ENTREPRENEURSHIP AND SUSTAINABILITY ISSUES
ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2024 Volume 12 Number 2 (December)
http://doi.org/10.9770/f2379425762

Publisher
http://jssidoi.org/esc/home

CAPITAL AND INTERNATIONAL GROWTH: LESSONS FROM IT COMPANIES FOR SHAPING ENTREPRENEURSHIP IN THE AGE OF INDUSTRY 4.0

Alexander Reinhold Werbik

University of Applied Sciences and Arts Lucerne, Switzerland

Received 28 August 2024; accepted the 2nd November 2024; published 30 December 2024

Abstract. This study examines how investors influence the international expansion of IT startups. The research is based on quantitative primary data collected through a comprehensive survey of leading IT startups. The findings reveal that capital providers play a dual role in facilitating entry into foreign markets. Their direct involvement includes proactive support in the internationalisation process, while indirectly, they help overcome barriers such as cultural challenges and market entry risks. Through quantitative analysis, the study highlights dynamics that continue to be essential for understanding investor strategies in today's rapidly evolving business environment. These insights are particularly relevant in the AI-driven era, where data-intensive business models and strong network effects make rapid global scaling a critical success factor. The analysis provides a unique perspective on enduring patterns that are increasingly relevant in the current context, offering valuable lessons for navigating contemporary challenges in international expansion.

Keywords: capital; IT; startups; investor strategies; AI; business models

Reference to this paper should be made as follows: Werbik, A. R. 2024. Capital and international growth: lessons from IT companies for shaping entrepreneurship in the age of industry 4.0. *Entrepreneurship and Sustainability Issues*, 12(2), 429-442. http://doi.org/10.9770/f2379425762

JEL Classifications: L26

1. Introduction

The internationalisation of the IT industry has emerged as a significant phenomenon in the global business landscape. As digital technologies continue to reshape the "DNA" of industries and transform economies, software companies have been at the forefront of leveraging these opportunities to expand their presence beyond domestic markets (Martinelli et al., 2021). In the Age of AI in production and Industry 4.0, this growing trend of internationalisation holds implications not only for IT companies themselves but also for manufacturing firms seeking to remain competitive on a global market scale (Kagermann et al., 2016).

The role of investors, such as banks, venture capital firms, business angels, and private investors is a critical determinant in understanding the internationalisation process of software companies (Anwar et al., 2023). Certain types of investors, particularly venture capital, extend beyond merely providing financial resources; they also play a vital role in shaping the future performance of their portfolio companies (Rossi & Martini, 2019). Investors act as "scouts" that extend the network of entrepreneurs (Granz et al., 2021) and facilitate access to foreign markets via their network connections (Picot et al., 2015).

They can fulfil a “coach function” by providing strategic guidance and mentorship to their portfolio companies (Colombo & Grilli, 2009). They help entrepreneurs overcome growth and innovation challenges through mentorship and extensive networks with key partners, potential advisors, and customers (Ahlstrom & Bruton, 2006; Greenwood et al., 2022). In this respect, experienced and specialised investors that offer "smart money"

ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2024 Volume 12 Number 2 (December)
http://doi.org/10.9770/f2379425762

support alongside financial investments also facilitate the international ambitions of their portfolio companies (Sørensen, 2007; Isabelle et al., 2019; Bosio et al., 2021).

Understanding the relationship between IT companies and their investors in better detail is critical to developing robust internationalisation strategies for diverse industries in today's Industry 4.0 era. Manufacturing firms, particularly those embracing AI-technologies and data-driven business models, can greatly benefit from understanding the experiences of the IT industry (Björkdahl, 2020). The integration of data-driven technologies and software solutions into their operations, enhances their capabilities but also exposes them to strong networking effects (Obermaier & Mosch, 2019). These networking effects, which are driven by the interconnectivity and data-driven nature of the IT industry (Buxmann et al., 2015), have significant implications for the internationalisation and financing strategies of data-driven manufacturing firms (Winter, 2019).

By examining the pathways into global markets within the software industry in more detail, manufacturing firms can gain insights and guidance to effectively navigate the complexities of international markets (Kagermann & Wahlster 2013; Werbik et al., 2024).

The need for internationalisation in the Age of Industry 4.0

In the age of Industry 4.0, internationalisation has become essential for companies embedded in the data economy. Expanding into global markets opens access to new opportunities and resources while also presenting challenges, such as managing "psychic distance" – the differences in language, culture, legal systems, and economic conditions across countries (Stöttinger & Schlegelmilch, 1998; Vătămănescu et al., 2020; Puthusserry, 2021). Addressing these challenges effectively requires building and leveraging networks that bridge cultural divides, close information gaps, and help manage risks related to suppliers, partners, and customers (Santos et al., 2012; Vahlne, 2020; Morrish & Earl, 2021).

In this context, entrepreneurial decisions about international expansion are shaped as much by personal connections as by formal market analysis. Cuypers et al. (2020) provide insights that international strategies are driven not only by data but also by the social fabric of existing networks. Such networks guide companies in selecting markets and defining entry strategies. Their social connections provide crucial insights into export potential and reduce uncertainties in unfamiliar environments (Thrassou et al., 2020). These relationships thus play an essential role in influencing the direction of international growth as a "socially embedded endeavour" (Masiello & Izzo, 2019).

Beyond market access, one significant advantage of entering international markets is that it drives innovation and strengthens competitive positioning. By exposing companies to diverse consumer preferences, business practices, and regulatory landscapes, global expansion catalyses product and process adaptation (Knight & Cavusgil, 2024; Singh et al., 2024). Competing on a global scale encourages firms to refine their operations, achieving efficiencies, cost advantages and competitive advantages (Koudal & Coleman, 2005; Pinto Soto, 2018; Petrillo et al., 2021).

Operating in foreign markets also equips companies with advanced knowledge and skills essential for navigating the digital age. Engaging internationally enables firms to adopt cutting-edge technologies, business models, and management practices, thus building capabilities that support value chain growth (Zahra et al., 2000; Leão & da Silva, 2021). These experiences attract global talent, adding diverse perspectives that are strategic assets in sustaining long-term growth (Yudha et al., 2020).

For companies in the data economy, which often operates under a "winner-takes-all" paradigm, scaling up through internationalisation is paramount. Success in data-driven fields, particularly in AI, hinges on access to large, diverse datasets to refine algorithms, enhance products, and provide highly personalised services (Haucap, 2020). Expanding globally allows companies to tap into these rich data sources, amplifying their technological advantage and continuously improving AI capabilities (dos Santos & Williamson, 2024). This strengthens market dominance by enabling more efficient and accurate solutions and creates a feedback loop that further

ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2024 Volume 12 Number 2 (December)
http://doi.org/10.9770/f2379425762

consolidates competitive standing. In these high-stakes markets, international expansion is not merely an option but a core strategy to secure long-term relevance and outpace global competitors.

Moreover, internationalisation fosters robust cross-border networks that connect firms to invaluable resources, including capital, technology, and market intelligence (Johanson & Vahlne, 2009). These networks facilitate partnerships that fuel both innovation and growth (Insch & Steensma, 2006). For IT and data-driven companies, especially, maintaining strong networks is essential in keeping pace with rapid technological advancements (Bhatti et al, 2020). Investors play a key role here, using their connections to support international expansion, extending the company's reach and capabilities (Kromidha & Robson, 2021).

Thus, networks bridge international markets (Sharma & Johanson, 1987), offering crucial insights that help companies expand globally (Vasilchenko & Morrish, 2011). In regional contexts, strong social capital greatly supports knowledge-sharing networks, where investors play an enabling role by using their connections to ease market entry (Valdaliso et al., 2011; Monaghan et al., 2020).

Role of financiers

In their study on Silicon Valley, Ferrari and Granovetter (2009) emphasise the important role of venture capital firms in cluster environments, where local stakeholders engage in strong connections and interact with a wide range of further participants in the region. These investments play a crucial role in fostering a dynamic network of diverse actors, facilitating collaboration and knowledge sharing among them (ibid, 2009).

In analysing the internationalisation of business angel investments, Croce et al. (2023) examine cross-border deals and investments in culturally distant markets. Their findings suggest that investment and entrepreneurial experience contribute to the internationalisation of portfolio companies. Accordingly, venture capitalists embed firms in a local entrepreneurial ecosystem (Granz et al., 2017).

In entrepreneurial ecosystems, investors play a key role in creating "entrepreneurial spawning grounds"- dynamic environments that foster the growth of new spin-off companies. (Gompers et al., 2005). Companies embedded in ecosystem alliances can strengthen their organisational legitimacy and benefit from gains in reputation (Svensson et al., 2019).

Companies in venture capital investors' portfolios benefit from direct and indirect access to valuable networks, expertise, and value-added services (Proksch et al., 2017). They can achieve better performance through a wider network incorporating intra- and extra-industry connections to potential suppliers, customers, and managers (Sørensen, 2007; Bellavitis et al., 2014).

In addition, venture capital investors actively invest in human resources by facilitating access to qualified team members and influencing corporate governance (Gulshani, 2023). Therefore, they play a key role in assembling the management team, influencing employee recruitment, monitoring activities, and getting involved in strategic decisions. Via their experienced business perspective, they create value beyond their financial investments (Gompers & Lerner, 2001; Weber, 2009; Gutterman, 2024). Bock et al. (2018) show that superior company performance can be attributed to the coaching support of venture capitalists. For resource-constrained small businesses in particular, this form of smart-money investment can serve as a catalyst by accessing external resources (Fernhaber & McDougall-Covin, 2009; Bumbac & Ştefaniuc, 2021).

In the evolving landscape of Industry 4.0 and AI in manufacturing, the role of financiers extends beyond the traditional purpose of funding and into the strategic facilitation of internationalisation (Woo, 2020). Recent authors underscore the significance of financiers in enabling companies to harness the potential of AI technologies, positioning these firms for successful global expansion (Lutz & George, 2012; Lerner & Nanda, 2020; Davenport & Mittal, 2023). Venture Capital financiers not only provide the capital necessary for technological adoption but also offer invaluable guidance and knowledge spillovers on leveraging these technologies to create competitive advantages in foreign markets (Florida & Kenney, 1988; Agmon & Messica,

ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2024 Volume 12 Number 2 (December)
http://doi.org/10.9770/f2379425762

2008; Akcigit et al., 2024). By acting as catalysts for technological integration, financiers help portfolio companies navigate the complexities of international markets more effectively (Fernhaber et al., 2009).

Moreover, the increasing interconnectivity of global markets demands that companies engage in more sophisticated strategies to manage cross-border operations. Financiers play a pivotal role in this regard by facilitating access to international networks that offer insights into market trends, regulatory landscapes, and potential partnership opportunities (Bradley et al., 2019). Companies can better adapt to the rapid changes in international markets through strategic alliances and collaborations, enhancing their agility and responsiveness (Vahlne & Johanson, 2021). This network access, provided by financiers, is particularly crucial for companies operating within the fast-paced sectors of Industry 4.0, where staying ahead of technological and market developments is critical to sustaining growth and competitive advantage (Niemczyk & Trzaska, 2020).

Additionally, the support of financiers in the internationalisation process increasingly involves a focus on sustainability and corporate social responsibility (Liang & Renneboog, 2020). As global stakeholders demand more environmentally and socially responsible business practices, financiers leverage their influence to encourage portfolio companies to adopt sustainable practices (Crifoet al., 2019). This shift aligns with global sustainability goals and opens new international market opportunities for companies that prioritise green technologies and CSR initiatives. In this way, the role of venture capital is critical in shaping the future direction of their portfolio companies, guiding them towards various growth paths that are aligned with global standards and expectations.

2. Research

As the literature review suggests, the multifaceted role of investors in facilitating international expansion goes beyond mere financial contributions, extending into the area of strategic guidance and providing market insights. This multidimensional support is particularly crucial in the high-tech and IT driven sectors, where the pace of change and the complexity of global markets demand nuanced understanding and rapid adaptability (Buxmann et al., 2015). Investors with a deep understanding of specific market nuances and technological trends can provide portfolio companies with a more competitive edge, enabling them to navigate international markets more effectively. This strategic alignment between investors' expertise and companies' internationalisation efforts underscores the importance of selecting investors who not only provide capital but also align with the company's vision and strategic direction (Picot, 2015).

The concept of "smart money" further elaborates on the idea that not all capital is equal. The qualitative aspects of capital, particularly in terms of added value that investors bring to their portfolio companies, are critical. This added value encompasses network access, industry insights, mentoring, and strategic advisement, which are indispensable for companies aiming to internationalise (Sørensen, 2007). Investors become co-pilots (Siegel et al., 1988) in the journey of international expansion, actively involved in steering the company towards strategic partnerships, identifying market opportunities, and avoiding potential pitfalls (Lutz & George, 2012). This collaborative approach between investors and companies underscores a symbiotic relationship where both parties work towards a common goal of successful internationalisation.

In context, it is assumed that companies receiving “scouting support” from investors (Colombo & Grilli, 2009) should be better able to allocate resources towards activities such as market research, new product development, overseas operations, and targeted marketing campaigns in foreign markets (Gurbuz, 2018). Given the potential positive impact of smart money engagements on “resource pooling” (Ferrary, 2010) as well as on firms` survival rates, revenue, and risk sensitivity (Huang & Madhavan, 2021), it is to assume that investors can have a favourable influence on the internationalisation of companies.

Referring to Ferrary and Granovetter (2009), Picot et al. (2015) and Bock et al. (2018), this assumption is grounded in the belief that financial support from investors has the capacity to help companies overcome broader resource challenges. Companies are expected to experience facilitation in their international expansion efforts by receiving additional know-how and coaching support.

ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2024 Volume 12 Number 2 (December)
http://doi.org/10.9770/f2379425762

Based on these assumptions, it is suggested that investors play a crucial role in supporting the internationalisation of companies. Hypothesis 1, therefore, proposes that when investors express a specific interest in internationalising, software companies should also exhibit a higher degree of internationalisation. This implies that investors actively encourage and facilitate the international expansion of the companies they support.

H1: IT companies expand internationally to a greater extent when they have the backing of investors who are specifically focused on global growth.

Furthermore, it is assumed that venture capitalists reduce major barriers to internationalisation. Due to their networks and industry insights, they provide strategic insights, industry-specific knowledge and access to potential partners and further stakeholders (Woo, 2020; Nörthemann, 2023). Aggarwal (2019) shows that access to network resources via strategic alliances is a vital determinant for innovation within a firm, as networks provide essential information and expertise (see also Yaqub et al., 2020; Fan et al., 2023). In combination with findings that investors facilitate the access of "social capital" (Alexy et al., 2012), they are expected to play a vital role in helping companies overcome not only financial barriers but also cultural barriers as well as contact deficits and therefore reduce asymmetric information (Brinster & Tykvova, 2021). Hypothesis 2 builds upon the notion that investors can effectively reduce barriers to international expansion through their assistance in forming strategic alliances, their market know-how, and their support in establishing business relationships (Balachandran, 2024).

H2: Investors play a significant role in reducing the barriers that companies face in their international expansion efforts.

3. Data set and methodology

The data from 440 individual IT companies were collected as part of an empirical survey (Werbik, 2015; Picot et al., 2015). In this study, the analysed data were collected as part of the DESC research project at LMU Munich, initiated in 2011 and concluded with the publication by Picot et al. in 2015. The survey targeted managers of software and embedded systems companies, who were invited via email to participate as key informants. It achieved an 11% response rate, with a retention rate of 21%. Data sets with over 25% missing values and responses where participants completed less than 80% of the questionnaire were excluded, focusing exclusively on software companies. The final dataset of 440 IT companies was part of a dissertation project (Werbik, 2015) and has since been foundational in prior analyses. Its continued relevance is demonstrated through its application to contemporary AI and Industry 4.0 research, offering insights into internationalisation trends that influence technological advancements in these areas. The same methodological analysis was applied to ensure consistency and comparability with previous findings. This data reuse is explicitly stated to maintain transparency and provide a coherent analytical framework for current and future studies.

Despite being collected several years ago, these data provide valuable insights into fundamental dynamics of internationalisation that remain relevant in today's business environment. In the context of the rapidly evolving AI-driven economy, revisiting and analysing these constructs allows us to draw lessons crucial for addressing contemporary scaling and market entry challenges. The following constructs were considered for analysis:
Capital providers (Y1): The exogenous construct was measured using a 5-point Likert scale ("Our key capital providers are interested in the internationalisation of the company: Does not apply at all ... Applies completely").
Growth barriers (Y2): The endogenous construct was measured through four different indicators on a 5-point Likert scale. These include:
• Risk GB1 ("One obstacle to internationalisation is the high level of risk associated with expanding into new markets: Does not apply at all ... Applies completely")
• Cultural barriers GB2 ("One obstacle to internationalisation is the presence of language and cultural barriers: Does not apply at all ... Applies completely")
• Investment costs GB3("One obstacle to internationalization is the substantial investment require: Does not apply at all ... Applies completely")

ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2024 Volume 12 Number 2 (December)
http://doi.org/10.9770/f2379425762

• Contact deficiencies GB4 ("One obstacle to internationalisation is that the management lacks the necessary contacts abroad: Does not apply at all ... Applies completely").
Degree of internationalisation (Y3): The endogenous construct was measured using the ratio of foreign sales to total sales of the company as an indicator.
In addition, the three control variables “Company age”, “Company size”, and “Perceived market attractiveness” were included in the analysis:
• Company age (X1) was measured using the year of establishment of the company.
• Company size (X2) was determined by the number of employees in the last completed fiscal year.
• Market attractiveness (X3): The perceived market attractiveness was measured using a 5-point Likert scale ("We are inclined against further internationalisation because the German market is profitable enough to not require internationalisation: Does not apply at all ... Applies completely").
The data was analysed using the “smartPLS" program. The results were visualised in the form of a structural equation model.

4. Results

The constructs in the study show a strong correlation among their items, as indicated by the factor and indicator reliability analysis. The factor loadings for the items representing “Risk” (0.810), “Cultural barriers” (0.794), “Investment costs” (0.794), and “Lack of contacts” (0.751) demonstrate their contribution to their respective constructs. Furthermore, the measure of scale homogeneity, Cronbach's Alpha, exhibits a value of 0.8386, surpassing the accepted threshold of 0.7 (Hair et al., 2011). The results confirm the reliability and consistency of the components, as demonstrated in Table 1.

Table 1. Factor and indicator reliability of the constructs

	GB 1	GB 2	GB 3	GB 4
Factor loadings	0,810	0,794	0,794	0,751
Cronbach's Alpha	0,8386			

Moving on to the analysis of the direct and indirect influence of capital providers on the degree of internationalisation, the significance of these relationships was evaluated through 5000 bootstrap samples and a case-wise exclusion approach. Figure 1 visually depicts the interconnections between the constructs.

The exogenous construct "capital providers" accounts for 17.3% of the growth obstacles faced by companies. With a negative β value of -0.416 and being significant at a level of 0.001 (t=5.239), the results in Figure 1 suggests that capital providers, who demonstrate a stronger interest in internationalisation, significantly reduce the barriers to expanding internationally. This results in an acceptance of hypothesis 1.

ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2024 Volume 12 Number 2 (December)
http://doi.org/10.9770/f2379425762

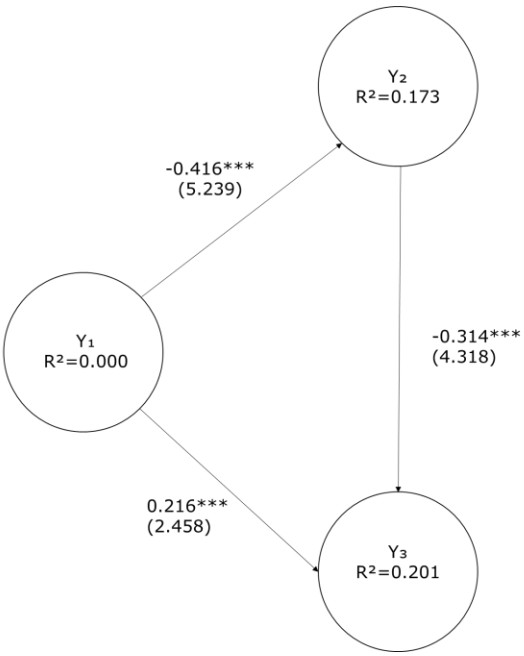

Figure 1. Relationships of constructs

Moreover, capital providers have a direct influence on the internationalisation of companies. The β value is positively significant (β = 0.216; t = 2.458) at a level of 0.001. This means that the higher the interest of capital providers in the internationalisation of companies, the higher the degree of internationalisation observed. Interestingly, the influence of capital providers also indirectly affects the degree of internationalisation. The results show a significant negative relationship (β = -0.314; t = 4.138) between internationalisation barriers and the degree of internationalisation of software companies. The constructs "capital providers" and "internationalisation barriers" together account for 20.1% of the variance in the variable "degree of internationalisation".

In the next step, the three control variables were included in the further analysis, namely “Company Age” (X1), “Company Size” (X2), and “Perceived Market Attractiveness” (X3). As illustrated in Figure 2, the incorporation of these variables significantly improves the model's overall explanatory capacity by an additional 6% when compared to the previous version.

In total, the two constructs, "Capital Providers" and "Internationalization Barriers" account for 26.2% of the variance of the construct "Degree of Internationalisation". The impact of capital providers on the internationalisation level of the software companies remains strongly positive (β=0.222; t=2.378), indicating their significant role in facilitating international expansion. Additionally, capital providers have a notable negative effect on the construct of "Internationalization Barriers" (β=-0.418; t=5.221), indicating their influence in reducing the obstacles associated with internationalisation. The relationship between "Internationalization Barriers" and the "Degree of Internationalisation" continues to be significantly negative (β=-0.1600; t=2.020). Hypothesis 2 could be accepted.

ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2024 Volume 12 Number 2 (December)
http://doi.org/10.9770/f2379425762

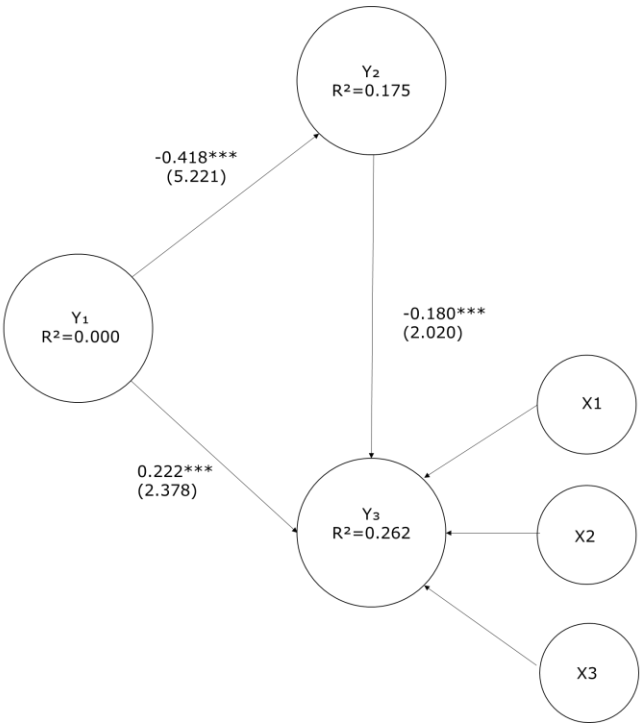

Figure 2. Relationships of constructs, including control variables

Consistent with the results, capital providers who show a genuine interest in the internationalisation of companies exert a dual influence, both directly and indirectly, on the expansion into foreign markets: Their direct influence is evident in their proactive support, where they contribute resources, expertise, and guidance to ensure a seamless entry into new markets and facilitate expansion. Additionally, they indirectly contribute to internationalisation by actively addressing and minimising barriers that companies face in their international ventures.

5. Discussion & Interpretation

The findings of this study emphasise the multifaceted role of investors in supporting the internationalisation efforts of IT companies. Beyond providing capital, investors offer strategic insights, access to industry-specific knowledge, and expansive networks, all of which help companies overcome significant barriers to international expansion (Ferrary & Granovetter, 2009; Bellavitis et al., 2014; Cuypers et al., 2020). This dual role, both financial and strategic, aligns with previous studies showing that investors directly influence a company's international ambitions and indirectly reduce the obstacles they encounter, such as cultural, informational, and regulatory challenges (Granz et al., 2021).

These insights carry practical relevance for manufacturing firms in Industry 4.0 and AI sectors. The rapid advancement of interconnected, data-driven models has intensified the need for international growth, particularly in environments where network effects amplify the benefits of global scaling (Santos et al., 2012; Kagermann et al., 2016; Björkdahl, 2020) By observing the strategies that IT companies employ with investor support, manufacturers can adapt these approaches to enhance their internationalisation efforts. Investor networks offer IT firms access to foreign markets, new capabilities, and competitive positioning - essential advantages for AI and data-intensive business models (Obermaier & Mosch, 2019).

The results suggest that investors with global experience not only provide "smart money" but also act as connectors, bridging cultural, regulatory, and informational gaps that arise during internationalisation (Sørensen, 2007; Woo, 2020; Bradley et al., 2019). This role is particularly valuable in sectors where companies

ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2024 Volume 12 Number 2 (December)
http://doi.org/10.9770/f2379425762

are embedded within complex global supply chains and require diverse data sources to fuel AI models and support data-driven decision-making (Winter, 2019; dos Santos & Williamson, 2024). The data indicate that investors with deep industry insights and international connections can help firms navigate complexities, accelerating entry into new markets and enhancing operational resilience.

The alignment of investor ambitions with company goals emerges as a key factor in internationalisation success. For IT firms, selecting investors with a strong interest in global growth can create synergies that support market expansion and the technological evolution needed for competitiveness in AI-driven industries (Lutz & George, 2012; Crifo et al., 2019). This alignment reduces the challenges associated with global expansion, including psychic distance and cultural barriers, while helping firms adapt products and services to meet international demands (Stöttinger & Schlegelmilch, 1998; Mason & Stark, 2004; Cuypers et al., 2020).

The indirect effects of investor involvement, as demonstrated by this study, further highlight the role of investors as strategic partners who actively reduce internationalisation barriers. For companies operating in Industry 4.0, investor support in logistical and regulatory challenges offers a path to mitigating the risks and costs often accompanying international market entry (Calvelli & Cannavale, 2018; Aggarwal, 2019). Such support shortens time-to-market and enhances competitiveness in interconnected global markets, a critical advantage in AI and data-driven manufacturing (Yudha et al., 2022; Greenwood et al., 2022).

In conclusion, these findings reinforce that investor support functions not only as a financial resource but as a strategic asset crucial for companies in data-intensive sectors such as Industry 4.0 and AI. Aligning with globally experienced investors allows firms in these sectors to capitalise on networks, strategic guidance, and cross-border insights to overcome the complexities of internationalisation. This study's alignment with current literature highlights the investors' dual role, providing essential financial backing while leveraging networks crucial for success in globally integrated Industry 4.0 environments.

6. Learnings for Entrepreneurship in the Age of Industry 4.0

This study explored the dynamics of investor involvement in the internationalisation of companies, revealing the multifaceted roles that investors play beyond providing financial support. The findings illuminate how VC investors facilitate global market entry and expansion for their portfolio companies through a focused examination of industry-specific expertise, strategic guidance, network access, and the motivational drives of venture capital investors. These insights offer valuable guidance for entrepreneurship within the Industry 4.0 landscape, where strategic partnerships with investors can make a decisive impact on global growth trajectories. These insights are relevant to smart manufacturing startups and established companies in the Industry 4.0 era. By understanding the value of venture capital investors' industry knowledge, strategic guidance, networks, and motivations, smart manufacturing companies can gain key lessons to support their global market entry and expansion strategies in modern entrepreneurship.

Adapting to Global Market Dynamics through Strategic Investor Selection

The empirical findings highlight the importance of selecting investors who contribute more than financial support alone. For smart manufacturing startups and entrepreneurial ventures with advanced technological platforms and highly interconnected systems - fields that are strongly impacted by network effects (Kagermann et al., 2016) - investors who bring industry insights, strategic mentorship, and broad networks are invaluable. These contributions are instrumental in navigating the complex, international landscape of Industry 4.0. For these entrepreneurial firms, this underscores the need to strategically select investors who align with their global growth vision and provide the resources and expertise required to achieve international success.

Utilising Investor Networks for Market Penetration

The study’s insights reinforce the strategic advantage of leveraging investor networks to support international market entry and expansion. Smart manufacturing and AI-driven startups can tap into their investors' networks to access critical market insights, potential partners, customers, and regulatory guidance. Aligning with

ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2024 Volume 12 Number 2 (December)
http://doi.org/10.9770/f2379425762

investors with strong connections in target markets can significantly reduce "psychic distance" (Stöttinger & Schlegelmilch, 1998) and cultural barriers, smoothing the path to global expansion.

Emphasising the Role of 'Smart Money'

The concept of "smart money," where investors add value beyond capital through strategic guidance, industry expertise, and networks, emerges as a pivotal factor for startups and companies pursuing internationalisation. One crucial success factor for future entrepreneurs is to engage with investors who actively support their international growth journey as strategic partners - not just financiers. Choosing investors with a successful track record in global expansion, especially those experienced in integrating advanced technologies across borders, is particularly beneficial. The "smart money" advantage is essential for smart manufacturing startups operating in highly specialised and complex technological environments.

Investor Involvement

Investor engagement is during critical growth phases, such as international expansion, scaling operations, or overcoming market entry barriers. Their involvement extends beyond mere financial support, as investors actively leverage their expertise, networks, and strategic insights to drive the company's success. Their participation is typically motivated by significant profit opportunities and the potential to mitigate risks, underscoring their dual role as both financial backers and strategic partners. Aligning investor involvement with the growth stages of startups ensures that their contributions have the greatest impact on the company's performance and competitive positioning in the market.

Strategic Alignment with Investors' Global Aspirations

The findings also suggest that aligning with investors who share similar global ambitions can enhance a company's ability to address challenges in international markets. For entrepreneurs, this means seeking out investors whose aspirations for global expansion match their own. Such alignment facilitates a smoother internationalisation process and ensures that both the company and its investors are working toward maximising global market opportunities together.

Leveraging Technological Synergies for International Growth

The evolving dynamics of global markets, with a strong focus on digitalisation and AI integration, suggest that investors with technological expertise are especially valuable. Smart manufacturing companies and startups at the forefront of Industry 4.0 should prioritise investors who understand the complexities of technological advancements and can guide them in leveraging these innovations for international growth. This includes navigating regulatory complexities around data, employing AI-driven market analysis, and utilising digital platforms to extend global reach.

In conclusion, entrepreneurs in the Age of AI and Industry 4.0 can draw significant learnings from the empirical results, particularly in terms of investor involvement in the internationalisation process. By strategically selecting and aligning with the right investors, leveraging their networks, and capitalising on the 'smart money' advantages, these companies can enhance their competitiveness and achieve successful global expansion in the dynamic landscape of AI and Industry 4.0.

7. Research Limitations

While historical data offer a robust foundation for understanding long-term trends, they may not fully capture recent shifts driven by advancements in AI, machine learning, and the increasing importance of data-driven decision-making. One limitation of this study is the age of the primary data, collected nearly a decade ago. This presents an opportunity for future research to replicate the study with Industry 4.0 companies. Such replication would not only enable a comparative analysis of how internationalisation strategies have evolved over time but also yield more profound insights into the distinct challenges and opportunities that companies encounter in the

age of digital transformation. Additionally, while the focus on software companies provides rich insights into this specific sector, it limits the generalizability of the findings across other industries. Broadening the scope to include a broader range of Industry 4.0 enterprises could offer a more holistic understanding of internationalisation practices across various technological landscapes.

References

Aggarwal, V. A. (2019). Resource congestion in alliance networks: How a firm's partners' partners influence the benefits of collaboration. *Strategic Management Journal*, 41(4), 627-655. https://doi.org/10.1002/smj.3109

Agmon, T., & Messica, A. (2008). Venture capital funds, financial foreign direct investment and the generation of local comparative advantage in the technology sector in Israel. *Contributions to Political Economy*, 27(1), 57-72. https://doi.org/10.1093/cpe/bzn001

Ahlstrom, D., & Bruton, G. D. (2006). Venture capital in emerging economies: Networks and institutional change. *Entrepreneurship Theory and Practice*, 30(2), 299-320. https://doi.org/10.1111/j.1540-6520.2006.00122.x

Akcigit, U., Ates, S. T., Lerner, J., Townsend, R. R., & Zhestkova, Y. (2024). Fencing off Silicon Valley: Cross-border venture capital and technology spillovers. *Journal of Monetary Economics*, 141, 14-39. https://doi.org/10.1016/j.jmoneco.2023.10.016

Alexy, O. T., Block, J. H., Sandner, P., & Ter Wal, A. L. (2012). Social capital of venture capitalists and startup funding. *Small Business Economics*, 39, 835-851. https://doi.org/10.1007/s11187-011-9337-4

Anwar, M., Li, S., Al-Omush, A., & Al-Nimer, M. (2023). SMEs' internationalisation: Mapping the field through finance, ITC, and social ties. *Sustainability*, 15(4), 3162. https://doi.org/10.3390/su15043162

Balachandran, S. (2024). The inside track: Entrepreneurs' corporate experience and startups' access to incumbent partners' resources. *Strategic Management Journal*, 45(6), 1117-1150. https://doi.org/10.1002/smj.3576

Bellavitis, C., Filatotchev, I., & Kamuriwo, D. S. (2014). The effects of intra-industry and extra-industry networks on performance: A case of venture capital portfolio firms. *Managerial and Decision Economics*, 35(2), 129-144. https://doi.org/10.1002/mde.2647

Bhatti, W. A., Chwialkowska, A., & Glowik, M. (2020). The Role of Power and Network Positioning in Technology Firms' International Expansion. In Academy of Management Proceedings, 2020(1), 13328. https://doi.org/10.5465/AMBPP.2020.13328abstract

Björkdahl, J. (2020). Strategies for digitalisation in manufacturing firms. *California Management Review*, 62(4), 17-36. https://doi.org/10.1177/0008125620920349

Bock, C., Huber, A., & Jarchow, S. (2018). Growth factors of research-based spin-offs and the role of venture capital investing. *The Journal of Technology Transfer*, 43(5), 1375-1409. https://doi.org/10.1007/s10961-017-9635-3

Bosio, A. O., Gervasoni, A., & Bollazzi, F. (2021). The strategic role of private equity in the internationalisation of Italian SMEs. *Journal of Financial Management, Markets and Institutions*, 9(02), 2150007. https://doi.org/10.1142/S2282717X21500079

Bradley, W. A., Duruflé, G., Hellmann, T. F., & Wilson, K. E. (2019). Cross-border venture capital investments: What is the role of public policy? *Journal of Risk and Financial Management*, 12(3), 112. https://doi.org/10.3390/jrfm12030112

Brinster, L., & Tykvova, T. (2021). Connected VCs and strategic alliances: Evidence from biotech companies. *Journal of Corporate Finance*, 66, 101835. https://doi.org/10.1016/j.jcorpfin.2020.101835

Bumbac, D., & Ştefaniuc, O. (2021). Venture capital financing: Particularities and opportunities. *International Journal of Innovative Technologies in Economy*, 34(2), 1-6. https://doi.org/10.31435/rsglobal_ijite/30062021/7544

Buxmann, P., Diefenbach, H., & Hess, T. (2015). Die Softwareindustrie: Ökonomische Prinzipien, Strategien, Perspektiven. Springer-Verlag. https://doi.org/10.1007/978-3-662-45589-0

Calvelli, A., & Cannavale, C. (2018). Internationalising firms: International strategy, trends, and challenges. Springer. https://doi.org/10.1007/978-3-319-91551-7

Colombo, M. G., & Grilli, L. (2009). A capital partnership: How human and venture capital affect the growth of high-tech startups. *Strategic Change*, 18(7-8), 231-239. https://doi.org/10.1002/jsc.850

Crifo, P., Durand, R., & Gond, J. P. (2019). Encouraging investors to enable corporate sustainability transitions: The case of responsible investment in France. *Organization & Environment*, 32(2), 125-144. https://doi.org/10.1177/1086026619848145

Croce, A., Schwienbacher, A., & Ughetto, E. (2023). Internationalisation of business angel investments: The role of investor experience. *International Business Review*, 32(1), 102033. https://doi.org/10.1016/j.ibusrev.2022.102033

Cuypers, I. R., Ertug, G., Cantwell, J., Zaheer, A., & Kilduff, M. (2020). Making connections: Social networks in international business. *Journal of International Business Studies*, 51, 714-736. https://doi.org/10.1057/s41267-020-00319-9

Davenport, T. H., & Mittal, N. (2023). All-in on AI: How smart companies win big with artificial intelligence. Harvard Business Press.

Dos Santos, J. F., & Williamson, P. J. (2024). Beyond connectivity: Artificial intelligence and the internationalisation of digital firms. *Information and Organization*, 34(4), 100538. https://doi.org/10.1016/j.infoandorg.2024.100538

Fan, Y., Ly, K. C., & Jiang, Y. (2023). Institutional investor networks and firm innovation: Evidence from China. *International Review of Financial Analysis*, 89, 102751. https://doi.org/10.1016/j.irfa.2023.102751

Ferrary, M. (2010). Syndication of venture capital investment: The art of resource pooling. *Entrepreneurship Theory and Practice*, 34(5), 885-908. https://doi.org/10.1111/j.1540-6520.2009.00356.x

Ferrary, M., & Granovetter, M. (2009). The role of venture capital firms in Silicon Valley's complex innovation network. *Economy and Society*, 38(2), 326-359. https://doi.org/10.1080/03085140902786827

Fernhaber, S. A., Mcdougall-Covin, P. P., & Shepherd, D. A. (2009). International entrepreneurship: Leveraging internal and external knowledge sources. *Strategic Entrepreneurship Journal*, 3(4), 297-320. https://doi.org/10.1002/sej.76

Florida, R. L., & Kenney, M. (1988). Venture capital-financed innovation and technological change in the USA. *Research Policy*, 17(3), 119-137. https://doi.org/10.1016/0048-7333(88)90038-8

Gompers, P., Kovner, A., Lerner, J., & Scharfstein, D. (2005). Venture capital investment cycles: The role of experience and specialisation. *Journal of Financial Economics*, 81(1), 649-679. https://doi.org/10.3386/w11385

Gompers, P., & Lerner, J. (2001). The venture capital revolution. *Journal of Economic Perspectives*, 15(2), 145-168. https://doi.org/10.1257/jep.15.2.145

Granz, C., Lutz, E., & Henn, M. (2021). Scout or coach? Value-added services as selection criteria in entrepreneurs' venture capitalist selection. *Venture Capital*, 23(1), 5-40. https://doi.org/10.1080/13691066.2020.1824603

Granz, J., Lehmann, E. E., & Woywode, M. (2017). The effects of family ownership on innovation: Empirical evidence from the German machine tool industry. *The Journal of Technology Transfer*, 43(1), 30-57.

Greenwood, J., Han, P., & Sánchez, J. M. (2022). Venture capital: A catalyst for innovation and growth. Available at SSRN 4077464. https://doi.org/10.20955/r.104.120-30

Gulshani, R. (2023). HRM in Venture Funded Entrepreneurial Firms: A Stage-wise Functional Elaboration Approach. Academy of Management Proceedings, 2023(1), 16855. https://doi.org/10.5465/AMPROC.2023.16855abstract

Gurbuz, E. (2018). Theory of new product development and its applications. *Marketing*, 57-75. https://doi.org/10.5772/intechopen.74527

Gutterman, A. S. (2024). Launching and Managing an Impact Investment Venture Capital Fund: A Guide for Fund Managers and Sustainable Entrepreneurs. https://doi.org/10.2139/ssrn.4944235

Hair, J. F., Black, W. C., Babin, B. J., & Anderson, R. E. (2011). Multivariate data analysis (7th ed.). Prentice Hall.

Haucap, J. (2019). Competition and competition policy in a data-driven economy. *Intereconomics*, 54, 201-208. https://doi.org/10.1007/s10272-019-0825-0

Huang, P., & Madhavan, R. (2021). Dumb money or smart money? Meta-analytically unpacking corporate venture capital. *Strategic Entrepreneurship Journal*, 15(3), 403-429. https://doi.org/10.1002/sej.1369

Insch, G. S., & Steensma, H. K. (2006). The relationship between firm strategic profile and alliance partners' characteristics. *Journal of Managerial Issues*, 321-339.

Isabelle, D. A., Westerlund, M., Rajala, R., & Leminen, S. (2019). Understanding the aspirations of Finnish entrepreneurs and venture capitalists: Their effects on international operations and growth. *International Journal of Entrepreneurship and Small Business*, 37(2), 190-213. https://doi.org/10.1504/IJESB.2019.100106

Johanson, J., & Vahlne, J. E. (2009). The Uppsala internationalisation process model revisited: From liability of foreignness to liability of outsidership. *Journal of International Business Studies*, 40, 1411-1431. https://doi.org/10.1057/jibs.2009.24

Kagermann, H., Anderl, R., Gausemeier, J., Schuh, G., & Wahlster, W. (2016). Industrie 4.0 in a global context: Strategies for cooperating with international partners. Herbert Utz Verlag.

Kagermann, H., Wahlster, W., & Helbig, J. (2013). Securing the Future of German Manufacturing Industry: Recommendations for Implementing the Strategic Initiative Industrie 4.0. Forschungsunion and National Academy of Science and Engineering.

Knight, G., & Cavusgil, S. T. (2024). A path forward for research on born global firms. In Key Developments in International Marketing: Influential Contributions and Future Avenues for Research (pp. 55-72). Cham: Springer International Publishing. https://doi.org/10.1007/978-3-031-17366-0_3

Koudal, P., & Coleman, G. (2005). Building a global presence: Strategic imperatives for manufacturers. *Harvard Business Review*, 83(3), 82-91.

Kromidha, E., & Robson, P. J. (2021). The role of digital presence and investment network signals on the internationalisation of small firms. *International Small Business Journal*, 39(2), 109-129. https://doi.org/10.1177/0266242620958898

Leão, P., & da Silva, M. M. (2021). Impacts of digital transformation on firms' competitive advantages: A systematic literature review. Strategic Change, 30(5), 421-441. https://doi.org/10.1002/jsc.2459

Lerner, J., & Nanda, R. (2020). Venture capital's role in financing innovation: What we know and how much we still need to learn. *Journal of Economic Perspectives*, 34(3), 237-261. https://doi.org/10.1257/jep.34.3.237

Liang, H., & Renneboog, L. (2020). Corporate social responsibility and sustainable finance: A review of the literature. European Corporate Governance Institute - Finance Working Paper, (701). https://doi.org/10.2139/ssrn.3698631

Lutz, E., & George, G. (2012). Venture capitalists' role in new venture internationalisation. *The Journal of Private Equity*, 26-41. https://doi.org/10.3905/jpe.2012.16.1.026

Martinelli, E. M., Farioli, M. C., & Tunisini, A. (2021). New companies' DNA: The heritage of the past industrial revolutions in digital transformation. *Journal of Management and Governance*, 25, 1079-1106. https://doi.org/10.1007/s10997-020-09539-5

Mason, C., & Stark, M. (2004). What do investors look for in a business plan? A comparison of the investment criteria of bankers, venture capitalists, and business angels. *International Small Business Journal*, 22(3), 227-248. https://doi.org/10.1177/0266242604042377

Masiello, B., & Izzo, F. (2019). Entrepreneurial ecosystems and the growth of SMEs in Italy. *Entrepreneurship & Regional Development*, 31(7-8), 497-515.

Monaghan, S., Tippmann, E., & Coviello, N. (2020). Born digitals: Thoughts on their internationalisation and a research agenda. *Journal of International Business Studies*, 51, 11-22. https://doi.org/10.1057/s41267-019-00290-0

Morrish, S. C., & Earl, A. (2021). Networks, institutional environment and firm internationalisation. *Journal of Business & Industrial Marketing*, 36(11), 2037-2048. https://doi.org/10.1108/JBIM-05-2019-0230

Niemczyk, J., & Trzaska, R. (2020). Network approach in Industry 4.0: Perspective of coopetition. In Contemporary Challenges in Cooperation and Coopetition in the Age of Industry 4.0 (pp. 139-154). Springer International Publishing. https://doi.org/10.1007/978-3-030-30549-9_7

Nörthemann, A. (2023). Industry-specific specialisation in venture capitalists' internationalisation decisions. *Journal of Business Economics*, 93(5), 891-927. https://doi.org/10.1007/s11573-022-01129-1

Obermaier, R., & Mosch, P. (2019). Digitale Plattformen - Klassifizierung, ökonomische Wirkungslogik und Anwendungsfälle in einer Industrie 4.0. In Handbuch Industrie 4.0 und Digitale Transformation (pp. 379-417). Springer. https://doi.org/10.1007/978-3-658-24576-4_17

Petrillo, A., De Felice, F., Lambert-Torres, G., & Bonaldi, E. (Eds.). (2021). Operations Management: Emerging Trend in the Digital Era. https://doi.org/10.5772/intechopen.87847

Picot, A., Hess, T., Hörndlein, C., Kaltenecker, N., Jablonka, C., Schreiner, M., Werbik, A., Benlian, A., & Neuburger, R. (2015). The internationalisation of German software-based companies. Springer. https://doi.org/10.1007/978-3-319-13548-9

Pinto Soto, G. (2018). Global strategies for SMEs in Latin America. *International Journal of Emerging Markets*, 13(2), 323-344.

Proksch, D., Stranz, W., Röhr, N., Ernst, C., Pinkwart, A., & Schefczyk, M. (2017). Value-adding activities of venture capital companies: A content analysis of investors' original documents in Germany. *Venture Capital*, 19(3), 129-146. https://doi.org/10.1080/13691066.2016.1242573

Puthusserry, P., Khan, Z., Nair, S. R., & King, T. (2021). Mitigating psychic distance and enhancing internationalisation of fintech SMEs from emerging markets: The role of board of directors. *British Journal of Management*, 32(4), 1097-1120. https://doi.org/10.1111/1467-8551.12502

Rossi, M., & Martini, E. (2019). Venture capitalists and value creation: The role of informal investors in the growth of smaller European firms. *International Journal of Globalisation and Small Business*, 10(3), 233-247. https://doi.org/10.1504/IJGSB.2019.100123

Santos, J. C., Ferreira, M. P., & Reis, N. M. R. D. (2012). Industrial network membership: Reducing psychic distance hazards in internationalisation of firms. *Revista Brasileira de Gestão de Negócios*, 14, 438-452. https://doi.org/10.7819/rbgn.v14i45.1082

Sharma, D., & Johanson, J. (1987). Technical consultancy in internationalisation. *International Marketing Review*, 4(4), 20-29. https://doi.org/10.1108/eb008339

Siegel, R., Siegel, E., & MacMillan, I. C. (1988). Corporate venture capitalists: Autonomy, obstacles, and performance. *Journal of Business Venturing*, 3(3), 233-247. https://doi.org/10.1016/0883-9026(88)90017-1

Singh, B., & Kaunert, C. (2024). AI-driven strategies for customer engagement, market segmentation, and resource optimisation: Projecting end user satisfaction and futuristic growth of business. In AI Innovations in Service and Tourism Marketing (pp. 104-128). IGI Global. https://doi.org/10.4018/979-8-3693-7909-7.ch006

Sørensen, M. (2007). How smart is smart money? A two-sided matching model of venture capital. *The Journal of Finance*, 62(6), 2725-2762. https://doi.org/10.1111/j.1540-6261.2007.01291.x

Stöttinger, B., & Schlegelmilch, B. B. (1998). Explaining export development through psychic distance: Enlightening or elusive? *International Marketing Review*, 15(5), 357-372. https://doi.org/10.1108/02651339810236353

Svensson, C., Udesen, J., & Webb, J. (2019). Alliances in financial ecosystems: A source of organisational legitimacy for fintech startups and incumbents. *Technology Innovation Management Review*, 9(1). https://doi.org/10.22215/timreview/1209

Thrassou, A., Vrontis, D., Crescimanno, M., Giacomarra, M., & Galati, A. (2020). The requisite match between internal resources and network ties to cope with knowledge scarcity. *Journal of Knowledge Management*, 24(4), 861-880. https://doi.org/10.1108/JKM-06-2019-0291

Valdaliso, J., Elola, A., Aranguren, M., & Lopez, S. (2011). Social capital, internationalisation and absorptive capacity: The electronics and ICT cluster of the Basque Country. *Entrepreneurship & Regional Development*, 23(9-10), 707-733. https://doi.org/10.1080/08985626.2010.505268

Vahlne, J. E. (2020). Development of the Uppsala model of internationalisation process: From internationalisation to evolution. *Global Strategy Journal*, 10(2), 239-250. https://doi.org/10.1002/gsj.1375

Vahlne, J. E., & Johanson, J. (2021). Coping with complexity by making trust an important dimension in governance and coordination. *International Business Review*, 30(2), 101798. https://doi.org/10.1016/j.ibusrev.2021.101798

Vasilchenko, E., & Morrish, S. (2011). The role of entrepreneurial networks in the exploration and exploitation of internationalisation opportunities by information and communication technology firms. *Journal of International Marketing*, 19(4), 88-105. https://doi.org/10.1509/jim.10.0134

Vătămănescu, E. M., Alexandru, V. A., Mitan, A., & Dabija, D. C. (2020). From the deliberate managerial strategy towards international business performance: A psychic distance vs. global mindset approach. *Systems Research and Behavioral Science*, 37(2), 374-387. https://doi.org/10.1002/sres.2658

Weber, C. (2009). Corporate venture capitalists with a 'bird's-eye view'-a dynamic social network perspective. *Schmalenbach Business Review*, 61, 195-224. https://doi.org/10.1007/BF03396784

Werbik, A. (2015). Die Bedeutung des Standortes im Zeitalter der Digitalisierung am Beispiel von Softwareunternehmen. Lulu.com.

Werbik, A., Nussbaum, J., & Winter, J. (2024). Coming home in the age of Industry 4.0? The effects of offshoring and backshoring on manufacturing companies' success. *Sci*, 6(4), 58. https://doi.org/10.3390/sci6040058

Winter, J. (2019). Wertschöpfung 4.0 - Auf dem Weg in eine kollaborative Wirtschaft. Marktchancen, 40-62.

Woo, H. (2020). Foreign venture capital firms and internationalisation of ventures. Multinational Business Review, 28(3), 381-399. https://doi.org/10.1108/MBR-09-2019-0104

Yaqub, M., et al. (2020). Networks and knowledge exchange in international business. *Journal of International Business Studies*, 51(3), 455-477.

Yudha, P. S., Udin, U., Widowati, R., & Wahyuningsih, R. S. H. (2022). Talent management research trends in international market-based organisations: A bibliometric analysis from 2018 to 2021. Ec*onomics and Business Quarterly Reviews*, 5(4). https://doi.org/10.31014/aior.1992.05.04.471

Alexander Reinhold WERBIK
ORDID ID: https://orcid.org/0009-0001-3172-4138

Copyright © 2024 by author(s) and VsI Entrepreneurship and Sustainability Center
This work is licensed under the Creative Commons Attribution International License (CC BY).
http://creativecommons.org/licenses/by/4.0/
Open Access