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Luigi Pio Leonardo Cavaliere, Rameshwaran Byloppilly, Swapna Datta Khan, Bestoon Abdulmaged Othman, Iskandar Muda, Rupa Khanna Malhotra

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Luigi Pio Leonardo Cavaliere*

Department of Economics,
University of Foggia,
Foggia, Italy
Email: luigi.cavalie@gmail.com
*Corresponding author

Rameshwaran Byloppilly

Department of Marketing,
City University Ajman,
Ajman, United Arab Emirates
Email: b.ramesh@cu.ac.ae

Swapna Datta Khan

NSHM Business School,
NSHM Knowledge Campus,
Durgapur Established by NSHM Academy Arrah, Durgapur,
Kolkata, 713 212, India
Email: captsdk@gmail.com

Bestoon Abdulmaged Othman

Department of Insurance Management,
College Humanity Sciences,
University of Raparin,
Ranya, Sulaimani-Kurdistan Region, Iraq
and
Department of Business Administration,
College of Administration and Economics,
Nawroz University,
Duhok, Iraq
Email: Bestoon2011@yahoo.com

Iskandar Muda

Universitas Sumatera Utara,
Medan, Indonesia
Email: iskandar1@usu.ac.id

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Rupa Khanna Malhotra

Department of Commerce,
Graphic Era Deemed to Be University,
Uttarakhand, India
Email: dr.rupakhanna@gmail.com

Abstract: High-diversity processes, including industrial growth and technological advancement, affect work forms, vocations, job profiles, and fintech's role. These effects raise social policy questions. This in-depth literature review summarises the latest findings on how the Industry 4.0 Revolution has affected human and consumer capital development. The Malaysian retail sector is declining. This is because people prefer internet purchasing over brick-and-mortar stores. However, online buying has drawbacks. Younger generations have different shopping expectations due to their digital sophistication. They want a seamless shopping experience across all platforms, including brick-and-mortar stores, online merchants, and bricks-and-clicks (web rooming and showrooming). Technology-driven stores are also popular because they offer a unique and exciting shopping experience. Technology has boosted corporate performance before. Therefore, employing Industry 4.0 technologies in retail should boost productivity. This study will evaluate merchant performance using monetary and non-metric variables. A proposed online poll will collect primary data for this project. For statistical analysis, approximate least squares-structural equation modelling will be used. This study's approach can help the Malaysian retail industry solve its difficulties and improve performance.

Keywords: Industry 4.0; innovation; Retail industry; technological advances; performance; Malaysia; information technology; communication technology; work economy; internal and external organisational strategies.

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Biographical notes: Luigi Pio Leonardo Cavaliere, researcher at the University of Foggia, Italy, has authored and co-authored research projects and articles (Scopus and Google Scholar), acts as an international conference organiser, co-editor, and reviewer for scholarly blogs and international academic journals, and participates on international teams for research projects and publications in banking, accounting, finance, and management information systems. Professionally, he is a Certified Microsoft and Certiport IT specialist and is soon to obtain the Professional Chartered Italian Accountant qualification.

Rameshwaran Byloppilly is an Assistant Professor at the City University of Ajman in the UAE. He did his PhD in the area of Marketing at Kannur University. He got his MBA from the University of Calicut and his B-Tech in Mechanical Engineering from NIT Calicut. He has 24 years of teaching experience at various international universities across the globe. He has presented papers at Harvard University USA, London University UK, Calw University Germany, Riedlingen University Germany, and various universities in India. He is a reviewer and editorial board member of many international and national journals. He won the Best Teacher Award in 2020 from Edutrex International in collaboration with the North American Association.

Swapna Datta Khan is a Globsyn Business School, Kolkata faculty member. As a researcher, she has over 40 publications to her credit. She is also a veteran of the Indian Army and enjoys reading and working on statistical and mathematical solutions. She is keenly interested in contemporary environmental issues.

Bestoon Abdulmaged Othman is currently a Lecturer at Erbil Polytechnic University. He completed his PhD at the Universiti Tun Hussein Onn Malaysia in 2020. He received his Master's in Management Technology from the University of Technology Malaysia, Malaysia. In 2009, he joined the Department of Business Administration at Koya Technical Institute as an assistant lecturer. His research interests are marketing management, business, and human resource management.

Iskandar Muda is an Accounting Lecturer at the Faculty of Economics and Business, the University of Sumatera Utara (2002–until preesent). He is also active in professional organisations such as the Indonesian Institute of Certified Public Accountants (IAPI), the Indonesian Institute of Accountants (IAI), the Indonesian Bachelor of Economics Association (ISEI), the Institute of Certified Sustainability Practitioners (ICSP) in the Netherlands, and the International Public-Sector Accounting Standards (IPSAS), USA. In addition to being a Lecturer in Masters and Doctoral Accounting programs at the University of Sumatera Utara, he is also active as a regional finance researcher, speaker of technical guidance (BIMTEK), and practitioner accountant at the City District in North Sumatra. Some of his research has been published in indexed national and international journals, and his intellectual property rights are listed on the Google Play Store.

Rupa Khanna Malhotra has extensive research experience in marketing, and management of the international business, specifically documentation, international logistics, and international marketing. She has authored various articles in international and national journals and has written chapters for various books. She has over 20 years of experience in industry and academia, especially in international marketing of pharmaceutical products, bulk drugs, commodities, shipping, logistics, and documentation. She is heading the Department of Commerce and working as a senior international business and marketing professor. She has guided various PhD scholars. She has also conducted various FDPs on NAAC and NBA accreditations. She is also a member of many professional bodies, to name a few: the Ph.D. Chamber of Commerce, the CII, the IAU, and the AIMS. She has also conducted various training programmes for senior professionals at organisations like ONGC and organised various training programmes and seminars for corporations.

1 Introduction

Technological progress has been the engine that has propelled human civilisation forward ever since it began. Experts' worries have evolved alongside technological progress throughout time. The steam engine kicked off the fourth industrial age, which was followed by advances in electricity, information, and technology. According to Suriyapperuma et al. (2015), individuals are worried about being replaced by robots in the workplace. The first knitting machine was invented by William Lee in 1589, and it took several more decades before the first industrial revolution. Since the beginning of

the first industrial revolution, technology and innovation have been crucial for enhancing the performance and sustainability of businesses (Sima and Gheorghe, 2014; Suriyapperuma et al. (2015). Sustainable manufacturing methods are beneficial because they decrease overall input and output waste (Dahnil et al., 2014). Due to their significant influence on the global economy, businesses must actively contribute to sustainability and emphasise its significance (Ramayah et al., 2016). Businesses can quantify their competitive advantages by employing the triple bottom line, which combines social equality, ecological integrity, and financial prosperity (Kurnia et al., 2015).

Additionally, it bestows on businesses a sustainability cachet that can be exploited in marketing and to influence consumer choice (Peltier et al., 2012). Environmental research conducted before achieving sustainability goals can teach businesses new marketable skills or increase efficiency, so it's not just about protecting the environment (Grandón et al., 2011). However, that continues to be a top concern since business executives are more conscious that, if unchecked, natural resource depletion will eventually result in financial losses (Tan, 2010). Visible environmental repercussions encourage SMEs to establish sustainable, environmentally friendly enterprises and increase their ecological consciousness (Gibbs and Kraemer, 2004; ICT Facts and Figures, 2015).

Many of these SMEs understand that operating sustainably is in their best interests to win over consumers, appease regulators, and cut costs (Ongori and Migiro, 2010), showing how the environment and its variables positively impact SME performance (Tripathi and Al-Shahri, 2023). However, hatred toward sustainability regulations and costs may increase when small enterprises feel suffocated by larger organisations or when SMEs believe there are no development chances in the market due to fierce competition (Mutula and van Brakel, 2006; Wolf and Chowdhury, 2003). Various industries can employ Industry 4.0 technologies. To realise their full potential, these new technologies must benefit major corporations and small and medium-sized businesses (SMEs) (Hill, 2008). Most economies worldwide are supported by SMEs (Hill, 2008). For SMEs, Industry 4.0 offers a tonne of fantastic opportunities. However, these businesses must first overcome several obstacles because they rarely have the resources to conduct research and development (R&D) (Piris et al., 2004; Poon and Jevons, 1997). Several member European Union (EU) member states have implemented policies encouraging innovation to address this issue (Abu-Rumman and Qawasmeh, 2021). These nations believe that such R&D will result in the introduction of digital technologies, which will increase company resilience, competitiveness, flexibility (by, for example, offering more customised goods and services), and environmental and social responsibility (Silva et al., 2019; Kinzel, 2017). The move from the fragmented city to the smart city was made possible by the fourth industrial revolution (Industry 4.0) (Vashishtha and Dhawan, 2023). The economic and social changes are based on digitalisation, the most recent technical development, rather than discovering a new energy source (Ghozali, 2022). New goods and services have highlighted the relationship between machines and people, enabling substantial changes in personal and professional lives (Ghozali et al., 2022).

Large global corporations that already used procedures for continuous improvement of product and procedure quality and had exacting quality standards for development quickly and easily accepted the idea of Industry 4.0 to strengthen their competitiveness (Tan, 2010). Identity, self-knowledge, and identity in the field are ways to accept this idea. According to (Grandón et al., 2011), in this way, employees interact with computers instead of operating them.

Since these factors are crucial for self-organised systems, they must be emphasised in a smart manufacturing system. Industry 4.0 incorporates aspects from the physical, cognitive, and biological realms to create an improved industrial environment that benefits governments' economies and development objectives (Piris et al., 2004). Industry 4.0 is one of the most significant worldwide economic and industrial shifts, according to Pantano and Di Pietro (2012). Industry 4.0, as described by Tan (2010) makes extensive use of emerging technologies and the rapid evolution of machinery to improve manufacturing processes and address global issues. The key concept behind Industry 4.0 is the use of state-of-the-art information technology to implement IoT by incorporating technological skills (Piris et al., 2004). Wolf and Chowdhury (2003) showed that adapting to Industry 4.0 helps businesses in any sector stay competitive. In this approach, modern equipment and tools with embedded network sensors and sophisticated software can optimise a business's value chain (Pantano and Di Pietro, 2012). The end result is a more fluid production process (Sima and Gheorghe, 2015). However, there is a significant negative impact from job market disruptions (Sorescu et al., 2011). The fourth industrial revolution, or Industry 4.0, is a scientific and technological development that will radically alter business as well as social, cultural, biological, and ethical practises (Graessley et al., 2019).

Improving economic productivity requires altering the inherent connection between race and human capital. With more technical resources and fewer people involved, businesses can make choices more quickly (Alayli, 2023). The automation of technology capital yields products and services of superior quality. Increased labour productivity can be attributed to the fact that fewer manufacturing lines are down and more decisions are being made mechanically or semi-automatically. The ability to keep an eye on the production line simplifies product launches and opens up new possibilities for streamlining the manufacturing process. The plant is intelligent, and the output may be adjusted accordingly. Incorporating state-of-the-art technologies into production allows businesses to save money and increase profits. The production cost will decrease significantly, but slowly. Although they will require a sizable upfront investment, those costs will be amortised over time. The potential benefits to the industry and financial returns are what really matter (Raja et al., 2019).

The fourth industrial revolution will not be without unintended consequences. There is a risk that machine automation and the elimination of human capital from industrial technology may lead to a decrease in originality. Hardware is tuned, set up, and built to perform no matter what goes wrong, but human inventiveness is what really sparks discussions and changes minds (Graessley et al., 2019). An additional drawback could be a rise in unemployment, at least in some areas (Sabti et al., 2023). Increases in manufacturing automation are correlated with increases in the unemployment rate (Dadwal, 2020). Computerisation in the workplace and automation in the applied sciences have displaced a large number of people, necessitating a reorganisation of human resources. New factories might be built with the help of modern technology, leading to the creation of many new employment opportunities (Mert, 2022).

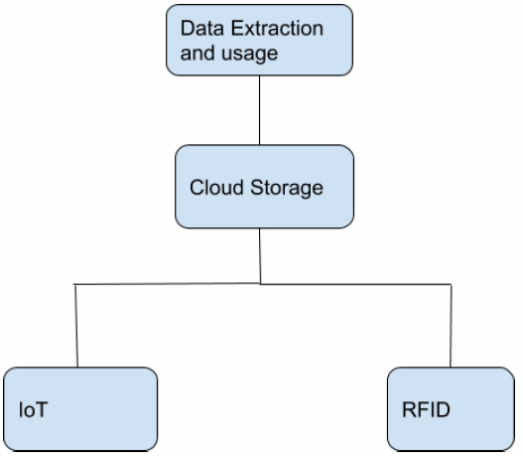
The effect on environmental protection is also crucial. Some of the machinery and tools used in Industry 4.0 factories have a major impact on the natural world. A bad outcome could result from a breach in data security. The internet of things (IoT) is a network of interconnected devices that rely on a system of artificial intelligence to ensure user security. The complexity of the task exceeds its capabilities. Even if advances in

Industry 4.0 manufacturing have led to higher quality goods, they have not solved the problem of complex industrial supply chains. At the moment, no machine can execute the kind of complex, specialised industrial work that only humans can. Technological advancements necessitate well trained personnel. In addition to the maintenance supplied to the industry 4.0 production technologies, human capital needs to be taught in the deployment, operation, and repair of the electronic equipment to assure their continuing operation. Adopting the principles of Industry 4.0 will require work from across industries. The initial investment is substantial.

1.1 During the Middle Ages 4.0, intellectual capital

Organisations and specialised workforces are affected by the introduction of new technologies. In order to solve the problem of the competency framework, a multifaceted approach is required, one that takes into account not only the many stages of production but also the level of company management and the various forms of competence involved (Agolla, 2018). The retail sector's performance in Malaysia is declining (Abu-Rumman, 2021). According to the Malaysia Retail Industry Report for the fourth quarter of 2018, the retail sector's performance has underperformed the GDP for six years. Additionally, the growth in sales for March 2017, March 2018, and March 2019 was 10.09%, 9.225%, and 8.646%, respectively. This demonstrates that sales growth has declined steadily for the past three years. Nearly 45% of the nation's economy in 2017 came from the retail sector (Al-Naif and Al Shraah, 2018). Since retail contributes significantly to the Malaysian economy, steps must be taken to increase retailer sales. Adopting technology is one tried-and-true method to boost Malaysian shops' performance (Martiskova and Svec, 2020). The education system must be modified for the Industry 4.0 stage to meet society's new requirements for development (Ocoró et al., 2023). There have been a few changes in tasks and abilities (Lovric, 2012). Human capital will consequently actively engage in the job and observe a change in the environment in which it operates and learns (Büchi et al., 2020) (Figure 1).

Figure 1 Usage of Industry 4.0 (see online version for colours)



People play a role in every aspect of production in the Industry 4.0 era, including system design, labour force participation, and consumer engagement (Al Shraah et al., 2013). The method for conveying expectations and demands among all parties involved should consider the demands and objectives of each person involved with the process (Lovric, 2012; Büchi et al., 2020; Valaskova et al., 2018).

1.2 Communication in the era of Industry 4.0

Customers' expectations rise gradually and include the importance of technology for information and communication in the purchasing process (Rüßmann et al., 2015; Hecklau et al., 2016), compelling traders to respond quickly to market changes (Haseeb et al., 2019; Autor, 2015). Linked customers have emerged due to the internet and technology's integration (Charalampidis, 2020; Eichhorst et al., 2017). They use a variety of gadgets, including laptops, tablets and cellphones, to inform themselves and make purchases. Because of this shift, the marketing team's internal organisation is different now. To improve consumers' access to data, these divisions must work with IT and technology divisions. To remain competitive, businesses must incorporate these new technologies into their marketing strategies and train their staff in technological skills (Sorgner, 2017). Firms can now get sustainable competitive advantages from technology's ability to provide access to vital talents and capabilities. In addition, the usage of ICT in business has posed new cybersecurity challenges.

2 Inspiration

Smart manufacturing is a notion that must be adopted as part of the Industry 4.0 revolution. The new paradigm describes how workers engage with automated systems. As a result of all the moving parts, the new intelligent manufacturing systems rely heavily on linkages between humans and machines. Employees must be creative, imaginative, informed, and qualified to function in these situations. They can only be supplied by an educational system built on creativity, information, and creativity (Dedrick et al., 2013). In addition, Malaysia's manufacturing sectors have difficulties or obstacles in implementing Industry 4.0 due to a lack of technological infrastructure, facilities, and resources and a highly skilled workforce. Although the Malaysian government launched the Malaysia Nationwide Policy on Industry 4.0 intending to drive production sectors towards Industry 4.0, at this point, the initiatives might not be very noticeable among the general population since the touch point is more restricted to technologists.

In the context of Industry 4.0, new knowledge and skill difficulties arise due to the introduction of novel technologies and methods in the field of human resources management. In order to meet the needs of the existing and future labour markets, it is essential that the workforce acquire the skills necessary to do so. In order to succeed, students need to study 'the technology of things' (ToT), interact with machines, utilise technology-technology interfaces, show off their creative flair, and master the inner workings of the network. Key benefits include reduced manufacturing costs and shorter consumer wait times, increased product output because to streamlined technical processes, and enhanced product quality and responsiveness to customer needs. These

factors pushed industrialised countries to include the idea of Industry 4.0 into their long-term plans for growth. Emerging economies must be actively involved in this effort to increase industrial quality.

3 Methodology

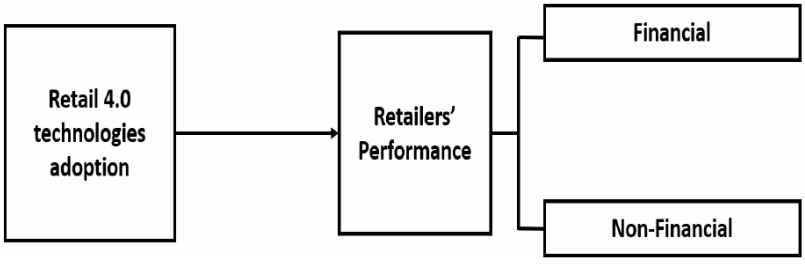
A thorough literature analysis was conducted to provide a complete picture of the studies on the impacts of the Industry 4.0 transformation (Kunanets et al., 2018; Dedrick et al., 2013; Kampa and Golda, 2018; Petroutsatou and Sifiniadis, 2018) on human capital development and consumer habits. The data will be analysed using the widely used IBM Statistical Package for Social Sciences (SPSS) version 22. SMEs in the service sector registered with SME Corporation Malaysia comprise the study's target population in the Klang Valley. According to Sima and Gheorghe (2015), this region was chosen because it has the most service sector SMEs per capita in Malaysia, with 179,271 (19.8%) in Selangor and 133,703 (14.7%) in Wilayah Persekutuan Kuala Lumpur. Thus, there are 312,974 SMEs in the Klang Valley overall. As a result, the samples obtained can adequately reflect Malaysia's SMEs in the service industry. To prevent situations where a sample may noticeably overrepresent or underrepresent specific population members, the selection will be made by the assortment performed by stratified sampling based on geographical references (Al Shraah et al., 2022).

There will be various stages to the analysis process. Analyses of frequency, mean, and standard deviation will be made to evaluate the demographic profile. Frequency analysis will clean up the data by avoiding mistakes and checking for missing response values. Inferential statistics like Pearson's coefficient and multiple linear regression analysis will be used to determine whether a variable link exists. A descriptive analysis will be employed to determine the respondents' characteristics. The reliability test will then be run on the data, showing the correlation between each item. The presence of factor loadings larger than or equal to 0.30 will be verified. The emphasis on methodically discovering and gathering all available information on a given issue gives SLR its scientific significance. Based on these data, a distinctive tendency unique to the theme or research domain can be identified.

3.1 Recognition of data sources and aspects of research

The use of the science index webpage was carefully planned. It was decided to search for articles on subjects including Industry 4.0, social capital, and patronage. The Web of Science database was selected because of its wide scope. We also conducted a constrained Google Scholar search on the grey literature. Every database was searched on 2 March 2020. Due to financial constraints, we have solely considered open-access sources in the search for information in articles. The initial search returned 2,204 titles, including those for papers with closed access. Only 762 were saved to satisfy the open-access criteria and used for analysis. This might be a problem with the study. Figure 2 shows the initial search as the conceptual framework for the retail sector. The various analysis methods are mentioned in Section 4.

Figure 2 Explanatory getting started guide



3.2 Standards for admission and exclusion

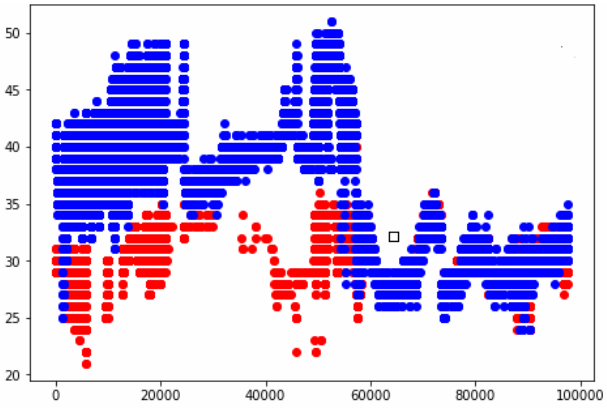
The study's main goal is to assess a country's preparedness to lead in the impending Industry 4.0 era; the rankings of that country in the World Economic Forum's Global Competitiveness are compulsory. Reports are utilised as a benchmark. Notably, Malaysia ranked 32nd overall and top among countries with incomes above the middle class, followed by China at 41 and Romania at 47. Due to the government's enforcement of complacency and support for the digital agenda, advancement, and convergence of technology, almost two-thirds of Malaysia's population is already online.

Malaysia is 'ideally positioned for the future' and has a 'strong present production base', per the 2018 edition of the Readiness for the Future of Production Report. The only two countries with a low per capita income to be found here are Malaysia and China. By taking advantage of the government's prepared initiatives, local SMEs can grow and improve their current business operations by incorporating the cutting-edge technologies of Industry 4.0. This will help them increase their value and speed up their market growth, as well as boost their global reputation and involvement.

4 Results

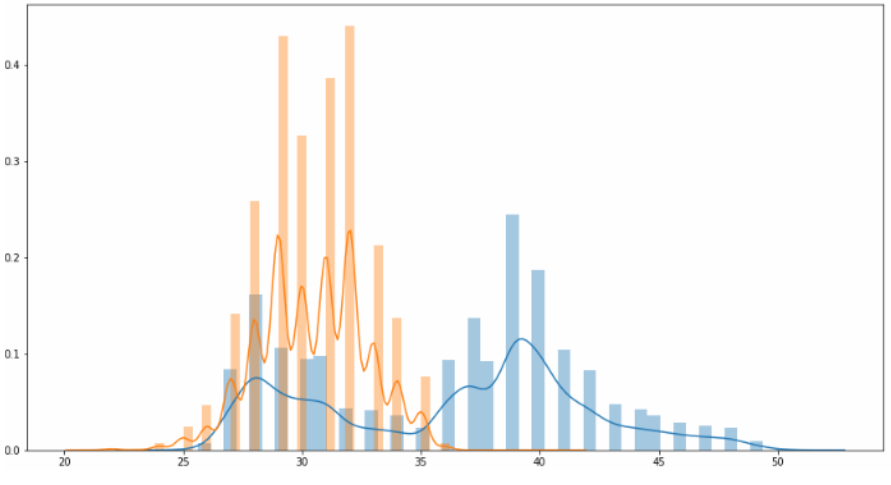
By obtaining data from various sources, RP assists in determining the cost of setup for various workshops used to create housing modules and the expenses associated with producing brand-new products. The RP is used to identify the deliverables and assists in analysing the material needs and, consequently, the assembly time by estimating the time needed for each stage. The management can use this RP to assist them in deciding how much material to buy to meet module requirements, ultimately affecting the customer's final order. This approach even aids in figuring out how to set up a new workshop that will be used to assemble modules based on consumer demands and data on production times for each module. Planning the inventory for both module construction workshops and the module itself is helpful. When a company of this size invests in the most expensive and up-to-date RP operating system and customises its functionalities for the business, it is not cost-effective. However, using an application or service like Microsoft Office effectively can reduce the high investment costs and resources required to train or hire new employees (Figure 3).

Figure 3 Number of well-chosen articles released each year. Researchers' calculations based on existing studies (see online version for colours)



The UK is in the lead in the research on Industry 4.0, with 39 papers. With 28 and 24 publications, respectively, the USA and Germany are next (Chakraborty and Bhojwani, 2018; Stefancic and Zirnstein, 2018; Frank et al., 2019a; Ogutu et al., 2014). Applications from 36 countries, predominantly in Europe, were included in the selected publications. The bulk of the 45 periodicals are in Europe 20 of which are in Northern Europe, including five in the UK, where most articles have been published. It is vital to remember that Switzerland, in particular, has been the main hub for print publication in Western Europe. With six publications, four from Poland, Eastern European countries are also well represented. The first study about Industry 4.0 to be published came from Ukraine in 2013 (Arnold et al., 2016), after the term was originally used in 2012 (Montgomery et al., 2018). The breakdown of publications by country is seen in Figure 4.

Figure 4 World Wide Web expansion in the majority of advanced economies (see online version for colours)



4.1 Principal subjects illustrated in the scientific report

In addition to the topics mentioned by Frank et al. (2019b), another topic, 'marketing in the digital age', can be recognised based on the analysis done of the 111 articles. These 12 major subjects are summarised in Table 1, which is detailed below. These modifications can be seen in the stock exchange's structure, where the financial services sector dominates (Dubé et al., 2018; Fantini et al., 2020). However, the industrial architecture of the GDP and stock markets is anticipated to change significantly. New technologies are linked to the new economy. Traditional industries' share of GDP will decline, while robotic industries' share of GDP that uses IT will rise. These support the hypothesis that the financial services industry, which places a high value on human capital, will experience a decline in its position (Srinivas et al., 2023). National plans should guide the gradual adoption of new technology. Governments should think about easing the transition to economic and social systems that are based on new technologies. There could be problems with data security and a number of people could lose their employment (Priscila et al., 2023).

Radical changes in the labour markets were brought about by new and developing technologies, which resulted in the automation of occupations and the growth of entrepreneurship (Vashishtha and Kapoor, 2023). Information technologies drive qualitative changes in educational services, fostering conditions that enhance residents' quality of life and comfort levels on both an individual and a collective level (Venkateswaran and Viktor, 2023). In this way, advancements in information technology might support individualised career decisions in a smart city's social, academic, and communicative context. Its facilities offer the chance to combine the stages of specialised training depending on a person's needs, economic and social growth, local labour market needs, and the related communities' overarching goals (Hecklau et al., 2016).

Industry 4.0 has varying effects on typical companies and manufacturing industries. An increase in personnel costs influences the equipment and manufacturing sectors. The focus has shifted from the research and manufacture of equipment to software in recent years. Staff must be ready to adapt since, due to the widespread implementation of the IoT, employees' roles will evolve from operators into issue solvers. Industry 4.0 is transforming how businesses operate in various manufacturing sectors. Businesses are ready to help higher education institutions by financing interdisciplinary schooling in economics, engineering, computer science, and mathematics for future employees but it has also changed industrial architecture (Arnold et al., 2016). Integrating artificial intelligence into production processes has beneficial and problematic effects. Labour law has undergone forced changes due to the Industrial 4.0 revolution, which requires attention. Reorganising the industrial process is necessary.

The electrical system engineering and ICT sectors also focus on the clients of those clients and their customers. As a result, B2B2C linkages are formed. However, several industries are undergoing slight changes. In this context, we're talking about sectors that employ modern machinery, like the auto or medical engineering sectors. In conjunction with Industry 4.0, servitisation, which prioritises increasing customer value, helps organisations transform (María et al., 2023). Organisations may become more creative and competitive by incorporating design into value generation. Companies can differentiate themselves from the competition with the help of this technique because it will be more challenging for competitors to adopt their company model and strategy. Businesses, as a result, acquire competitive power that is intelligent and long-lasting.

Promoting original thinking is essential while implementing new management procedures. In addition to the economic, ecological, social, and technological aspects, we also need to consider the integration of technology, data and information, and the public setting. Despite validating their present business strategy in this setting, many companies still fail to adequately account for or grasp the repercussions on a macro level.

SME production is essential for creating industrial value. A corporate strategy has been implemented to create, capture, and provide value. The Industry 4.0 revolution, which affects this paradigm on three levels digitalising high-quality manufacturing processes, intelligent production, and business connectivity, operates on these three levels. Depending on their relationship to Industry 4.0 as craft producers, early adopters, users, or full-scale adopters SMEs have a variety of business models. Many innovative solutions are now feasible thanks to the widespread use of artificial intelligence (AI) across various industries. As specific AI business models arise, businesses face more regulatory, human resource, and data-gathering challenges. Both explicit rules and AI competence are now more necessary than ever due to the management of AI-based innovation. Therefore, human considerations should be emphasised in policies that promote AI-based innovation. Improving the value chain, the shift to Industry 4.0 is accompanied by rising expectations, especially for companies with cutting-edge IT infrastructure that enable seamless connectivity of all corporate operations via computer systems and network information management. By utilising the special Industry 4.0 infrastructure, these improve manufacturing flow efficiency and promote self-learning intelligence. Therefore, this study is essential and will not be outdated in the next five to ten years, given that several aspects must be considered before Malaysia can fully deploy the technology. In order to more effectively validate the variables, improve the study's rigour, and expand its usefulness, researchers suggest future research to conduct an empirical study utilising this conceptual framework. Future studies may adopt the approach from this study to identify additional potential components boosting SMEs' readiness for Industry 4.0, or they may use the qualitative study because it offers thorough analysis and detailed justifications focusing on links found in the framework.

They have a variety of options for conducting business, including online and offline methods. Digitalisation and real-time data also allow manufacturers and retailers to better respond to changing market conditions and keep costs in check. The rise of technology has necessitated a new set of skills and knowledge for small and medium-sized enterprises (SMEs), including digital and technical skills embedded in education and training systems, reshaping production processes that accelerate agilely supported by well-coordinated systems, and a high degree of technology integrated with software and databases, all in an effort to increase productivity and gain a competitive advantage in the marketplace. The term 'competitive productivity' is used to describe the ability to steer enterprises toward rapid development, which is the message of Industry 4.0. Tan (2010) argues that the Industry 4.0 movement has the potential to revolutionise small and medium-sized enterprises (SMEs) by, among other things, increasing their organisational, management, and production capacities; boosting their cost-effectiveness and productivity; and fostering a new generation of entrepreneurs who are themselves creative and innovative. Some studies show that Germany accepted the concept of Industry 4.0 in 2011, while Malaysia only started implementing it in 2016.

Emerging technologies enable the division of traditional job activities to support global and digital manufacturing. They frequently benefit from online hiring platforms. The development of digitisation can also benefit women by giving them access to fields

previously closed off to them or where they were underrepresented. On the other hand, people who have less education and come from underprivileged social strata appear to experience more risk and social insecurity. Studies (Pantano and Di Pietro, 2012) that emphasise the factory's involvement in the global division of labour underscore the significance of workplace characteristics for the relationship between automation and skills. The institutional framework, as well as a company's reputation in the marketplace, plays essential roles. These necessitate professionals with specialised education from labour force suppliers who can generate the latest skills necessary to fill in the gaps in the current labour market. These efforts offer long-term benefits that allow businesses to maximise profits by improving productivity and eliminating waste. In a global, competitive, and always-evolving market, this might mean the difference between success and failure. Large corporations tend to be more creative than their smaller counterparts. One important tenet of the Industry 4.0 paradigm is the incorporation of self-regulating intelligent systems. Human, technical, and production systems are all interdependent, thus smooth logistics operations are essential (Kuragayala, 2023). Finding the most qualified individuals to fill certain managerial positions has never been simpler, thanks to online hiring platforms (Grandón et al., 2011). Its ripples in the realm of communication have consequences for marketing managers who must deal with more demanding customers in the modern digital world (ICT Facts and Figures, 2015).

4.2 Restructuring the internationalisation process

In order to be competitive in today's global economy, businesses must both innovate and expand abroad at the same time. The advantageous impacts in the case of businesses focusing on distinction start to show themselves after the application of product development technology. Instead, organisations prioritising cost reduction, increased productivity, or operational flexibility should prioritise Industry 4.0 innovations that significantly enhance the production process (Dadwal, 2020). The systematic use of cyber-physical systems (CPS), the only ones capable of monitoring and coordinating all information at all levels, is necessary for the large-scale transition to Industry 4.0 (Mutula and van Brakel, 2006). Additionally, by utilising computer algorithms, networked devices can function more productively, cooperatively, and robustly (Piris et al., 2004). Increasing quality and efficiency standards brought on by manufacturing automation have organisational, technological, and ergonomic ramifications, according to Mutula and van Brakel (2006). Managers must prioritise HRM tasks to improve business performance (Hecklau et al., 2016; Lovric, 2012). Using communication, internet, and information technology facilities helps the health systems run more efficiently, provides innovative services like telemedicine, and increases the population's access to high-quality treatments (Büchi et al., 2020; Venkateswaran et al., 2023).

Automation permeates every aspect of life, including the home, business, and, of course, marketing and retail. Marketing initiatives aim to draw in, convert, and keep customers. The goal of automation employed to draw clients is to increase online information traffic. Websites have begun to become crucial marketing tools as a result of the development of the internet. The significance of using the internet has grown over the past 25 years. The marketing in the upcoming Industrial 4.0 revolution is concentrated on mass customisation and filtering messages using the data we already have on consumers. Businesses prioritising making their products as distinctively customised for their

customers as possible will prevail in the market competition (Wolf and Chowdhury, 2003). The IoT has changed how information is disseminated by altering consumer behaviour. Thus, data mining technology can be used to enhance the customer experience. The advantages result from developing customer-focused provider and client alliances, which are made possible by big data analysis, relational fusion technology, and the IoT (Poon and Jevons, 1997). Tracking the consumer profile – including who we are tackling it to, his interests, where he receives information, whether he uses a mobile device or not, the place he is when he encounters the message, and what his profession is – is necessary to comprehend users' acknowledgement and desire to use a store app (Dedrick et al., 2013; Kampa and Golda, 2018; Petroutsatou and Sifiniadis, 2018). As a result of the changes in the societal and economic environment, retailers are under considerable pressure, and they need to employ innovative pricing optimisation techniques to boost their profitability, profits, and market share. Security remains an additional important consideration (Graessley et al., 2019).

Table 1 Key themes of the papers that are covered

Aspect	*Quantity of objects*	*Parameter*
Intrinsic utility	4	4.56
Appearance of convenience of use	9	5.79
Personal standards	12	4.38
Picture	5	5.22
Favourable circumstance	8	3.58
Height	7	4.89
Psychological danger	2	3.73
Intentional activity	4	6.42
Productivity in the workplace	5	5.69
Sensation	14	2.54
Online surfing	21	8.32

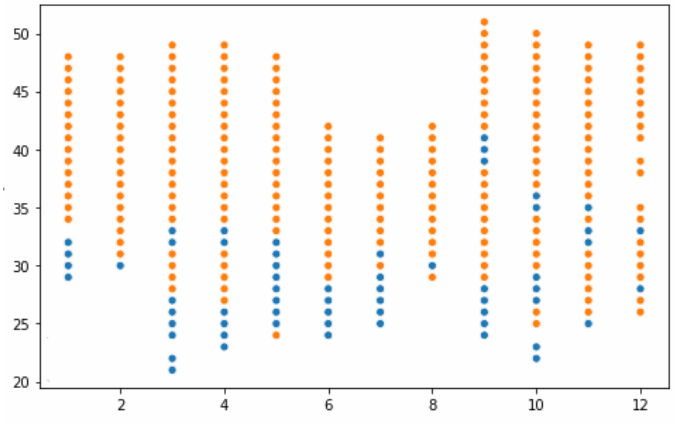
Note: Individuals based on reviewed works of literature.

The primary subjects of these studies are shown in Table 1. When this was seen through historical lenses, it was discovered that certain eras had shown a greater interest in various topics. Performance was primarily discussed throughout 2015–2016.

4.3 Skilled labour design's primary types of Industry 4.0 revolution effect

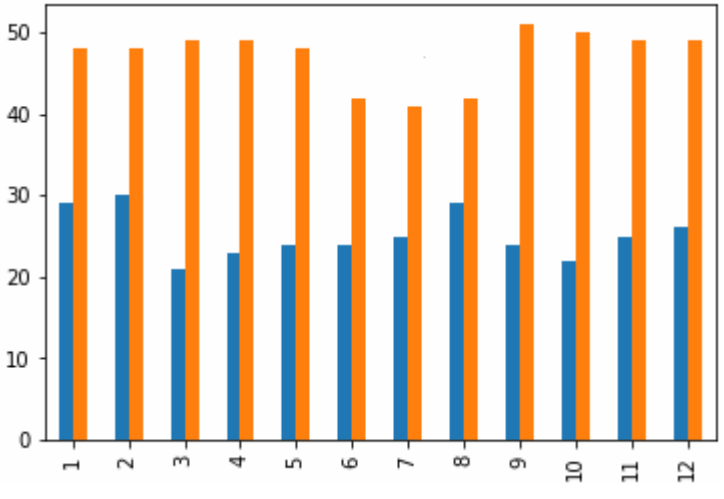
Automated automation and robotics of industrial processes will mostly impact industries with regular and repetitive work, displacing many jobs, primarily for individuals with less education. According to numerous academics, workers will need to learn new or different skills to deal with these changes in manufacturing processes (Said and Tripathi, 2023). This may lead to more employment but also reduce a sizable portion of the workforce. Digitalisation is the aspect of Industry 4.0's changes to industrial processes that looks to have the biggest overall impact on the economic and social landscape. Rethinking conventional teaching strategies is necessary to find solutions to these issues (Tan, 2010) (Figure 5).

Figure 5 Information for organising resources (see online version for colours)



Human capital is the main asset required to support the effective use of IT. Technological advancement is fairly rapid, and organisational variables are happening faster than before. Additionally, acquiring new abilities has become more important than possessing the necessary qualifications, creating new pressures on the job market and educational systems. Therefore, it is necessary for everyone, including those who are proficient in using technology, to update and broaden their skills and competencies. The school system, which must develop new tools and strategies to address these issues, appears to hold the key. In addition to knowing how to use new gadgets, educated workers are more adaptable and can do so more quickly when new technology is introduced. According to several studies, the degree of education and IT investments are strongly correlated (Montgomery et al., 2018). These findings align with the theory that highly educated nations have greater impacts from IT on productivity. At the same time, the importance of tertiary education policies is emphasised.

Figure 6 Developing a strategy for Industry 4.0 integration with SEM (see online version for colours)



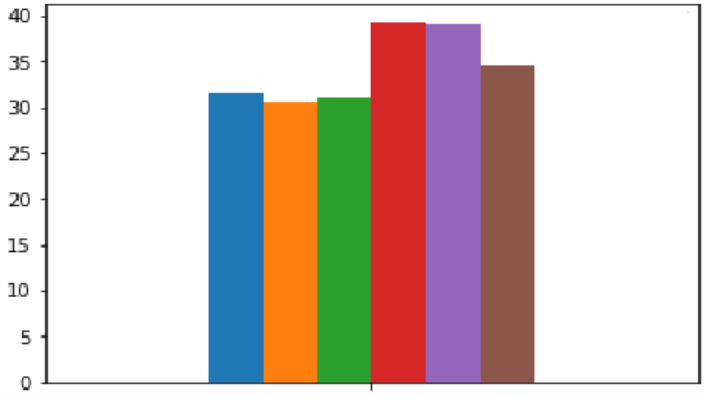
The demand for workers with particular abilities will rise as software, connectivity, and analytics are used more frequently. As a result, there will be a greater need for skilled people to create software and IT technologies. For workforce suppliers, this transition in skills presents a significant issue. The government, educational institutions, trainers, and businesses must work together to address these issues as effectively as possible. In order to promote entrepreneurial approaches and adjust courses, they must collaborate. This will help the workforce develop IT and innovation abilities (Kampa and Golda, 2018). They must be adaptable, open to change, and able to collaborate in interdisciplinary teams to comprehend the ideas and concepts of other fields. It is crucial for this to communicate, be open to different cultures, and be able to use digital tools (Figure 6).

Using data from the EU, Lovric demonstrated that education, particularly at higher levels, is more important than ICT adoption for boosting productivity in emerging nations (Arnold et al., 2016). A high enrolment rate in postsecondary education indicates a substantial contribution to human capital development. It turns out that to increase productivity, decision-makers must consider education as a crucial aspect. The recommendation is to implement IT technology in schools at a young age, create complementary training programs, and set up tertiary programmes for skill development. New educational systems must be implemented. As Tambaip et al. (2023) demonstrated, this does not appear to address the issue of elderly workers. Promoting new positions effectively and correctly becomes crucial in terms of recruitment strategies. By gathering pertinent data regarding the knowledge and skills required in rapidly changing industries, technology can assist in achieving these aims. These analyses' derived job descriptions show that employers are not looking for people with traditional education but rather creative specialists with diverse abilities who can improve a company's efficiency and competitiveness. These studies can aid in the growth of human capital by benefiting both the labour force and human resources specialists and labour suppliers, i.e., education systems, on the one hand. Therefore, the typologies of the job profiles needed for Industry 4.0 can be defined for the first category. Second, new techniques for monitoring changes in the knowledge and skills required for Industry 4.0 can be found. The third category may receive updated data on essential curriculum revisions. Last, exploratory analysis of job advertisements can be useful to recruitment firms.

4.4 Primary consumer preferences effects of the Industry 4.0 movement

Due to introducing of new technologies, Industry 4.0 will provide clients with new advantages. The demand for requirements will rise along with the level of technological sophistication, and clients with particular or even unusual needs will start to show up. As a result, novel purchase strategies could appear. Customers can make individualised requests, ask for particular features, or buy a single item. Customers are not charged extra fees to modify their orders or ideas at any point throughout manufacturing, even at the last minute. The interconnected networks of Industry 4.0 require firms to gather and evaluate enormous amounts of data. As a result, consumers and producers are concerned about the issue of privacy (Ramos et al., 2023). It will be difficult for both sides to deal with this problem, which may threaten privacy (Figure 7).

Figure 7 Operational and technological strategies for SMEs (see online version for colours)



People are prepared to spend more for more security. Consumers' purchasing decisions can be affected by the availability of security information. Therefore, lowering these risks would encourage customers to purchase more secure gadgets. One of the examined research projects (Hill, 2008) shows that consumers' purchase decisions may be affected when they acquire security information, such as through a label. Data mining techniques will be employed more frequently to investigate consumer perceptions in the new '4.0 market', enhancing marketers' calculating tools (Pandit, 2023). Information delivery to the end user is becoming increasingly reliant on technology. Virtual reality technology is used as an example (Petroutsatou and Sifiniadis, 2018). This technology can significantly improve the effectiveness of how new products are presented, as well as communication and content delivery. It can also make it easier for different market players to exchange information, positively impacting how consumers behave and perceive products. Although trust in websites has not increased due to increasing internet adoption, buying intentions have. Furthermore, research has revealed a link between a website's trustworthiness and its usability that is unfavourable. This has three important implications, which are as follows:

1 a consumer is less inclined to trust a website and provide it with their personal information the more they enjoy its effectiveness and convenience of use

2 a significant direct correlation exists between a website's usability and the likelihood of purchasing

3 there is a correlation between internet users' skills and website confidence, suggesting that people are less averse to online shopping the greater their internet skills.

The adoption of IoT alters how businesses interact with customers, making communication much more personal while improving segmentation and audience targeting. It might even be regarded as a distinct direct marketing branch (Gibbs and Kraemer, 2004). This capability might be a requirement for more advanced, tailored marketing. IoT enables the development of expansive networks that link individuals, objects, and organisations, changing how products are advertised and communicated with consumers and their expectations, perceptions, and needs from businesses (Lovric, 2012).

This will have an impact on consumer and purchase behaviour. E-rapid commerce's expansion has been aided by the IoT and big data analytics. The proliferation of data sources has boosted consumers' confidence in making purchases over the internet. Research by Sorgner (2017) shows, however, that online consumer reviews do seem to influence the decision-making process for customer behaviour.

Table 2 Division of the responders' upbringing and characteristics by regularity

Divergent		*Number*	*%*
Demographics	Masculine	52	62.3
	Women	45	59.1
Endurance	American	41	46
	African	27	48.2
	Malaysian	16	24.5
	Other	21	28.3
Academia	PGDCA	63	77.1
	Undergraduate	27	37.4
	Postgraduate	13	14.3
	Doctorate	5	10.9
	Others	2	13.6
Information systems usage utility	True	68	78.4
	False	36	46.9

Regarding service safety and protection (Table 2), IT can be particularly advantageous in the healthcare industry. The effectiveness of hospital facilities can be increased by providing mental health treatment. IT faces significant challenges in psychotherapy due to challenges with heterogeneous data, a lack of training with telecom operators for health, and the management of privacy concerns. Implementing Industry 4.0 technology in the healthcare sector promotes patient-centred care and more effective utilisation of existing treatments. Healthcare professionals are encouraged to use technology ethically to enhance health services by regularly using diverse technologies daily (Pickernell et al., 2013; Haseeb et al., 2019). Through online communication, healthcare providers can gain a better perspective by being aware of people's changing habits (Figure 8).

Figure 8 Mass production as the budget management system is implemented and developed (see online version for colours)

Artificial intelligence can potentially alter consumer behaviour more than other new technologies. When clients use AI, a low-level positive mentality could develop due to their interactions. As communication has greater effects when it matches the attitude, it is still unknown what additional mindsets the AI could identify or how an AI programme should interact with clients. In the post-AI adoption phase, according to Haseeb et al. (2019), clients may, if AI can accurately forecast their preferences, experience a loss of autonomy and act inappropriately.

5 Findings and discussion

In this study, Industry 4.0 establishes a new economic framework that leads to a new social structure and a transition from the 'economy of lack' to the 'economy of abundance'. The artificial intelligence economy is seeing the emergence of new complex forms, putting further strain on the market institutions that control competition, innovation, and commercialisation (Gibbs and Kraemer, 2004). Despite the difficulties the developing world faces, technological development has enabled innovative solutions to ineffective resource management and improved human welfare. The industrial internet of things (IIoT), including TBL sustainability benefits, is advantageous for industrial manufacturers from an economic, environmental, and social standpoint. The IIoT framework was developed by Wolf and Chowdhury (2003) with three TBL elements: 'data and information', 'public context', and 'technical integration', which are used to describe the implementation of the IIoT within and across enterprises. 'Data and information' refers to the ability to process and analyse data. In certain studies, geographic differences have been found. There will probably be less of an impact because SMEs in Germany are predicted to find the shift to Industry 4.0 more challenging. However, Chinese SMEs primarily see the social advantages of this approach.

Concerns about the economy, the environment, technology, and society, which mostly include job losses, are also raised by SMEs' adoption of Industry 4.0. Requalifying human capital, according to academics, can lessen social hazards. Most technological concerns are associated with political and IT security issues. These challenges necessitate a fresh management strategy that is intelligent, synergistic, and predictive and can anticipate and counteract all problems. Modern advancements in information and communication technologies can be used to better the operational management framework. New challenges for human behaviour and social/business processes arise as a result of the complexity of digitalisation and collaborative consumption. The most cutting-edge educational technologies can help produce the well-trained workforce and abundant resources essential to long-term prosperity. In the 'post-economy of artificial intelligence', alternative energy and social communication technology take centre stage. Changing from an 'economy of need' to an 'economy of abundance' generates a new economic foundation and calls for new social order structures. There are emerging complex forms in the AI economy that will place new demands on market institutions in terms of invention, commercialisation, and competition. Sustainability, the triple bottom line, and Industry 4.0 are all examples of global movements that, according to Kinzel (2017), pave the way for businesses to establish a foundation of connection with corporate responsibility towards society.

6 Conclusions

The growth of human capital has thus led to an original solution. Today's intellectual capital is a superhuman resource and a creative claim. The fourth industrial revolution, which substantially impacts the economic-social environment, each person's life, and global interactions, is centred on the internet and artificial intelligence. In the ensuing decades, a sizable share of occupations will be impacted when industrial robots eventually replace some professions. As a result, conventional jobs in agriculture, industry, and amenities will become outdated, while brand-new jobs in devotion, entertainment, and welfare supply will develop. Employees will still need to learn new skills for these new professions, notably in the digital space. Employees with inconsistent formal education are now the ones who worry about job automation the most. Continuous employee retraining is the most commonly used tactic for closing skill gaps. Various sources of uncertainty, such as the performance of the construction parties, the availability of resources, the state of the environment, other parties' involvement, and contractual relationships, have inundated the building project with several predictable and unpredictable hazards. The primary goals of risk management in a construction project include executing the work within the appropriate quality, safety, and environmental standards, as well as the stipulated cost and time limits. Previous research has demonstrated that systematic risk management improves business success. In order to apply Retail 4.0 technology, Malaysian merchants can build on the conceptual framework presented in this article. Implementing these technologies will lead to the development of Malaysia's retail industry. As a result, customers can choose omnichannel shopping and make purchases whenever, wherever, and however they please. In this case, both the vendor and the end user benefit. The shop can still make sales even if clients do not enter the 'brick and mortar' establishments. Without departing the cosy environment of their homes, customers can purchase the goods they need from the businesses.

Incorporating Retail 4.0 technologies would enable creative and compelling shopping experiences that would appeal to Gen Y and Gen Z, who comprise 67% of Malaysia's population. Ensuring that stores can draw in younger customers is essential because they have the purchasing power to boost sales and, consequently, the success of the retail sector, which accounts for about 45% of the Malaysian economy. Businesses must support education and get involved. Governments must encourage initiatives for ongoing education. Learning 4.0 requires Industry 4.0. Future-oriented quality education must be evaluated from various angles, including higher education, inventiveness, personal economics, and electronic youth development.

6.1 Limitations to this study

There are certain limitations to this study. Due to financial constraints, it is not allowed to include papers that are not openly available in the information search in articles. 2,204 titles, among which were papers with closed access, were returned by the initial search. Only 762 were saved to satisfy the open-access criteria and used for analysis.

6.2 Future work

In the future, the competitive edge that a skilled and reasonably priced workforce offers will be a major driver of recent economic progress. Due to the demand for an experienced

staff that is also eager to learn new skills, this advantage has decreased in the digital age. Innovations related to Industry 4.0 demand the creation of fresh organisational structures, industrial processes, and academic goals. This paper's primary flaw is the lack of actual study data; instead, it was created using a theoretical framework already provided. The data collection's results and conclusions are essential for validating the proposed framework. Second, this article has only examined three internal independent variables: people, process, and technology. More significant elements, which might also contain extraneous aspects, might be included in future studies. Thirdly, future research may examine another moderator's or mediating variable's effects on the correlations. Since the research is just concerned with the manufacturing sector, it is possible to explore other industries because they can provide extra contributions. For instance, the SMEs in the service sector have greatly strengthened Malaysia's economy. One of Malaysia's most difficult and dynamic businesses is construction. Due to its distinctive and intricate qualities, this industry is distinct from other industries. The construction business is vulnerable to numerous dangers because of these variances caused by the characteristics of kind, size, duration, inclusion of players, and location. Therefore, managing risks can be adopted in Malaysia in the future. Not all businesses, meanwhile, have risk management divisions.

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