu & Serban, 2025). Therefore, we applied a bibliometric literature review to identify the most important topics and trends in green public procurement and to discuss the potential for further research.

For stronger confirmation and a practical insight into the research field, we supplemented theoretical analysis with qualitative research: a pilot study of semi-structural personal interviews with public procurement managers from different Croatian firms that are subject to public procurement. We asked public procurement managers to comment: How and how frequently they use GPP instruments in public procurement procedures? Is green public procurement something new for them? What are the advantages and disadvantages of green public procurement? And, which three words they associate with the term of green public procurement?

Therefore, the article describes the evolution and identifies key sub-topics of GPP over the last two decades. To that end, our study sought to answer the following research questions:

- RQ1:** How green public procurement evolves as a research field in period 2005-2025?
- RQ2:** Which countries are the most influential in the field of green public procurement?
- RQ3:** What are the dominant subtopics in the research field and are the subtopics interconnected?
- RQ4:** How practitioners perceive the importance and role of the green public procurement?

RQ5: Based on the perceptions of public procurement managers, are any topics neglected in the available literature in the field of green public procurement?

LITERATURE REVIEW

As already mentioned in the introduction, research in GPP continues to evolve, and scientific interest has only grown over the last two decades. Moreover, consolidation and integration of green aspects into public procurement policies becomes increasingly frequent at the international level. Bunescu and Serban (2025) provide a bibliometric analysis of specialised literature related to green public procurement conducted using publications indexed in the Web of Science database, applying rigorous selection criteria and specialised tools such as CiteSpace and Bibliometrix.

The study by Rejeb *et al.* (2024a) showed that sustainable development, sustainability, green supply chain management, and GPP remain core topics related to green procurement. In addition, Rejeb *et al.* (2024b) conducted the bibliometric review to investigate the current state of public procurement research. The results indicate that public procurement research has increased significantly in recent years. The findings from keyword co-occurrence network reveal six main research themes including innovation, corruption, and GPP. By applying bibliographic coupling, Rejeb *et al.* (2024b) found that the focus of public procurement research revolves around seven thematic areas: GPP, corruption, the role of SMEs in public procurement, electronic public procurement, innovation, labour standards, and service acquisition.

Ortega Carrasco *et al.* (2025) prepared systematic literature review and bibliometric analysis of GPP research between 2003 and 2023 to identify key topics, trends and research gaps. A dataset of 201 documents retrieved from the Web of Science database was analysed using CitNetExplorer and VOSviewer. By analysing prior literature on the effect of GPP on achieving sustainable development, they found that (1) richer qualitative analysis on green public procurement is needed, (2) there is a gap in understanding localised factors influencing green public procurement in developing countries, and (3) the transformative role of digitalisation in promoting social and environmental outcomes in GPP is an essential factor.

Galán-Valdivieso *et al.* (2024) performed bibliometric analysis by Scopus documents from 1990 to November 2023 so as to find that the most influential journals are *Journal of Cleaner Production* and *Sustainability*. The latter is an open access journal while the former publishes through traditional subscription.

Masudin *et al.* (2022) used a structured literature study sample for 1994-2022. A total of 220 articles with the keywords green procurement and supplier selection were collected. The authors used Publish or Perish and VOSviewer to find journals, authors, citations, keywords, and word hierarchy maps. This bibliometric review is related to the implementation of green procurement.

Many authors research GPP in a specific country (Tan We *et al.*, 2025; Deschamps, 2025; Nguyen & Van Vu, 2025; Gao & Lu, 2025; Shanin *et al.*, 2025; Migone *et al.*, 2024; Ishak & Thirucelvam, 2024) or a specific industry (Bhandari *et al.*, 2025; Tim *et al.*, 2025; Aldenius *et al.*, 2022), while a significant number addresses the construction sector (Ahmed *et al.*, 2024; Gruber *et al.*, 2025; Hosseinpoor Azari *et al.*, 2024; Flores Lara *et al.*, 2025; Idir *et al.*, 2025). In future, artificial intelligence (AI) is expected to become a more prominent topic, Iders-Bankovs *et al.* (2025) wrote the article about public procurement in the age of AI and emphasised challenges and opportunities which AI brings to the field.

Most articles that applied bibliometric analysis to green procurement and GPP draw on data available in the Web of Science bibliographic database. Various analytical tools mapped the field, such as CiteSpace, Bibliometrix, CitNetExplorer, and VOSviewer. Our study employed data extracted from the Scopus bibliographic database because it provides more scientific journals from regions of Central and Southeastern Europe than the Web of Science database. Therefore, the results of our bibliometric analysis may differ from previous analyses.

Besides the differences in analysis of a different period (2005-2025), which includes most recent articles in the field, our bibliometric analysis included more papers published in languages other than English, which are available in Scopus but not in the Web of Science database. Moreover, Bunescu and Serban (2025) indicate that the qualitative studies that combine bibliometric analysis with interviews with field experts could provide a more nuanced perspective on the real impact of new practices and

technologies on the procurement process. Therefore, we firstly analysed Scopus documents with keywords, precisely the keyphrase ‘green public procurement’ in the ‘Article title, Abstract, Keywords’ in all available languages. Secondly, we conducted a pilot study by interviewing public procurement managers who provided a perspective on GPP in practice.

RESEARCH METHODOLOGY

Research was conducted in two phases: (1) a bibliometric analysis of articles published in 2005-2025, and (2) primary qualitative research on a sample of public procurement managers. The methodology for each phase is described in more detail below.

Phase 1: Bibliometric Analysis of Green Public Procurement as Research Field in 2005-2025

This study used bibliometric analysis paired with a graphical mapping technique. The aim was to investigate the existing scientific literature in the field of green public procurement and, consequently, recognise the research trends in the field and identify research gaps for further scientific work. Figure 1 presents the key steps of bibliometric analysis procedures.

In the first step, we used the phrase ‘green public procurement’ to perform a test search in the Scopus database. The test search returned a large pool of 918 documents with the keyword in the ‘Article title, Abstract, Keywords’ (see second research step). Therefore, ‘green public procurement’ was accepted as a suitable keyword on which further analysis would be based. A period from 2005 to 2025 was taken as a relevant period for research, since in the early 2000s a Scopus search on this topic returned only a few scientific papers and the field was still unexplored. Research step three shows that 872 of the 918 documents fall within this twenty-year period. These documents formed the basis for further analysis.

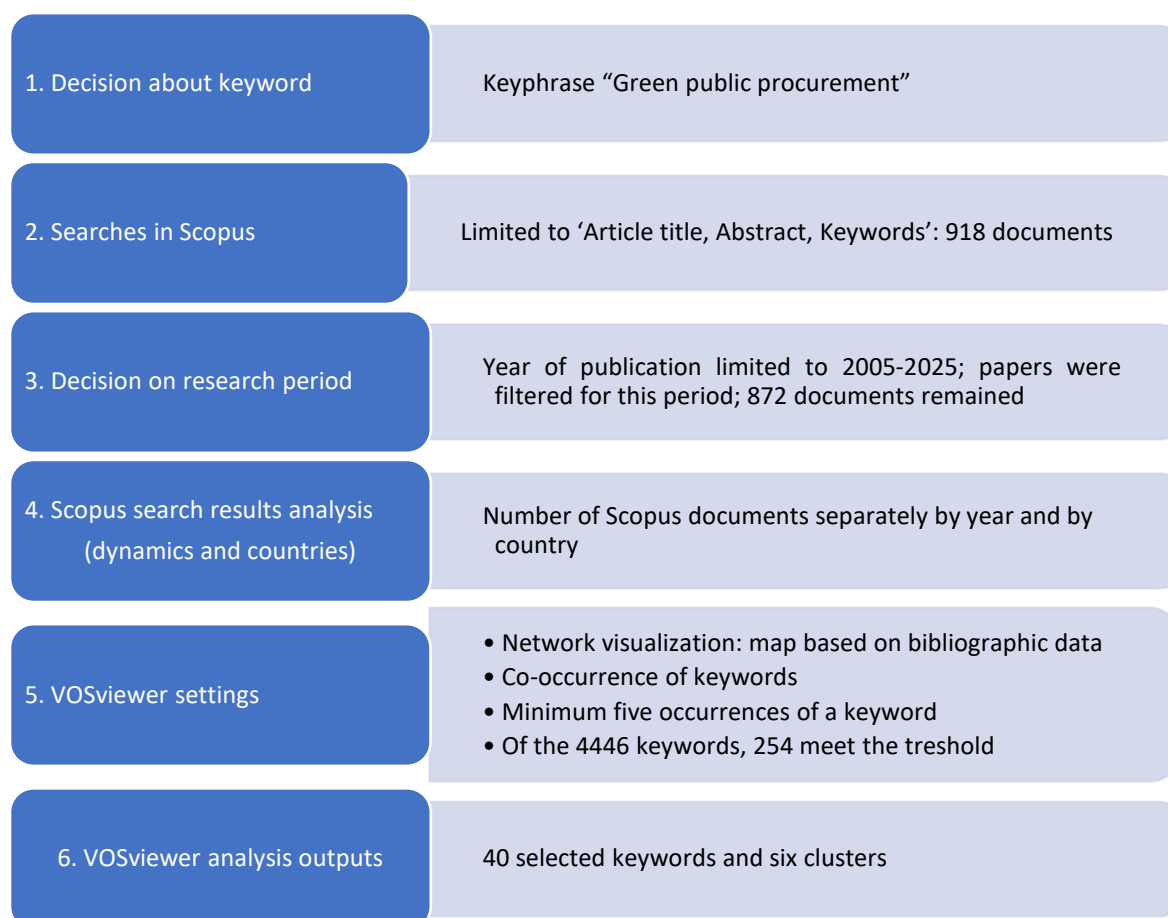


Figure 1. Steps of the bibliometric research procedure

Source: own elaboration.

In the fourth step, we scrutinised the data by year of publication and country of origin to describe the development trend in the field and to identify the countries where the topic is most represented. Then, in step five, we entered Scopus data into VOSviewer, a software tool for constructing and visualising bibliometric networks, and calibrated the settings as shown in Figure 1. We chose co-occurrence as the analysis type, with a minimum of five keyword occurrences. Results show that out of the 4 446 keywords, 254 met the threshold. Finally, 40 keywords were selected, and based on given preconditions, VOSviewer analysis provided six clusters whose description leads to valuable conclusions about key topics, trends, gaps and space for further investigation in the field of green public procurement.

Phase 2: Methodology of a Primary Qualitative Pilot Research on a Sample of Procurement Managers

In addition to the bibliometric analysis, semi-structured interviews on green public procurement were conducted with public procurement managers to practically confirm that the abovementioned terminology and the discovered relationships between concepts are suitable as a research subject for a broader primary quantitative study. Table 1 shows the profile of the ten public managers involved in the pilot study conducted in Croatia from late December 2025 to early February 2026.

Table 1. Qualitative pilot research sample structure

MANAGER CODE	GENDER (M/F)	SECTOR / INDUSTRY	INSTITUTION/COMPANY SIZE (according to number of employees)
M1	F	Healthcare	large
M2	M	Healthcare	large
M3	F	Healthcare	large
M4	F	Education	medium
M5	F	Education	large
M6	F	Local government	medium
M7	M	Local government	medium
M8	F	Local government	small
M9	F	Government	large
M10	F	Wood processing industry	large

Source: own study.

Table 1 shows that out of the 10 interviewed managers, three come from the health sector, two from the education sector, three from the local government, one from the government sector, one from the wood industry. Notably, the sample included eight women and two men. Regarding the size of institution or public company: six worked in large (with more than 250 employees), three in medium-sized (with 50-250 employees), and only one manager in small institution (with less than 50 employees). All companies and institutions were located in Croatia, mostly in the capital city Zagreb (7 out of 10), while three in other Croatian cities.

RESULTS AND DISCUSSION

Discussion on Field Dynamics and Dominant Originating Countries

Our review of the literature available in the Scopus database shows that in 2005 only five articles were published about GPP (Baidz, 2005; Berdegue, 2005; Faith-Ell, 2005; Valko, 2005; Green, 2005), in 2015 – 19 articles (such as: Igarashi *et al.*, 2015; Lunberg *et al.*, 2015; Nikolaou & Loizou, 2015; Uttam & Le Lann Roos, 2015; Guevara Ortega Carrasco, 2015; Yan, 2015; etc.), and in 2025 the number of articles rose to 129. In 2015 there even appeared the book *Public Procurement Policy* (Piga & Tatrai, 2015). Over the last ten years (2015-2025), publications related to green public procurement revealed a significant growth (Figure 2). Green public procurement has become increasingly popular among researchers in recent years. Because the number of available papers has risen rapidly since 2023, we expect further growth in the near future.

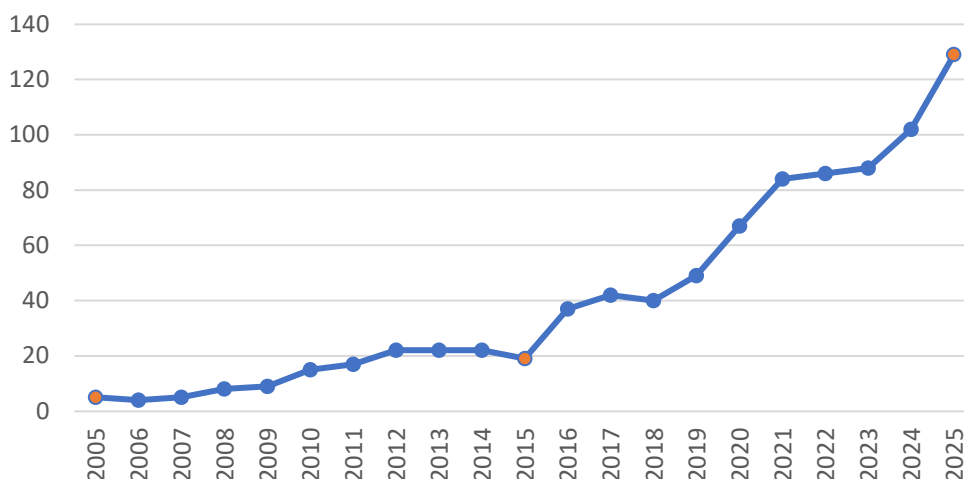


Figure 2. Evolution of publication on green public procurement

Note: Total of published papers over the last twenty years is 872.

Source: own elaboration based on number of papers in the Scopus database.

In total, 595 papers appeared over the last ten years. By far the most publications about GPP originated from Italy (115), and then Spain (83), China (80), the UK (65), the USA (54), Sweden (52), Germany (50), Poland (35), and France (31), while all other countries together account for 30 published scientific articles. These data reveal a strong concentration of papers from four countries because more than half of the published papers in the field originated from Italy – almost 20% of all published papers in last ten years – then Spain (14%), China (13%), and the UK (11%). This finding differs slightly from that by Bunescu and Serban (2025) and Ortega Carrasco *et al.* (2025) who do not mention Spain as one of the dominating countries in the field. Moreover, Poland ranks higher in our study as an originating country – represented with 35 papers – than in previous studies based on bibliometric analysis, which may confirm the assumption of better regional journal availability, namely presence in the Scopus database among journals for the Central and Eastern European region. Croatia has only two documents on this topic in the Scopus database in the given period. Stojic (2021) explores how four public incentives (regulation, taxes, subsidies, and procurement of eco-innovations) and two private incentives (demand incentives and reputational concerns) contribute to creating private and social benefits from green innovations in emerging Central European economies. The second article originating from Croatia by Böttge *et al.* (2023) emphasise that shifting green public procurement from voluntary application to legal obligation could push companies and organisations towards more strategic and outcome-oriented purchasing in various sectors in the EU.

Discussion on Keywords and Co-occurrence Network

As described earlier, by performing common keyword analysis within the VOSviewer (Figure 1), 40 keywords were isolated and co-occurrence analysis identified six clusters (for clusters, see Figure 3). Each cluster groups related keywords, revealing trends in green public procurement, under-investigated terms, and connections between topics.

Keyword co-occurrence network reveals six main research themes of green public procurement: (C1) sustainability (red cluster with nine keywords), (C2) public procurement policies and process (purple cluster with eight keywords), (C3) life cycle (blue cluster with seven keywords), (C4) supply chain management and decision making (yellow cluster with seven keywords), (C5) cost analysis (green cluster with six keywords) and (C6) supplier selection (light blue cluster with three keywords).

The red cluster (C1) shows GPP as the biggest bubble. The other bubbles in the given cluster are circular public procurement, ecolabels, green products, green procurement, procurement, procurement practices, sustainability, and sustainable public procurement. This cluster shows that scholarship often investigates GPP in relation to sustainability and sustainable public procurement

(Naveed *et al.*, 2025; Guarini *et al.*, 2025; Shahin *et al.*, 2025; Ayarkwa *et al.*, 2025; Tuffour *et al.*, 2024). This finding agrees with Bunescu and Serban (2025) who also foreground this aspect as a very important topic within the research field.

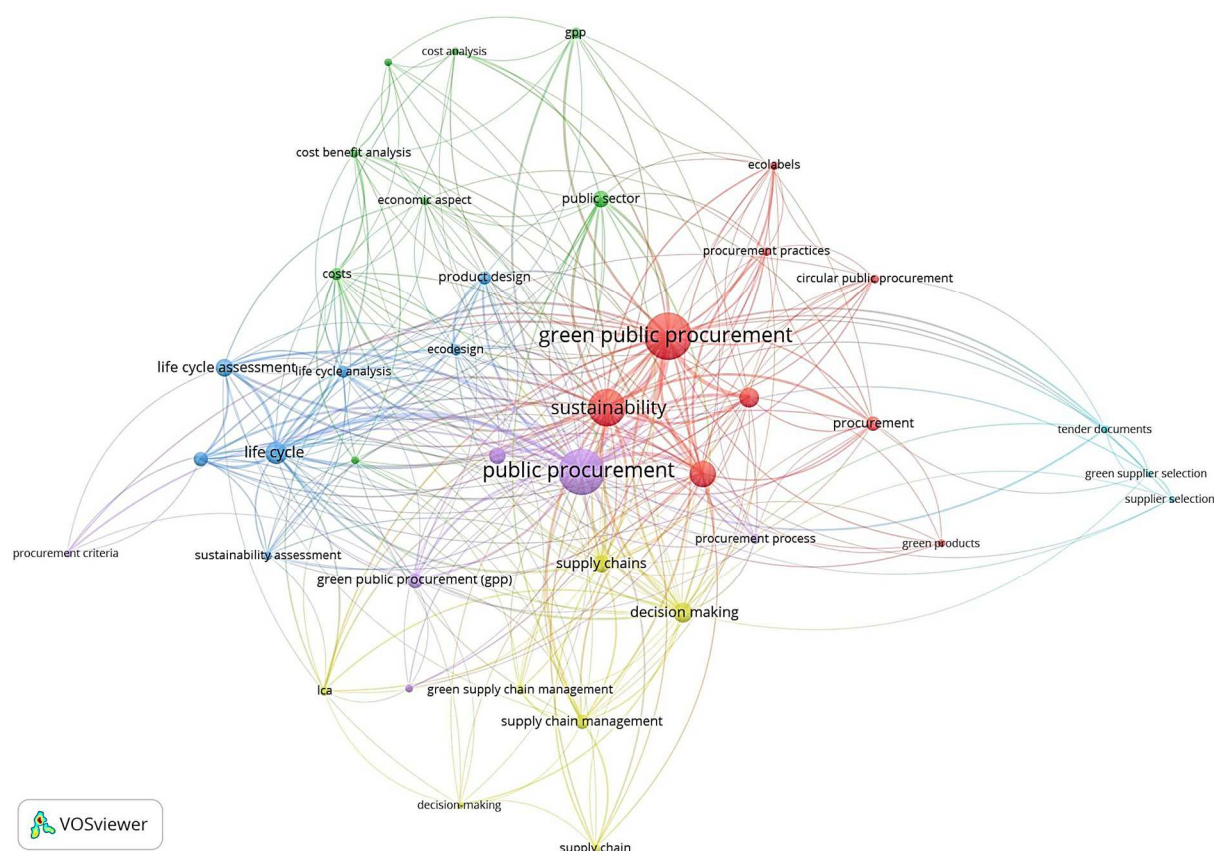


Figure 3. Co-occurrence network based on conducted bibliometric analysis

Source: own elaboration using VOSviewer software.

Sustainable public procurement links with all other clusters except for the light blue cluster (C6), which represents operative terms of public procurement. Nevertheless, procurement practices and ecolabels – also operative practices of GPP – are not strongly connected with other clusters. Therefore, scholars may investigate the implementation of procurement procedures and selection within the framework of managerial decisions and characteristics.

Public procurement from the purple cluster (C2) – as a wider term – is strongly interlinked with other clusters. In turn, the blue cluster (C3) appears strongly interlinked to green (public) procurement, which means managers often mentioned green procurement together with life cycle. These interlinkages show how keywords from different clusters relate to each other. When we set aside the direct procurement terms (green public procurement, green procurement, and public procurement), sustainability is the largest bubble and it is strongly linked with all other clusters, which makes it a trend to investigate in many fields.

In the light blue cluster (C6), the bubbles are of relatively similar size, and it is not highly linked to other clusters. The bubbles of green cluster (C5) are also relatively the same size. Decision-making from yellow cluster (C4) is interlinked to all other clusters, which makes it important and highlights the managerial component, which is not directly investigated in the field of green public procurement.

Pilot Research Results

The pilot research was conducted via interviews with a limited number of public procurement managers in Croatia as an exploratory and complementary add-on to bibliometric analysis. Figures 4 and

5 show the results of the content analysis, categorised and systematised according to the transcribed managers' answers in the conducted interviews.

Frequency and instruments of green public procurement	Trend of green public procurement	Advantages and disadvantages of green public procurement
• rarely or never • voluntarily • connected with products (e.g. Ecolabels, biodegradable products) • expect more instruments in the future (for instance suppliers' ISO certificates)	• new trend • EU trend • new in Croatia	ADVANTAGES • environmentally friendly • ecological • adding value DISADVANTAGES • expensive • decreasing competition • incompletely responding to consumer needs

Figure 4. Categories of managers' opinion on green public procurement

Source: own elaboration based on information from conducted interviews.

Figure 4 summarises findings from answers to the first three questions from interviews. Firstly, we asked public managers to describe how often they use green public procurement instruments in their public procurement procedures. Answers show that seven out of 10 managers use it rarely or never, and if they do sometimes use it, it is always oriented towards such products as ecolabels or biodegradable components – not suppliers. Nonetheless, eight out of 10 managers expected that supplier characteristics like ISO certificates will also be valued in GPP in the near future. As a reason for not implementing the GPP they stated that it is still voluntary (M1, M2), GPP requires more time and broader market investigation and they lack the people and time (M1, M2, M3), that they do not have enough education for it as well as that Croatian market is still undeveloped for it (M4, M5, M7), but they are nevertheless aware that GPP will be important the near future – maybe even changing from voluntary to obligatory in procurement procedures (M1, M2, M4, M5, M6, M7).

Secondly, managers were asked whether green procurement is a trend. All managers consider green public procurement a new trend that came from the EU and remains undeveloped in Croatia. Thirdly, managers were asked to emphasise advantages and disadvantages of green procurement as a concept and trend in the public procurement. Around half of managers were somewhat sceptical about green public procurement, as they consider it an instrument which is expensive (M1, M3, M4, M7, M9), which decreases competition (M4, M5, M6, M8, M9, M10), and which is not always compatible with the consumer needs (M2, M3, M7, M8, M10). However, most managers (eight out of 10) claim that a major advantage of green public procurement is a positive environmental and ecological impact, while half of them agreed that green procurement can contribute to added value in their company or organisation (M3, M5, M6, M8, M9). Therefore, we conclude that sustainability – especially its environmental and ecological aspects – and GPP are concepts strongly connected not only by the co-occurrence network of the bibliometric analysis but also by procurement managers. This finding supports Cheng *et al.* (2018), who claim that the policy environment is a primary factor that determines the extent of engagement in green public procurement.

Finally, each interviewed manager was asked to give three words, which associate them with green public procurement as a concept. In total, 26 words were extracted from the interview transcript, and four words were mentioned twice. In Figure 5, the extracted words are categorised into five aspects: products, specific products, environment and energy, economy in general, and other (uncategorised). This structural table shows that managers associate the term most with the product. The second column of Figure 5 shows that managers gave their associations based on their job and type of products they purchase. As expected, they regard green public procurement partly as an environmental matter and partly associate it with economic terms.

Notably, some of the words in Figure 5 were not found through the co-occurrence network within the bibliometric analysis such as 'biodegradable,' 'FSC certificate,' 'added value,' 'MEAT' (the most economically advantageous tender), 'warranty,' 'ISO certificates,' and all words from the specific products field. Therefore, based on both bibliometric research and pilot research we can conclude that green procurement is a suitable topic for future wider primary research, but in addition to aspects available in the literature – explained based on bibliometric research – there remains space to explore more specific fields of green public procurement, based on the pilot research. Moreover, this agrees with the suggested research direction by Cheng *et al.* (2018) and Ortega Carrasco *et al.* (2025) who claim that some qualitative research methodologies must be used to improve the evidence on this topic from managers' viewpoint and to promote more practices which are used in green public procurement.

PRODUCT	SPECIFIC PRODUCTS	ENVIRONMENT & ENERGY	ECONOMY	OTHER
• ecolabel • product • extended product life • biodegradable • FSC certificate • life cycle • added values	• food packaging • ecological detergents • electric vehicles • solar panels	• renewable energy sources • use of recycled materials • recycle • environment • energetic efficiency	• costs • the most economically advantageous tender (MEAT) • warranty for defect removal • contract • suppliers • ISO certificates	• new • future • education • grass

Figure 5. Associations of interviewed managers regarding phrase 'green public procurement'

Source: own elaboration based on information from conducted interviews.

CONCLUSIONS

The study sought to answer five research questions. Here we summarise the answers, drawing on the results and discussion above.

Answer to RQ1: Green public procurement evolved rapidly over the period 2005-2025. Analysis of articles on this topic shows significant growth over the last two decades and research interest is increasing rapidly over the last five years. Therefore, we expect further growth of research interest in the field of green procurement in the near future.

Answer to RQ2: Four dominant countries of origin of papers have been identified, covering more than half of all available publications in the Scopus database: Italy, Spain, China, and the UK. Italy is by far the most represented country of origin, making up almost 20% of all the available articles.

Answer to RQ3: The bibliometric analysis identified that six main topics connected to green public procurement are: (1) sustainability, (2) public procurement policies and process, (3) life cycle, (4) supply chain management and decision making, (5) cost analysis and (6) supplier selection. The co-occurrence network isolated relationships among the six topics and some research gaps were described in the discussion section referring to this analysis.

Answer to RQ4: Even though managers recognise green public procurement as a new growing trend and even though they emphasise advantages that green procurement can bring to ecological and economic aspects of doing business, they still consider it voluntary and do not implement it into their everyday practice on a large scale. Even if it is implemented, they state that it is oriented mainly towards products, not supplier relationships, and the reasons are a lack of education, lack of resources and underdeveloped market conditions.

Answer to RQ5: For procurement managers, sustainability and GPP are strongly connected concepts – especially in their environmental and ecological aspects – which supports findings from bibliometric analysis. Some notions that emerged as important associations with green public procurement from managers' viewpoint were not found through the co-occurrence network within the bibliometric analysis, such as 'biodegradable,' 'FSC certificate,' 'added value,' 'the most economically advantageous tender,' 'warranty,' 'ISO certificates,' 'specific products in public procurement.' Therefore, there is significant scope to broaden future research in the six most represented sub-topics by adding some of the abovementioned specific topics recognised by practitioners.

Our study addressed some limitations of previous bibliometric studies by including the most recent articles in the field and by using the Scopus database instead of the Web of Science, not to mention – by performing interviews with public procurement managers. Nevertheless, our analysis also has limitations. Our bibliometric analysis relied only on keywords, whereas it could also draw on citation, co-citation, and co-authorship analysis. Moreover, the Scopus keyword search could be extended to more related terms to map the GPP field more precisely. The main limitation of the pilot research was the small sample, which included only 10 public procurement managers from Croatia (mostly women), so we recommend further interviews or even a quantitative survey with a larger sample of public procurement managers from a larger pool of countries, which would improve the generalisability of the results. Moreover, the pilot research interviewed only public procurement managers, so future research should include perspectives from managers of private companies who are involved in public procurement processes. It would be interesting to investigate and explain their viewpoint regarding the most important sub-topics.

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Use of Artificial Intelligence

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Misaligned competence logics and the employability skills gap: Global business services sector in Poland

Marek Ćwiklicki, Agnieszka Pacut, Kamila Pilch

ABSTRACT

Objective: The objective of the article is to identify the employability skills gap between multinational corporations (MNCs) operating in the global business services (GBS) sector and prospective graduates, and analyses how divergent institutional logics shape competence expectations at labour-market entry.

Research Design & Methods: The study drew on focus-group data from GBS sector employers and university students in Poland in early 2021, offering a reference point from a period preceding the widespread adoption of generative artificial intelligence in workplace processes. The framework integrates institutional logics and signalling theory to interpret the mechanisms underlying observed competence misalignments.

Findings: The study suggests a systematic misalignment between an academic logic that privileges codified, measurable knowledge outputs such as technical proficiency and analytical capability and a market logic prioritising behavioural adaptability, proactivity, and interpersonal resilience under uncertainty. This misalignment reflects fundamentally different informational bases. Employers in MNCs select dispositional and contextual performance signals inherently resistant to credentialing, whereas educational institutions signal through standardised, measurable outputs. Proactive personality, communication competence, and adaptability emerge as bridging competencies spanning both logics.

Implications & Recommendations: The article offers a reference point for research on how generative artificial intelligence may reshape skills demand in the GBS sector. Educational institutions should reform credentialing and curriculum design, particularly around dispositional competencies, rather than treating the gap as individual student preparation.

Contribution & Value Added: The article advances person-environment fit theory by adding curriculum design as a structural conditioning factor in person-job fit. It proposes a competence-logic misalignment model potentially transferable to MNC contexts across other national and sectoral settings, subject to empirical validation.

Article type: research article

Keywords: employability skills gap; institutional logics; signalling theory; multinational corporations; global business services; person-environment fit; Poland

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INTRODUCTION

There persists a gap between the competencies that higher education institutions develop in graduates and the competencies sought by employers. The gap remains one of the most enduring challenges in human resource management and education policy. Recent evidence indicates this gap is widening rather than narrowing. For instance, the World Economic Forum's Future of Jobs Report 2025 projects that 39% of workers' core skills will undergo transformation by 2030, while the Cengage Group 2025 Graduate Employability Report reveals that only 30% of recent graduates secure employment in their

field of study, with 48% reporting they feel unprepared for entry-level positions. These findings especially concern multinational corporations (MNCs), which operate in complex, cross-border environments demanding competencies beyond those typically cultivated in national educational systems.

This article identifies the employment skills gap among MNCs operating in the global business services (GBS) sector. Prior research has documented the importance of soft skills for graduate employability (Finch *et al.*, 2013; McMurray *et al.*, 2016; Succi & Canovi, 2020) and identified sector-specific skills requirements across national contexts – including the IT sector in India (Jaiswal *et al.*, 2022), MNCs in Nigeria (Jiboku, 2023), and green MNCs in China (Taghian *et al.*, 2022). However, few studies theorise why the gap persists and through which mechanisms it reproduces.

This study moves beyond listing skills gaps to argue that employability shortfalls in MNCs stem from a clash between two institutional competence logics. Using institutional logics theory (Thornton *et al.*, 2012), we show that educational institutions and MNC employers are embedded in different institutional orders that generate competing definitions of ‘competence.’ Universities operate within a professional-academic logic driven by standardised assessment and credentialing. They prioritise codified knowledge, analytical reasoning, and demonstrable technical proficiency. By contrast, market logic governs MNCs, shaped by volatility, uncertainty, and cross-cultural complexity. They prize dispositional attributes: proactivity, resilience to stress, adaptability, and the ability to communicate effectively under ambiguity.

Educational provision reinforces this misalignment: universities can formally certify knowledge and technical skills, but the behavioural attributes valued by MNCs are much harder to codify, standardise and credential. Employers’ workplace experience further amplifies information asymmetries, as employers and educators not only possess different information, but also interpret ‘key competencies’ through different lenses. Signalling theory (Spence, 1973) clarifies why this mismatch persists. Because the behavioural attributes MNCs seek resist signalling via formal qualifications, educational institutions double down on what they can reliably certify. In doing so, they reproduce the very competence gap that MNCs lament. Therefore, this article addresses two research questions: (RQ1) How do employers and students construct and prioritise employability competences in the GBS sector? (RQ2) How do divergent institutional logics shape these expectations?

The presented study drew on focus group data collected in January-February 2021 from employers representing GBS-sector MNCs in Krakow, Poland, and university students as prospective employees. Poland offers a particularly instructive context: it ranks as the leading destination for business services in the Central and Eastern European region, hosting more than 2 000 BPO, SSC/GBS, IT, and R&D centres and employing nearly 490 000 professionals (ABSL, 2025; Ferencikova & Grachová, 2024). Poland’s GBS sector is a knowledge-intensive business services (KIBS) environment in which the interplay of technical and behavioural competencies is especially salient. Finally, studies of employability skills in transitional and emerging economies remain scarce (Nisha & Rajasekaran, 2018).

We collected the data at a historically specific juncture: early 2021, following the initial COVID-19-driven transformation of work practices but preceding widespread adoption of generative artificial intelligence tools from late 2022. Therefore, the findings relate to a transitional baseline before major job market disruptions. These misalignments should intensify as AI-driven automation further affects adaptability, creative thinking, and socio-emotional competencies, which educational systems have been slowest to develop (World Economic Forum, 2025).

Firstly, the article advances a theoretical explanation for the employability skills gap rooted in the misalignment of institutional competence logics. Secondly, it enriches person-environment fit theory (Kristof-Brown *et al.*, 2005) by adding curriculum design as a structural conditioning factor in person-job fit, connecting macro-level institutional dynamics to micro-level adjustment outcomes during organisational socialisation. Thirdly, it provides an empirically grounded baseline model against which future studies can assess how digital transformation and AI reshape competence expectations in the GBS sector.

LITERATURE REVIEW

Employee Skills in MNCs and the Persistence of the Employability Gap

Employability skills comprise the personal attributes and abilities that enable individuals to secure and sustain employment and to progress in their careers (Knight & Yorke, 2003; McQuaid & Lindsay, 2005; Álvarez-González *et al.*, 2017). Mohan *et al.* (2018, p. 66) synthesise employability skills as 'personal skills and attributes demonstrated by an individual that distinguish one job seeker from another.' Their meta-analysis identified 158 distinct employability skills, with teamwork, problem-solving, communication, and analytical skills appearing the most frequently. Multidimensional operationalisations extend this definition to encompass occupational expertise, anticipation and optimisation, personal flexibility, corporate sense, and balance. This meta-analysis of national and sectoral contexts omits the multicultural dimension while it is important for the European labour market, characterised by global and pan-European workers' mobility (Andrews & Higson, 2008). Together, these dimensions are measurable at the individual level and predictive of career outcomes (Heijde & Van Der Heijden, 2006). However, the composition and relative importance of these skills vary substantially by industry, company type, and national context (Chowdhury & Miah, 2019; Mohan *et al.*, 2018).

For MNCs in the GBS sector, several pressures shape the skills landscape. The increasing sophistication of information technology raises the importance of digital competence while making routine cognitive tasks automatable (Jaiswal *et al.*, 2022). GBS operations are inherently cross-border, which demands cultural and linguistic competencies for effective boundary spanning (Barner-Rasmussen *et al.*, 2014). The shift from volume-based to value-based service in GBS centres has raised the premium on initiative, judgment, and adaptive problem-solving over process compliance (Farndale *et al.*, 2010; Herbert *et al.*, 2020; ABSL, 2025). Recent industry evidence suggests these trends continue to intensify (ABSL, 2025).

Despite consistent evidence of employer dissatisfaction with graduates' preparedness, the gap persists. These findings recur across multiple countries and decades (Evans-Greenwood *et al.*, 2015; Messum *et al.*, 2017; Rao, 2014; Chhinzer & Russo, 2018; QS Global Employer Survey, 2024). These findings also align with employability research highlighting communication, problem-solving, adaptability and resilience as key determinants of graduate employability (Andrews & Higson, 2008; Tomlinson, 2017; Succi & Canovi, 2020), which recent surveys confirm remain top recruiter concerns (QS Global Employer Survey, 2024). Similarly, prior studies documented gaps between graduate self-perceptions and employer expectations (Finch *et al.*, 2013; Jackson, 2013; Clarke, 2018), gaps that recent industry data suggest persist despite employability initiatives (Cengage, 2025).

Polish and Central and Eastern European evidence points the same way. Competence audits in the Krakow BPO/IT sector identified initiative, communication skills, intercultural sensitivity, and learning agility as key deficits among graduates entering the industry (CEAPP, 2012). Broader labour-market studies confirmed that employers consistently value social and behavioural competencies, such as co-operation, self-organisation, and creativity, more highly than technical qualifications (Jelonek *et al.*, 2019), while research on economics graduates highlighted weaknesses in communication and argumentation skills (Dorożyński *et al.*, 2016). However, these studies mainly documented the mismatch rather than explain the mechanisms through which it is reproduced. The presented study addressed that gap by theorising competence-logic misalignment as a structural mechanism underpinning the persistence of the employability skills gap.

Although higher education institutions have introduced curricular reforms and innovative teaching over recent decades aimed at enhancing graduate employability (Knight & Yorke, 2003; Succi & Canovi, 2020), these changes remain largely incremental and uneven across institutions and countries. Dominant assessment and credentialing structures continue to privilege codified and measurable knowledge outcomes, whereas employers increasingly value behavioural and adaptive competencies. This suggests the employability gap persists not only because of a lack of educational reform, but also by differences in the underlying competence logics shaping educational and labour market expectations.

Institutional Logics and Signalling Mechanisms for Theorising the Gap

Institutional logics theory explains how societal sectors create distinct organising principles that shape actors' behaviour (Friedland & Alford, 1991; Thornton *et al.*, 2012). An institutional logic constitutes 'the socially constructed, historical patterns of cultural symbols and material practices' by which individuals and organisations produce and reproduce meaning systems (Thornton & Ocasio, 1999, p. 804). Different institutional orders – the market, the profession, the state, and the corporation – define value, legitimacy, and competence distinctly.

The theory explains why educational institutions and employers consistently differ in competence priorities regarding the employability skills gap. Universities operate predominantly within a professional-academic logic that defines competence through codified knowledge, standardised assessment, and credentialed expertise. This logic prizes what is measurable, certifiable, and comparable across individuals: technical proficiency, analytical reasoning, domain-specific knowledge, and examination performance. Students, socialised within this logic, internalise a human capital conception of employability that treats skill acquisition as an investment in measurable capabilities yielding labour-market returns (Becker, 1964).

By contrast, MNC employers, especially those in the GBS sector, operate within a market logic marked by uncertainty, competitive pressure, and the need for rapid adaptation to shifting client demands and technological disruptions. Within this logic, competence rests not on what an individual knows but on how they behave under conditions of ambiguity. Expected behaviours include proactivity in the absence of clear instructions, resilience under setbacks, the capacity to communicate across cultural and functional boundaries, and disposition towards continuous learning. These attributes go by various names: 'soft skills,' 'behavioural competencies,' or 'enduring human capabilities' (Deloitte, 2025). They resist the standardised assessment and credentialing that characterise the academic logic.

Signalling theory (Spence, 1973) offers a complementary mechanism. Under information asymmetry, educational credentials signal underlying capability. Yet these signals are structurally biased, reflecting what educational institutions can assess and certify (e.g. technical knowledge, analytical performance) while largely ignoring the dispositional attributes MNC employers prioritise. The result is a signalling gap – not because graduates lack these attributes, but because credentials do not convey them. Employers therefore adopt alternative selection mechanisms – interviews, assessment centres, probation – to assess competencies that educational signals miss. This structural misalignment endures regardless of curriculum reform because it stems from the different informational bases of educational certification and employer selection.

Experience asymmetry offers an alternative or complementary explanation for the divergence. Employers directly observe effective workplace performance, whereas students form competence expectations from second-hand sources: curricula, peers, and media. Succi and Canovi (2020) identify work experience and generation as key factors differentiating employer and student views of soft skills. This account complements rather than contradicts the institutional logics perspective, describing its proximal mechanism. Academic logic shapes the informational environment in which students form expectations (curricula, assessment, peer socialisation), whereas market logic shapes the experiential environment in which employers form theirs (observed performance, adjustment outcomes, client feedback). Experience asymmetry thus results from operating within different institutional logics rather than constituting an independent explanation.

This theoretical framing generates two propositions that guide the empirical analysis.

Proposition 1: Employer competence expectations in MNCs will systematically favour dispositional and relational attributes (aligned with the market logic), while student competence expectations will systematically favour codified and task-oriented attributes (aligned with the academic logic).

Proposition 2: The competencies identified as most critical by employers will correspond to the antecedents of successful organisational socialisation (Bauer *et al.*, 2007), reflecting the market logic's orientation towards contextual performance rather than static capability.

The GBS Sector in Poland: Context and Significance

Poland's business services sector comprises Business Process Outsourcing (BPO), Shared Services Centres (SSC), Global Business Services (GBS), Information Technology (IT), and Research and Development (R&D) operations. As an umbrella term, GBS covers professional, legal, financial and accountancy (F&A), IT, R&D, Human Resource (HR), and operational support services (Wirtz *et al.*, 2015). The sector qualifies as knowledge-intensive business services (KIBS), where specialised, qualification-dependent work and human capital underpin complex intellectual tasks (Muller & Doloreux, 2009).

Poland figures prominently in the global GBS landscape. In 2025, the sector encompassed 2 081 centres from 46 countries, employing over 488 700 people, 84.2% of whom worked in foreign-owned centres. Exports of business services were valued at 42.3 billion USD, growing at a compound annual rate of 6.9%. Access to qualified staff, notably a large pool of multilingual graduates, remains a key locational advantage attracting MNCs, with Krakow as the largest employment hub (Górecki, 2020; Kopyciński, 2020).

Sector-level indicators anchor this analysis. Innovation is widespread: 74.5% of centres introduced innovations in the previous three years. However, innovation increasingly stems from internal process redesign and global capability centres rather than formal R&D, reflecting the premium GBS employers place on proactivity and creative problem-solving. Talent shortages remain structural but seem less severe than in 2022. In the 2025 survey, 93.5% of respondents pointed to rising labour costs as a threat to Poland's shoring attractiveness, while 60.0% cited talent shortages in specific areas. Poland's position in the World Talent Ranking improved from 44th in 2023 to 36th in 2024, indicating a partial recovery in high-quality human capital for knowledge-intensive activities (ABSL, 2025). These dynamics make Poland's GBS sector a particularly suitable context for examining employability skills gaps in MNCs.

RESEARCH METHODOLOGY

Research Design

We used a qualitative research design to examine employers' and students' perceptions of employability skills in the GBS sector. Given the exploratory focus on how stakeholders construct and prioritise competence, we adopted an interpretive approach to capture the cognitive patterns, social meanings, and normative frameworks shaping participants' expectations (Denzin & Lincoln, 2018). The study followed an abductive logic, moving iteratively between theory and data. We derived the two competence logics and propositions deductively from theory and used as an interpretive lens, whereas we acquired the competence categories inductively from the focus-group data. Given this design, the study's theoretical contribution takes the form of propositions: conjectures grounded in theory that future research can examine empirically.

Data Collection

We collected data in January-February 2021, a period requiring explicit methodological attention. The period sits between two major disruptions to work. First, COVID-19 had already triggered a rapid, largely unplanned shift to remote and hybrid work, reshaping communication, supervision, and demands on employees' self-management in MNCs. Second, it preceded the public release of ChatGPT in November 2022 and the subsequent generative AI adoption that has reframed skills since 2023. This timing captures competence expectations after distributed work but before AI-driven automation fully emerged. The findings therefore provide a pre-transformation baseline – a reference point against which later reports of accelerated competence disruption (World Economic Forum, 2025; Cengage, 2025) can be calibrated. Repeated cross-sectional or longitudinal studies could then test the theorised intensification of competence logic divergence. Thus the 2021 data serve a generative theoretical function: they not only describe past conditions but ground propositions about divergence mechanisms for future testing.

We collected data from 28 participants in four Focus Group Interviews Online (FGIO), a method suited to pandemic conditions (Fox *et al.*, 2007) and well suited to studying socially constructed opinions and collective sense-making (Maison, 2019; Denscombe, 2014). We recorded and fully transcribed the interviews with informed consent. Online focus groups offered convenient access to busy professional participants; as with any modality they involve trade-offs, such as reduced visibility of non-verbal cues, which we kept in view during facilitation and analysis. We selected participants purposively. Two groups comprised business representatives responsible for recruitment and in-house training in MNCs in Krakow's GBS sector, ensuring direct knowledge of competence expectations and hiring criteria (7 and 11 managers in sequential sessions). Two groups comprised students from the Krakow University of Economics approaching labour-market entry, positioning them to articulate competence expectations relevant to MNC employment (6 and 4 students in sequential sessions). Each session lasted 60-90 minutes.

Including students as a second stakeholder group has empirical justification: 53.9% of GBS employees are under 35 and 13.6% are 26 or younger (ABSL, 2025), making recent graduates the main recruitment pool. We purposively selected students from the student governing body (broad knowledge of programmes and curricula) and from individualised programmes (high-performing students with tailored trajectories).

The business representative interview schedule covered: competencies sought in recruitment (expected skills), perceived deficiencies in graduates' preparation (competency gaps), and skills that future GBS-oriented curricula should prioritise (perceived curricular gaps). Student interviews examined perceptions of MNC work (benefits, challenges, career implications) and beliefs about the competencies required in the sector.

Given the exploratory, contrast-oriented design, analytical adequacy rested on the consistency of competence patterns within and across the two groups and their alignment with independent sectoral evidence, rather than on conventional thematic saturation.

Data Analysis

We thematically coded the transcribed data in MAXQDA. We inductively derived first-order codes from interview data, then mapped them onto the European Commission's key competences for lifelong learning (EC, 2019), used as a second-order analytical framework. The eight competences provided a standardised structure for comparing stakeholder groups; these competences were: literacy, multilingual, mathematical/scientific/technological/engineering, digital, personal/social/learning to learn, citizenship, entrepreneurship, and cultural awareness and expression.

RESULTS AND DISCUSSION

The Employers' Perspective

Expected Competencies

In interviews, GBS employers consistently prioritised soft skills and personal attributes over technical qualifications. They noted that technical competencies serve as baseline recruitment criteria, checked at entry. Fluency in at least one foreign language (with mandatory English) and strong MS Office skills, especially Excel, counted as non-negotiable prerequisites that cannot be developed after hiring.

Beyond basic thresholds, employers sought mainly behavioural and relational competencies. They prioritised communication (including negotiation), teamwork, and relationship-building, plus presentation skills and confidence in articulating and defending one's views in multinational teams. A 'can-do' attitude – optimism, solution focus, and belief that challenges are surmountable – was seen as crucial and closely aligned with proactivity, defined as anticipatory, change-oriented, self-initiated efforts to influence one's environment (Grant & Ashford, 2008). One employer captured this expectation directly:

I have the sense that young people today lack proactivity – going beyond your own tasks, beyond your own scheme of ‘what I have to do’, and wanting to do something more. The attitude now is: this is mine, and beyond that I don’t work ... I don’t step outside my so-called comfort zone. (E1)

Employers deemed proactivity, independent problem-solving, flexibility, and openness to diversity essential in the dynamic GBS context. Employers also valued stress resilience, self-confidence, innovative and ‘outside the box’ thinking, change management and adaptability, and the ability to accept constructive criticism while preserving self-esteem and stepping beyond one’s comfort zone.

The interviews show respondents focused far more on dispositional and interpersonal than on technical competencies. Through the institutional-logics lens, this pattern indicates a market logic centred on contextual performance under uncertainty: threshold skills (language, Excel) are the codifiable minimum the academic logic can certify, whereas the dispositional competencies dominating employer discourse lie in a domain formal credentials are ill-equipped to signal. Proactivity, communication skills, and teamwork received particular weight as contextually enacted rather than statically demonstrable, and thus resist standardised assessment. Respondents noted that specific technical tools and software in GBS firms can be learned on the job, whereas the attitudinal and communicative orientation required for complex, multinational settings cannot be readily taught. Read through this lens, such framing reflects the market logic’s emphasis on adaptability over accumulated knowledge.

Competency Gaps and Perceived Curricular Deficiencies

Business representatives reported a mismatch between university education and GBS labour market needs. They noted that curricula emphasise hard skills and codified knowledge, while the qualities that distinguish successful candidates – a ‘can-do’ attitude, openness, self-confidence, proactivity, and creativity – receive little systematic attention. Employers especially stressed adaptability to technological change, wanting employees who engage creatively with evolving processes rather than simply follow a ‘copy-and-paste’ model.

The most frequent gaps among graduates were low proactivity, weak self-confidence, and poor communication skills. Language fluency and MS Office skills were also sometimes lacking, but respondents treated these separately from the soft skills gap. Technical deficits concern codifiable, teachable domains where academic assessment works reasonably well. The soft skills gap instead reflects a deeper misalignment between what academia values and rewards and what the market requires for contextual performance. This requirement extends even to ostensibly codified domains: one employer noted that candidates may possess technical knowledge yet be unable to apply it contextually:

For me it matters especially that the person can turn that hard knowledge into practice They may know, say in finance, the principles of accounting, but when they have live material in front of them in the company, they can’t make a move with it from any angle. (E12)

This distinction is crucial. Incremental curriculum changes can reduce technical gaps; the soft skills gap persists because it is rooted in different institutional incentive structures shaping education and hiring. Employers implicitly recognised this, often stating that ‘attitude cannot be taught,’ signalling that some competencies lie beyond the academic logic’s effective reach.

Table 1 maps these employer priorities against the EU lifelong learning competence framework (EC, 2019): personal, social and learning-to-learn competence and entrepreneurship competence dominate employer discourse, while citizenship and science/mathematical/engineering competences remain largely absent – a distribution whose theoretical significance we examine in the Discussion.

Table 1. Lifelong learning competencies vs companies' and students' perspectives

The perspective	Specific skills and competencies	Lifelong learning competency						
		Literacy	Multilingual	Mathematical / Science	Digital	Personal	Entrepreneurship	Cultural
the companies' perspective	Communication skills	•						
	Good teamwork					•		
	Presentation skills	•				•		
	'Can-do' attitude					•		
	Proactivity					•		•
	Resistance to stress, self-confidence					•	•	
	Thinking 'out of the box'						•	
	Ability to manage change, adaptability						•	
	Ability to accept criticism					•		
	Good knowledge of MS Office			•	•			
	Fluent English		•					
the students' perspective	Proactive attitude, willingness to learn					•	•	•
	Ability to handle Excel well			•	•			
	Fluent knowledge of English		•					
	The ability to work on projects					•		
	Very well-developed communication skills	•						
	Analytical skills			•				

Source: own study.

The Students' Perspective

Perception of Employability Skills

Students highlighted key competencies for MNC employment: a proactive, autonomous, and learning-oriented attitude; Excel proficiency; fluent English; project work experience; strong communication; and analytical skills. Mapped to the lifelong learning framework, their priorities concentrated in mathematical/scientific/digital competence and personal/social/learning-to-learn competence, with relatively less focus on entrepreneurship than employers.

The contrast with employer priorities aligns with Proposition 1. Socialised in the academic logic, students emphasised codifiable, task-oriented skills (Excel, analytical abilities, project execution) amenable to university assessment and credentialing. Although they mentioned dispositional competencies (proactivity, communication), they framed these instrumentally, in terms of task completion, not in the relational and adaptive terms used by employers. This pattern fits both the institutional logics account and experience asymmetry as a mechanism: lacking direct exposure to GBS work, students derive competence expectations from their informational environment – curricula, assessment criteria, and peer socialisation – all structured by the academic logic.

Students recognised the international nature of GBS work and the need for change-management skills and psychological preparedness. They observed a mismatch between curricula and labour market needs: universities rely on established methods that lag behind evolving workplaces, offering strong theory but limited practice. As one student put it:

Some programmes offer too much theory ... there are no practical classes. Even if there are some exercises in a subject, they are ... very superficial ... unlike what you later encounter at work. (S2)

Students noted that GBS employers are generally willing to train newcomers in job-specific skills and that entry-level roles rarely demand extensive prior experience. At the same time, they saw GBS firms as potentially limiting individual subjectivity, treating employees as functional parts of larger processes. One student described this vividly:

[In a corporation] we treat the employee as a number in the payroll system ... beyond the team leader, beyond the immediate team, we don't know our surroundings, we feel like a tiny creature in the whole vastness of the organisation's functioning. (S6)

This perception, accurate or not, carries interpretive significance. It may suggest that students' mental models of MNC work sit in tension with the proactive, initiative-taking stance employers expect. The view of corporations as constraining agency thus conflicts with employer demands for proactivity and autonomous problem-solving, showing that competence misalignment concerns not only skills but also differing understandings of professional work.

Figure 1 presents the distribution of competencies identified by employers and students, delineating the shared bridging competencies at the intersection of both stakeholder groups and the exclusive priorities aligned with their respective institutional logics.

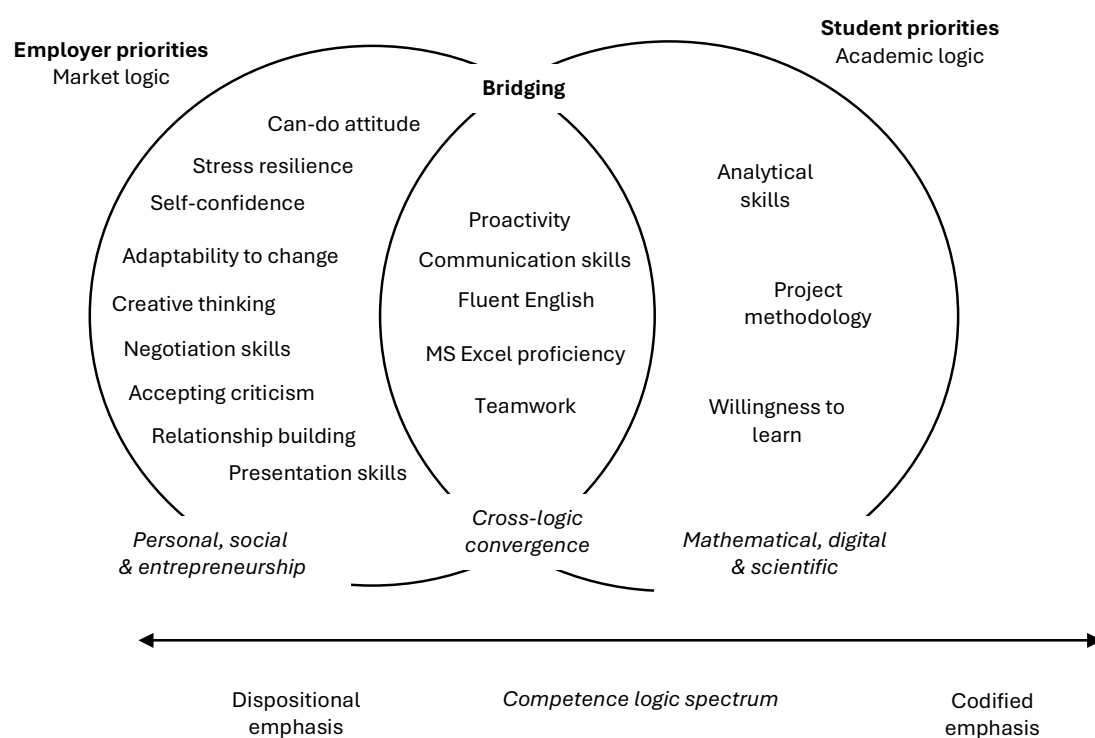


Figure 1. Bridging and divergent employability competencies across institutional logics: Employer and student priorities in the GBS sector

Source: own elaboration.

Discussion

The empirical findings support both propositions derived from the institutional logics' framework. The answer to RQ1 is consistent with Proposition 1: employer competence expectations favoured dispositional and relational attributes, while student expectations leaned more towards codified, task-oriented capabilities. This divergence reflects two distinct competence logics rooted in different institutional orders, which answers RQ2.

The academic logic under which students form their competence expectations treats employability as a function of accumulated human capital: the more technical knowledge and certifiable skills one possesses, the more employable one becomes. Universities' assessment practices, grading systems,

and credentialing mechanisms reinforce this logic, systematically rewarding the demonstration of codified knowledge. Students, rationally responding to these institutional incentives, develop a competence profile weighted towards what the academic system measures and values.

The market logic under which GBS employers form their competence expectations treats employability as a function of contextual adaptability: the capacity to perform effectively under conditions of uncertainty, change, and cross-cultural complexity. The operating conditions of MNCs reinforce this logic – volatile client demands, technological disruption, distributed multinational teams – which consistently demonstrate that technical knowledge, while necessary, is insufficient for successful performance. Employers, drawing on their accumulated experience of which employee attributes predict success, develop recruitment criteria weighted towards what their operational context demands.

The signalling mechanism explains why this divergence persists despite broad recognition of the gap. Educational credentials signal codified knowledge, analytical ability, and technical skill, but are structurally silent on dispositional attributes, which resist standardised, comparative assessment. MNC employers, aware of this limit, add interview-based behavioural assessments, creating an informational asymmetry that academically socialised candidates are ill-equipped to handle. The gap stems from the signalling system's structure. The stability of employer priorities over time indicates its structural nature: sectoral competence audits in Krakow as early as 2012 highlighted the same key skills, showing that the divergence observed in 2021 is not a pandemic anomaly but a persistent feature of Poland's GBS sector (CEAPP, 2012).

One might object that, if the signalling gap is the operative mechanism, the spread of alternative credentials should close it; the credentials being competency-based assessment, digital badges, micro-credentials, and behavioural simulations. Yet they have not resolved the misalignment. Three factors limit their effectiveness. Firstly, alternative credentials lack legitimacy: employer acceptance is uneven, and their signalling value depends on achieving the institutional recognition established degrees already enjoy. Secondly, large-scale assessment of dispositional competencies faces reliability and validity problems that technical-skill assessment does not, because such attributes are context-dependent and observation-intensive. Thirdly, and most importantly, the academic logic resists assessment mechanisms that cannot be standardised across large cohorts, since standardisation underwrites its legitimisation function. The gap's persistence despite available remedies is therefore consistent with the institutional logics account: the issue is institutional orders' structural resistance to tools originating outside their own logic (Gold, 2024).

The experience-asymmetry explanation forms a component of, not an alternative to, the institutional logics framework. Employers' accumulated experience of what predicts workplace success clearly shapes their competence priorities, and this operates independently of institutional logics. Crucially, this experience asymmetry does not close the gap even when its implications reach academia. Employers' expectations have been widely documented and shared through industry reports (ABSL, 2025), academic studies (Succi & Canovi, 2020), and employer-university fora. If the divergence were purely informational – students simply not knowing what employers want – this extensive documentation should have reduced the gap. Its persistence despite broad dissemination indicates a structural problem: the academic logic systematically downweights information that does not fit its assessment and credentialing practices, regardless of its availability. Experience asymmetry captures a real phenomenon, but institutional logics explain why its effects are not self-correcting.

Proposition 2 is consistent with the observed alignment between employer-prioritised competencies and the established antecedents of successful organisational socialisation. Identified by Bauer *et al.* (2007) as a key predictor of newcomer adjustment, proactive personality maps directly onto the 'can-do' attitude and the proactivity that employers emphasised as most critical: a linkage reinforced by evidence that proactive personality predicts work engagement, particularly in team contexts and under conditions of organisational support (Wang *et al.*, 2017). The communication competence and relationship-building skills highlighted by employers correspond to the information-seeking behaviour that newcomers must enact to reduce uncertainty during socialisation (Morrison, 1993). Adaptability and self-confidence align with self-efficacy, a further established antecedent of adjustment success

(Cooper-Thomas & Anderson, 2006). A methodological caveat is needed: researchers analytically inferred the link between employer language and socialisation constructs, not expressed by participants, and the alignment is a post-hoc theoretical mapping.

Identifying a core set of competencies valued by both employers and students highlights ‘bridging competencies’: attributes valued across institutional logics that create points of convergence. In our data, communication, proactivity, fluent English, MS Excel proficiency, and teamwork appeared in both groups’ priorities, indicating a shared core across the academic-market divide. Large-scale Polish survey data support their cross-institutional relevance, similarly pointing to social competencies as the most consistently demanded attributes across sectors and employer types (Jelonek *et al.*, 2019). These bridging competencies can function as boundary-spanning elements linking academic and market logics, providing a practical basis for curricular interventions that address the structural gap without wholesale institutional transformation (Gold, 2024). These findings extend person-environment fit theory by showing that curriculum design is a structural factor shaping graduates’ initial person-job fit in MNCs.

CONCLUSIONS

The study indicated that the divergence between employer and student competence priorities shows a structurally embedded phenomenon sustained by the different informational bases upon which educational credentialing and employer selection operate. This analysis makes three contributions. Firstly, it identifies the competence-logic misalignment as a mechanism that more parsimoniously explains the persistent employability gap than existing descriptive accounts. The framework clarifies why the gap endures despite awareness (it is reproduced by institutional logics rather than information deficits) and why experience asymmetry between employers and students is not self-correcting (the academic logic systematically underweights experiential information beyond its credentialing remit). Secondly, it extends the person-environment fit theory by including curriculum design as a structural conditioning factor in the person-job fit, linking macro-level institutional dynamics to micro-level socialisation outcomes and enriching employability and organisational socialisation literatures. This propositional contribution – pending quantitative validation – specifies a testable pathway from educational structures to adjustment outcomes not previously examined in the person-environment fit research. Thirdly, by treating the data as a pre-transformation baseline (between the COVID-19 and generative AI disruptions) it provides a theoretical reference point specifying which dimensions future studies should track and why divergence should widen, rather than a statistical benchmark.

The findings indicate a dual intervention strategy. For universities, the priority is not adding stand-alone soft skills modules but building competence literacy, helping students understand the different logics shaping employment in complex organisations. Soft skills are hard to teach because the academic logic lacks robust ways to assess and credential them, which helps explain why decades of employer feedback have yielded little curricular reform. A more promising intervention helps students and educators grasp the different competence logics in the labour market, so graduates can deliberately develop dispositional competencies that credentials do not signal. For MNC employers, recruitment communication should bridge the logic gap by describing role behaviours in terms that graduates shaped by academic logic can understand and use. For policymakers, the persistence of this gap despite long-standing awareness shows that information campaigns are insufficient; structural incentives that reward institutions for developing and certifying dispositional competencies, including alternative credentials and competency-based assessment systems, may be needed to shift the institutional equilibrium.

The main limitation comes from the study’s geographic and sectoral specificity: data from GBS employers and students in Krakow, Poland and the findings may reflect the local educational context, the specific features of the Polish GBS sector, and Krakow’s labour market culture, all of which may differ across other Polish cities, Central-Eastern European regions, and other MNC contexts (Geodecki, 2021). Further limits include the qualitative design, which provides depth but not statistical generalisability, and the sample of 28 participants in four focus groups, which prevents representativeness claims. The four-group design likewise does not support thematic saturation, though this bounds generalisability rather than the internal coherence of the observed contrast. Finally, the lack of post-2022

data – though reframed as a baseline – means the theorised intensification of misalignment remains a hypothesis rather than an established finding.

We propose three directions for future research. Firstly, longitudinal or repeated cross-sectional studies could test whether competence logic misalignment has widened since generative AI adoption. Cross-context replication across different educational systems and stages of sector maturity therefore offers a direct test of the model's scope. Secondly, cross-location comparisons of GBS sites with different educational systems could test the boundary conditions of the institutional logics model. Thirdly, quantitatively operationalising bridging competencies – examining whether competencies valued across institutional logics predict superior person-environment fit and socialisation outcomes – would rigorously test the model's practical implications.

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The contribution share of authors is equal and amounted to ⅓ for each of them.

MC – conceptualisation, literature writing, methodology, calculations, discussion; AP – literature writing, discussion, conclusions; KP – conceptualisation, methodology, coding, discussion.

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Conflict of Interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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