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Exploring the Challenges of Industry 4.0 Entrepreneurs: A Grounded Theory Approach

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Abstract

This article presents a comprehensive analysis of the entrepreneurial challenges within the context of Industry 4.0, focusing on the seamless integration of transformative automation technologies such as artificial intelligence, robotics, and the Internet of Things. Utilizing Constructivist Grounded Theory, the study engaged in-depth interviews and conducted Focus Group Discussions (FGDs) involving various stakeholders, including government agencies, entrepreneurs, senior executives, industry leaders, and auditors. These stakeholders were sourced through the Malaysian Investment Development Authority (MIDA), operating under the Ministry of Investment, Trade, and Industry (MITI), which plays a pivotal role in Malaysia's economic and technological progression by fostering collaboration across different industry sectors and stakeholders. The research revealed several significant challenges faced by entrepreneurs operating within Industry 4.0, including constraints related to funding, complexities in leadership, political influences, gaps in awareness, the imperative need for change agents, and disconnections within networks. Through the meticulous transcription of interviews and subsequent coding, the study offers nuanced insights into these challenges. This article contributes to the ongoing discourse on entrepreneurship in the Industry 4.0 landscape by providing a deeper understanding of the multifaceted obstacles encountered by entrepreneurs. By shedding light on these challenges, it seeks to inform policymakers, industry leaders, and entrepreneurs themselves, facilitating informed decision-making and fostering innovative solutions to address the complexities of Industry 4.0 entrepreneurship.

Keywords: Industry 4.0; Constructivist Grounded Theory; Challenges; Funding; Change Agent

1. Introduction

The Fourth Industrial Revolution (IR4.0) has revolutionized industries, ushering in disruptive changes in technology, business models, and organizational structures (Schwab, 2016). The digitalization of industrial processes has opened up new avenues for entrepreneurs to innovate and generate value in the global economy (Deloitte, 2020). Nevertheless, the swift evolution of technology in IR4.0 also poses challenges for entrepreneurs, requiring them to adapt and acquire the essential skills to thrive in this dynamic environment (Kao, 2018).

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The Fourth Industrial Revolution (IR4.0) stands as a transformative force reshaping global value chains and industrial systems, presenting a spectrum of opportunities and challenges to businesses and economies (Lee, 2020). This revolution, characterized by the convergence of digital, physical, and biological realms, incorporates advanced technologies such as artificial intelligence, robotics, the Internet of Things, and data analytics (Olsen, 2019). While IR4.0 offers avenues to address global issues like climate change and resource scarcity, there exists a risk of widening the technological gap, particularly for commodity-dependent developing countries (Jiang, 2018). Navigating this dynamic landscape demands addressing gaps, fostering innovation through partnerships, and ensuring equitable competition (Lee, 2020).

Central to IR4.0 are its pillars, comprising technological advancements that drive this revolution forward. These pillars encompass Cyber-Physical Systems, which leverage interconnected devices and machines; the Internet of Things, connecting devices and systems for seamless communication; Artificial Intelligence, empowering systems to learn, adapt, and make decisions; and Big Data Analytics, harnessing vast amounts of data for informed decision-making and insights.

The ecosystems within IR4.0 comprise a diverse network of industries, enterprises, technologies, and stakeholders. These ecosystems interconnect various sectors, fostering collaborations, innovations, and disruptive transformations across industries such as Electrical and Electronics, Automotive, Aerospace, and others. The stakeholders in this landscape span from entrepreneurs and industry leaders to government agencies and auditors, all playing pivotal roles in shaping and navigating the IR4.0 landscape.

Among the key facilitators and guides of Malaysia's IR4.0 journey, the Malaysian Investment Development Authority (MIDA) stands out as a vital institution. Recognized for its pivotal role in fostering investments, supporting industries, and promoting growth, MIDA serves as a central hub facilitating entrepreneurship and industry advancement within Malaysia's IR4.0 realm. This study aims to unveil the challenges faced by entrepreneurs in IR4.0, with MIDA providing critical insights and support in navigating this dynamic landscape.

The ongoing transformation driven by Industry 4.0 challenges traditional entrepreneurial models, paving the way for innovative approaches leveraging advanced technologies such as AI, blockchain, and IoT. Intelligent machines have initiated a decentralized, self-organizing system, revolutionizing the established top-down production hierarchy (Koh et al., 2019). Acknowledging the inadequacy of existing entrepreneurship paradigms in the IR4.0 era, there arises a need to craft a new model aligning with current trends and challenges. Prior studies in the context of Industry 4.0 emphasize the critical need for a redefined entrepreneurship landscape. Tang and Tan (2021) underscore the unpreparedness of conventional business structures for navigating the complexities of the digital age, urging entrepreneurs to cultivate new abilities in line with IR4.0 demands.

Furthermore, Zhou et al. (2019) highlight the essential role of entrepreneurial evolution amidst rapid technological advancements. Their study emphasizes that traditional entrepreneurial practices might fall short in the era of Industry 4.0, stressing the need for transformative strategies and adaptive learning to excel in the digital revolution. Despite numerous studies exploring entrepreneurial competencies, existing literature gaps persist.

This study aims to delve into these gaps by exploring the hurdles that entrepreneurs encounter in the IR4.0 era. Through interviews and discussions with entrepreneurs deeply involved in IR4.0 ventures, we aim to grasp the skills that matter most in this digital age. By examining the challenges of IR4.0, we seek to shape a new type of entrepreneurship that addresses modern problems using cutting-edge technology. This research aims to enhance our understanding of entrepreneurship in the IR4.0 era, contributing both to theory and real-world applications. Therefore, gaining insights into the challenges faced by entrepreneurs in this period is vital for driving innovation, growth, and competitiveness in business.

2. Literature Review

The demand for entrepreneurs to navigate the complexities of the Fourth Industrial Revolution (IR4.0) and leverage its potential benefits is steadily increasing. However, research into the challenges within this new industrial era remains limited. IR4.0 has significantly transformed the business landscape through the introduction of cutting-edge technologies like artificial intelligence (AI), the Internet of Things (IoT), and blockchain, presenting entrepreneurs with both opportunities and hurdles. These technologies necessitate a distinct set of skills and competencies, unlike those required in previous industrial revolutions (Dorrenbacher and Gann, 2020).

In the realm of IR4.0, conventional entrepreneurial paradigms may prove insufficient for achieving success. Traditional models often fail to address the evolving challenges and emerging trends of the digital age, having been developed for different contexts (Mathews and Tan, 2020). There exists a pressing need for a holistic framework that integrates advanced technologies such as AI and blockchain into the entrepreneurial landscape, notwithstanding the growing recognition of their potential (Zhou et al., 2020). While the importance of acquiring new skills and mindsets is widely acknowledged, a comprehensive understanding of the specific nature of these skills and mindsets remains elusive (World Economic Forum, 2018). Such insights have the potential to foster innovation, spur growth, and stimulate job creation within the context of the Fourth Industrial Revolution. Hence, the objective of this study is to pinpoint the entrepreneurial challenges associated with IR4.0 by extracting invaluable insights from entrepreneurs, senior executives, industry leaders, auditors, and government agencies through qualitative analysis.

2.1 Challenges of Entrepreneur in IR4.0 Context

Entrepreneurship has evolved significantly over time, influenced by a multitude of factors, with the Fourth Industrial Revolution (IR4.0) emerging as a recent and impactful force shaping its trajectory. This revolution marks the convergence of digital, physical, and biological technologies, ushering in new business models and opportunities. Entrepreneurs must grasp the implications of IR4.0 on their strategies, operations, and business models to thrive in the contemporary landscape.

Operating in the era of Industry 4.0 (IR4.0) presents entrepreneurs with multifaceted challenges that require adaptive skill sets and innovative approaches. One key challenge lies in the rapid pace of technological advancement, demanding continuous skill updates to remain competitive (Kubickova et al., 2020). The complex business environment, driven by interconnected technological systems, adds another layer of complexity, necessitating entrepreneurs to possess comprehensive knowledge across diverse technological domains (Xu et al., 2019).

Additionally, the adoption of automation and artificial intelligence poses ethical dilemmas regarding potential job displacement, compelling entrepreneurs to navigate these concerns for sustainable business practices (Ghobakhloo et al., 2019). Furthermore, the emergence of technology-enabled business models, such as platform-based enterprises and sharing economy frameworks, requires entrepreneurs to acquire distinct skill sets tailored to these modern models (Nambisan and Baron, 2019).

Further challenges include cybersecurity threats, data privacy issues, and persistent obstacles related to access to capital and funding. The increased reliance on data in business operations raises privacy concerns, while securing adequate funding remains a constant challenge in the fast-paced IR4.0 landscape (González-Pernía et al., 2020; Kubickova et al., 2020).

Entrepreneurs also grapple with the heightened complexity and uncertainty of the business environment, driven by technological advancements and evolving consumer preferences. This demands heightened adaptability and a proactive approach to seizing opportunities in a dynamic market (Wang et al., 2019).

Moreover, navigating the rapidly changing regulatory landscape and ensuring compliance with emerging laws add another layer of complexity for entrepreneurs (Chang et al., 2019).

Effectively addressing these challenges requires not only technical proficiency but also strategic innovation, adaptability, and a keen awareness of market trends. Entrepreneurs must stay abreast of the latest technologies, engage in continuous learning, and foster a socially responsible business approach to thrive in the evolving landscape of IR4.0. Successful entrepreneurship in this era demands a holistic skill set and an agile mindset to navigate complexities and leverage opportunities effectively.

3. Methodology

Previous studies on entrepreneurial skills mainly used quantitative methods. However, our study adopts Constructivist Grounded Theory (CGT) for data collection, following Kathy Charmaz's approach. Unlike traditional grounded theory, CGT recognizes the subjective nature of researchers' interpretations. It aims to build theories based on participants' experiences, prioritizing understanding over explanation. This method involves in-depth interviews, observations, and document analysis (Charmaz and Thornberg, 2021). Through CGT, the participants' feelings and experiences were explored comprehensively to understand their perspectives within specific contexts (Rahman, 2020). It emphasizes interpretation, enabling us to capture the subtleties of their experiences. The process involves open coding to identify initial concepts, memoing for researcher reflections, and theoretical sampling to refine emerging theories (Charmaz and Thornberg, 2021).

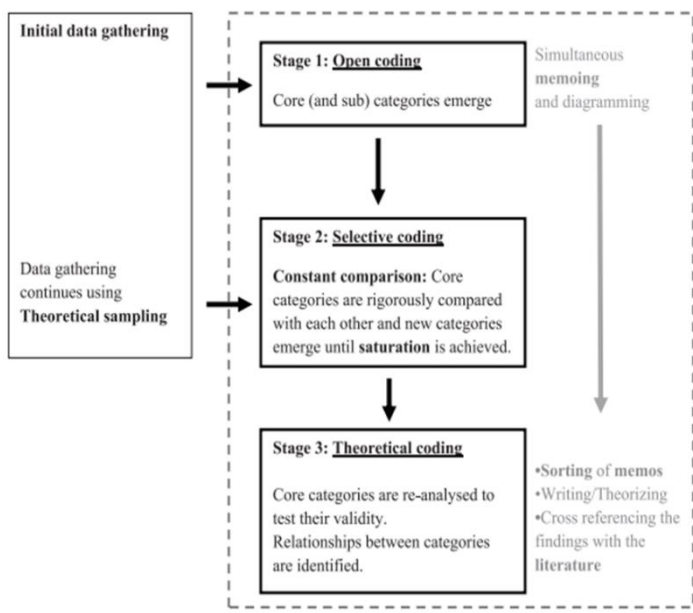

Figure 1. *Constructivist Grounded Theory Framework (Allen and Davey, 2018)*

In this qualitative study design, we employ two primary data collection methods: semi-structured, in-depth interviews and focus group discussions (FGDs). These methodologies facilitate a thorough exploration of participants' perspectives, experiences, and attitudes, yielding detailed insights into individual viewpoints (Gundumogula, 2020; DeJonckheere and Vaughn, 2019).

Additionally, alongside interviews, we conduct focus group discussions (FGDs). FGDs involve small groups guided by a moderator, enabling participants to share diverse viewpoints and build upon each other's ideas. Ridgeway et al. (2019) and Djohari and Hidgham (2020) both emphasize the effectiveness of focus group discussions in capturing varied perspectives and fostering interactive dialogue.

The combination of in-depth interviews and focus group discussions proves highly effective in qualitative research, especially for complex or sensitive topics (Gundumogula, 2020). In-depth interviews delve into individual experiences, while focus groups facilitate group interaction and the exploration of shared themes and diverse opinions (Alamri, 2019). Incorporating digital interviews can further enhance the efficiency of this approach, particularly for remote participation and sensitive subjects (Thunberg and Arnell, 2021). Focus groups, in particular, provide a unique platform for participants to validate shared experiences and expertise (Jung, 2019).

Participants in the study were carefully selected based on specific criteria, ensuring their expertise and direct involvement in Industry 4.0 (IR4.0). They represent fields closely associated with IR4.0, identified across eight areas outlined by MIDA. These professionals possess over a decade of experience in their respective domains, offering valuable insights into the evolution and intricacies of IR4.0 technologies.

During the data analysis phase, each recorded interview was transcribed verbatim, capturing all spoken words. Subsequently, we analyzed these transcripts to identify key themes using coding methodology. Three types of coding were utilized: open, axial, and selective. Coding plays a critical role in qualitative research analysis, as evidenced by Holohan and Sarhan (2020) in the context of strategic alignment.

This process involves breaking down data into smaller segments, connecting them to broader themes, and focusing on the most significant aspects (Peycheva et al., 2021). However, the quality of the data analysis can be influenced by factors such as incomplete documentation and limited resources (Doktorchik et al., 2020). To ensure the reliability and trustworthiness of the analysis, a team-based approach can be employed, as recommended by Cascio et al. (2019).

4. Results and Discussions

Table 1. Key Participants of Interview and Focus Group Discussions

Pseudonym	Code	Background	IR4.0 Sector
Adam	P1	Industry Leader	Mechanical and Engineering
Leo	P2	Industry Leader	Chemical
Sophie	P3	Senior Executive	Automotive
Lucy	P4	Senior Executive	Medical Devices
Mia	P5	Senior Executive	Medical Devices
Owen	P6	Senior Executive	Chemical
Tony	P7	Entrepreneur	Electrical and Electronics
Hans	P8	Entrepreneur	Furniture

Wang	P9	Entrepreneur	Mechanical and Engineering
Tom	P10	Industry Leader	Mechanical and Engineering
Nisa	P11	Auditor	IR4.0 Auditor

In Malaysia, MIDA has highlighted eight crucial sectors for transitioning to IR4.0. These professionals brought valuable experience and observations from industries such as Electrical and Electronics, Chemical, Mechanical and Engineering, Aerospace, Medical Devices, Automotive, and labor-intensive sectors like food and beverage and furniture, lending credibility to their insights within the realm of IR4.0. However, currently, there are no companies in Malaysia that can be considered fully operational under IR4.0 standards.

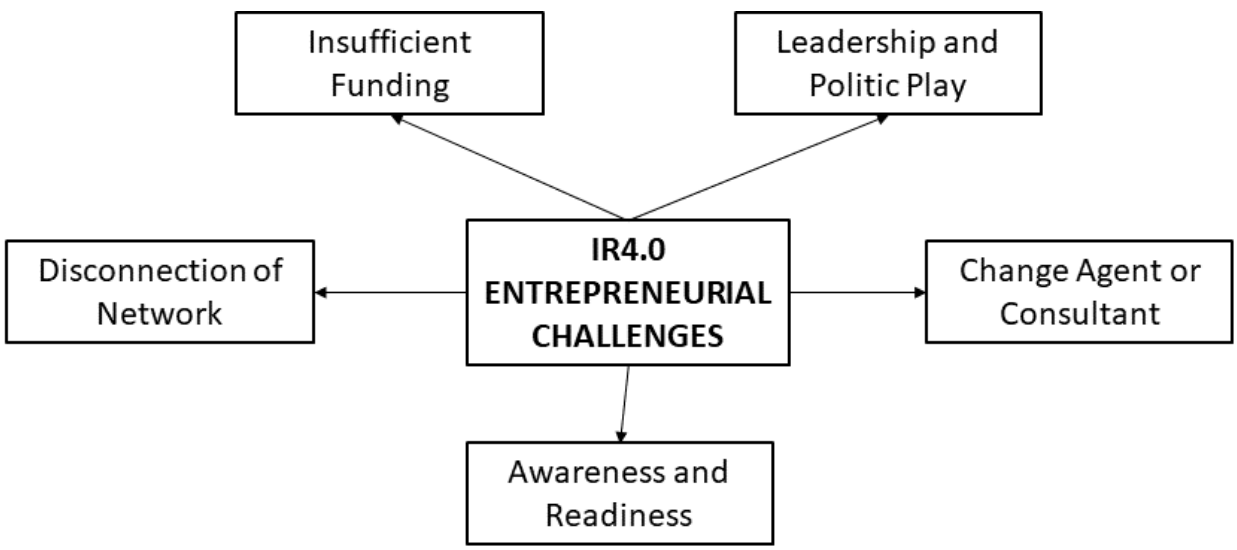

Figure 2. IR4.0 Entrepreneurial Challenges Framework

4.1 Insufficient Entrepreneurial Funding

In the current business environment, insufficient funds hinder the implementation of training programs and the initiation of new projects, ultimately resulting in reduced productivity and competitiveness. These challenges encompass a range of issues, including financial constraints, economic fluctuations, changes in leadership dynamics, and the urgent need to adopt transformative technologies. Amidst this intricate milieu, it becomes imperative to dissect the intricacies of these challenges and discern how they interplay in the modern working environment.

> "So basically, the challenge is that it will be best if we have the money. Right now, in our company, everything is at a halt as our company is in the midst of privatization. Whatever strategically will be under the parent company which is the major shareholders, and we are on the execution part. So, whatever, we must be budget-wise, we have to control everything.

> As of now, the money coming in is not much. We are facing a tough time." [Lucy SeniorExecutive, 2023]
>
> "Imagine, for example, we open a canteen in a school. We agree to sell the price of rice with RM1, but sometimes for RM1, it is tough. The school said no, it must be RM1. It happens to us even though it has been for 12 years; it will remain RM1. So, funding is really limited," [Sophie:P3, SeniorExecutive, 2023]
>
> "If we look at the economy, especially the recent past years, the challenges we are talking about, there will be things that may happen, and we need to take prevention measures. When there is foreign involvement, it will not only involve the situation in Malaysia only. Either way, it also affects the supply chain and pricing. Demand also will drop as the price increases locally, causing the business profile to be hard for prediction." [Leo:P2, IndustryLeader, 2023]
>
> "Besides the economic factor, it also causes instability in the source of income and wages paid to workers. Money or funds are not the factor. It is one of the factors, but it is not the main factor." [Adam:P1 IndustryLeader, 2023]

This finding of the study aligns with previous research, confirming the persistence of insufficient funding as a significant challenge for entrepreneurs in the contemporary business landscape. The pervasive nature of this challenge is evident in its exacerbation by economic shifts, leadership changes, and the increasing demand for transformative technologies (Jegnaradze, 2021). The constraints imposed by insufficient funding hinder vital training programs and the initiation of new projects across various sectors, resulting in reduced productivity and diminished competitive positions (Moyo, 2021).

This study echoes the findings of earlier research by highlighting the impact of company privatization, which enforces stringent budget controls, emphasizing the need for strategic financial management to navigate these challenges (Jegnaradze, 2021). Additionally, it underscores the undifferentiated implementation of funding in higher education, limiting its potential for system-wide gains, thereby further complicating the insufficient funding challenge (Moyo, 2021). Drawing parallels with studies conducted on European firms, the research emphasizes how financing constraints reduce investment in employee training, leading to lower productivity (Brunello et al., 2020). In the context of emerging economies, the study establishes a consistent pattern, showcasing how financial constraints impede firm growth, especially for small businesses (Wang et al., 2022).

In essence, insufficient funding stands as a formidable hurdle, requiring strategic financial management and a nuanced understanding of the broader economic landscape to navigate its multifaceted dimensions effectively.

4.2 Entrepreneurial Leadership and Political Play

In the landscape of business, leadership extends beyond company boundaries, often entwined with political plays and governmental decisions. The challenges entrepreneurs face stem from a complex interplay between business strategies and government policies, especially in the transformative era of IR4.0. Governmental shifts, regulatory changes, and geopolitical uncertainties significantly impact entrepreneurial ventures. Leaders in business often navigate intricate webs of political influence, where policies shape market conditions, trade regulations, and technological standards. These can affect access to resources, funding, and global market opportunities, directly influencing an entrepreneur's ability to innovate and grow within the IR4.0 landscape.

> "We GLC (government linked companies), when we change the government, the top will also

> change. It will impact us and the direction will be changing." [Lucy:P4, SeniorExecutive, 2023]
>
> "It is also the same in terms of recruitment when currently things like privatization. It will impact our current operation like for a certain time we need to freeze recruitment. Then other certain things, we then can release. So we need to take care of what needs to be done and come between." [Mia:P5 SeniorExecutive, 2023]
>
> "Before this is good already, have the thinking to move forward. Be global-minded. But when be global and failed, afraid to try for the 2nd times. So all being back to square one, become conventional again. Just do the core business of ours only. Don't do, don't expand, just take the business and not anything else that is not core to use. So when new, our board thinks like that. When we proposed new things and they see things like that. They will review it again and again. Ten times it enters the boards will talk about the same thing. It has become stringent and hard to move."[Owen:P6 SeniorExecutive, 2023]

This study resonates with prior research findings by emphasizing the pivotal role of leadership and political dynamics in the business landscape for entrepreneurs. In the transformative era of IR4.0, entrepreneurs grapple with challenges stemming from governmental shifts, regulatory changes, and geopolitical uncertainties, directly influencing market conditions, trade regulations, and technological standards (Zahra, 2020; Zayadin et al., 2022). The significance of institutional entrepreneurs as change agents becomes crucial, particularly in rural-peripheral regions, requiring strategic application of entrepreneurial leadership and core innovation capabilities for enhanced innovation performance (Leick, 2020; Utoyo el al., 2020).

The intricate relationship between business and politics unfolds with government changes significantly impacting government-linked companies (GLCs), necessitating adaptability through strategic planning amid shifts in leadership and strategic direction (Linh, 2023; Zhou et al., 2020). Government decisions, especially during events like privatization, introduce complexities that reverberate through entrepreneurial operations, demanding meticulous planning and adaptability (Wong and Hooy, 2020). The study underscores the impact of the COVID-19 crisis, emphasizing the need for businesses to respond to changing preferences and focus on corporate purposes justifying risk capital provision (Johnstone-Louis et al., 2020).

4.3 Entrepreneurial Change Agent or Consultation

In the pursuit of Industry 4.0 (IR4.0) integration, the absence of change agents or consultants emerges as a critical challenge for entrepreneurs. Even with available funding, the transition to IR4.0 is hindered by the lack of expert guidance. IR4.0 embodies the convergence of digital technologies, automation, and data exchange within industries. However, without knowledgeable intermediaries to steer this transformation, allocated funds might not translate into the expected progress in adopting these transformative technologies.

> "I already paid and joined the programs organized by the government for IR4.0, and I am really excited as I obtained new knowledge to boost my business. But when I come back, I cannot go for it, I cannot move forward because my employees cannot go for it. They don't have the vision that I have. So, where can I get the help to move forward, whom do I need to approach? [Hans:P8, Entrepreneur, 2023]
>
> "We know all about this aspiration for the company to change production toward the use of technology. But at the same time, we must also monitor the market for our product and, especially, our competitors. If we hire an agent, can they go into the competitor company and

> tell us what is there and what we need to have?" [Wang:P9 Entrepreneur, 2023]
>
> "For us, we have the product, and we also develop the product. Of course, you need to have mentorship in business. With it, you can either refer someone in the succession and study their success. What are their courses of action? What are their paths?" [Tony:P8, Entrepreneur, 2023]

This study aligns with prior research findings, emphasizing the pivotal role of change agents and consultants in assisting entrepreneurs navigating the challenges of Industry 4.0 (IR4.0). The transition to IR4.0 poses significant hurdles for entrepreneurs, especially in small and medium-sized enterprises (SMEs), marked by financial constraints and a lack of expert guidance (Masood, 2020; Santos, 2018). The multifaceted challenges encompass market uncertainty, competitive advantage, advanced manufacturing complexity, and the need for a comprehensive approach to Industry 4.0 adoption (Prause, 2019; Jayashree, 2019; Masood, 2020).

The study underscores the critical role played by change agents or consultants in facilitating the adoption of IR4.0, offering essential expertise, insights, and experience to overcome the hurdles faced by entrepreneurs (Jayashree, 2019). Amidst these challenges, the study also acknowledges the opportunities presented by Industry 4.0, such as increased flexibility and the potential for higher value-added production (Hardai, 2020). Additionally, insights from O'Connor (2002) stress the significance of assessing transition readiness, particularly for radical innovation, emphasizing the relevance of this study in understanding the dynamics of IR4.0 adoption in established companies. Their expertise as the change agent is seen as indispensable for overcoming challenges associated with internal alignment, market monitoring, and product development, ultimately facilitating a successful transition to IR4.0.

4.4 Entrepreneurial Awareness and Readiness

Additionally, a major hurdle lies in the insufficient awareness and readiness among industries to embrace IR4.0. The concept of Industry 4.0 might not be well-defined for all industry players, resulting in stagnation and the persistence of conventional work practices. This lack of understanding inhibits businesses from harnessing the benefits of advanced technologies like artificial intelligence, the Internet of Things, and automation, which could bolster efficiency, productivity, and competitiveness.

> "We are trying to provide digitalization to other companies. The challenge mostly that we get is awareness and readiness. Even though we do advertise our product for them to change their manual operations towards digital, they can't really see the importance and why they need to transform."[Tony:P7, Entrepreneur, 2023]
>
> "As we move towards IR4.0, awareness and readiness aren't the issues. Our company provides training, yes. But it's more than just being aware; it's about comprehending the technology, understanding it to solve problems. The challenge arises when there's a lack of readiness to tackle these situations head-on. Repeated occurrences of the same issue become a source of stress. They can't rely solely on me to solve it each time; action needs to come from within the team."[Tom:P10, IndustryLeader, 2023]
>
> "Like I told you before, I have joined and used my own money to attend these programs. But when I return, implementation becomes an issue. My employees aren't ready. I need to train my employees first." [Hans:P8, Entrepreneur, 2023]

This study echoes the findings of previous research, highlighting the lack of awareness and readiness for entrepreneurs embarking on business ventures in navigating the challenges of IR4.0. The barriers to Industry 4.0 adoption, particularly in the manufacturing sector, include insufficient awareness and readiness (Rehman et al., 2021). The growing cybersecurity challenges associated with IR4.0 add complexity, necessitating a more proactive and evolving perspective (Culot, 2019).

Despite these challenges, companies need to assess their digital readiness and develop clear plans for improvement (Machado, 2019). Perceived drivers for Industry 4.0 can boost readiness, but barriers can impede progress, underscoring the importance of comprehensive training and awareness (Arlbjorn et al., 2019). Challenges such as poor value-chain integration, cybersecurity, and uncertainty about economic benefits further compound these barriers (Kumar, 2021). Small and medium-sized enterprises (SMEs) encounter additional challenges, particularly in organizational readiness and the need for skilled employees (Grufman et al., 2020).

The lack of awareness and employee readiness hinders the implementation of IR4.0 programs (Pedota, 2023). To address these issues, it is crucial to assess and enhance employees' readiness for IR4.0 adoption (Hud, 2020). This involves developing a deeper understanding of the technology and fostering proactive cultural changes within the organization (Pedota, 2023). Future research should focus on developing models to assess IR4.0 maturity and readiness (Hajoary, 2021).

4.5 Disconnection of Network for Entrepreneur

In the era of Industry 4.0, a notable challenge arises from the disconnect among stakeholders: government bodies, government-linked companies (GLCs), and industry players. This disconnect impedes the seamless integration of IR4.0 technologies within businesses. The absence of unified collaboration obstructs progress and hampers the adoption of advanced technologies.

The link between government-linked companies and industry players acts as a conduit for knowledge exchange, resource allocation, and expertise dissemination. A weak or disjointed connection hampers industry players' access to vital resources, funding, and guidance necessary for effective IR4.0 transformation.

Nisa, an auditor, shed light on the disconnection of networks within companies seeking Industry4WRD readiness assessment. She explained how auditors, typically sourced from government agencies under MOSTI, play a crucial role. By assessing companies' readiness levels, they assist in obtaining grants facilitating the IR4.0 transition. Nisa stressed the importance of consultants in guiding companies through paperwork and system implementation post-assessment. Hans also voiced out his view on this matter.

> "Yes, there is a disconnection of the network, I agree with you. So, that's why we the auditors come into the company that registered for the Industry4WRD readiness assessment to audit and assess their company at which level. It is not easy to get the license and certification to become the auditor for this Industry4WRD. All the auditors will come from the government agencies under MOSTI, so they will come to the company and assess them for them to get the grant and the amount can assist them to go for IR4.0. We will look into what business they are doing, does the businesses diversify and have sustainability. It is also better for them to have the framework for their company to move for IR4.0". [Nisa:P11, Auditor, 2023]

> "Like I told you before, I have joined and used my own money to attend these programs. But when I return, implementation becomes an issue. My employees are not ready. I need to train my employees first." [Hans:P8, Entrepreneur, 2023]

Contrasting these perspectives, Tony, another entrepreneur, emphasized networking as pivotal for entrepreneurs. He exemplified how collaboration among technology-based companies benefits business growth.

> "For example, my company, we are a system developer, and we have our own product. But among our friends, which is a technology-based company too, they developed different products such as asset tracking. So, our approach is, instead of us also developing the asset tracking system which will take time and cost, why not, we collaborate and have partnership with them. So that we can leverage each other's network and clients. From that not only we get profit but also, we get a continuous business" [Tony: P7, Entrepreneur, 2023]

This study aligns with previous research highlighting the challenges arising from the disconnection of networks among stakeholders in the industry 4.0 era. Watson et al., (2017) underscores that this disconnect impedes the seamless integration of IR4.0 technologies in businesses, posing hurdles to progress and hindering the effective adoption of advanced technologies. Notably, the construction industry faces reluctance in incorporating these technologies, influenced by social and technical factors, as identified by Alaloul et al., (2020). Barriers to adoption in the manufacturing sector, including workforce availability, infrastructure, and management challenges (Rehman et al., 2021), along with a lack of digital strategy and resource scarcity (Raj et al., 2020), emphasize the need for coordinated national policies, improved standards, and government regulations to facilitate the adoption of Industry 4.0 technologies.

The importance of collaborative networks in addressing these challenges is echoed in various studies. Ramezani (2019) and Brondoni (2019) emphasize collaboration in business ecosystems, particularly concerning Industry 4.0. Camarinha-Matos (2019) highlights the role of collaborative networks in digital transformation, and Passaro (2020) provides evidence of their evolution in supporting startup sustainability. These findings collectively stress the significance of networks for knowledge exchange, resource sharing, and guidance in fostering the effective implementation of Industry 4.0 technologies.

5. Conclusion

In conclusion, entrepreneurs venturing into the realm of IR4.0 must be prepared to navigate a complex business landscape fraught with challenges. From funding limitations to the intricate interplay of leadership and political influences, the critical role of change agents, and the necessity for heightened awareness and network connections, numerous hurdles lie ahead. To thrive in this environment, entrepreneurs must proactively tackle these challenges head-on. Securing funding amidst economic fluctuations, swiftly adapting to technological shifts, and adeptly navigating the intricate dynamics of power transitions are essential strategies. Embracing Industry 4.0 requires not only awareness but also a profound understanding of its potential, relying on proficient change agents to navigate through these complexities effectively. Moreover, recognizing the importance of industry-specific insights and embracing continuous learning is paramount. This ongoing learning and adaptation empower businesses to position themselves for excellence amid the multifaceted challenges inherent in the modern working landscape. By embracing these strategies, entrepreneurs can fortify their businesses, ensuring resilience and adaptability in the dynamic domain of Industry 4.0.

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