Humanizing the Fourth Industry Revolution in Sustainable Supply Chain Management

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Abstract. The transition to Industry 4.0 and the growing adoption of new digital technologies in industrial operations present new challenges and opportunities in terms of human work and work organization. To overcome these obstacles and seize emerging opportunities, new socio-technical and human-centered design and engineering methods and approaches are required.

This paper will provide an overview of the Industrial Revolution version 5.0 and will discuss various aspects of Industry 4.0 implementation. Entering the 5th Industrial Revolution, globally companies will adopt new technologies to meet the demands of quality customers and value-added products, using new techniques in transparency, smart components, more significant data, and information security. The implementation of Industry 5.0 brings back human to the industry again and reduce unemployment which makes overall positive development for the future Industry. The leadership of organizations, policymakers, and other supply chain practitioners, particularly those currently working on Industry 4.0 initiatives, will benefit from this research because it will provide clear guidance on the dimensions necessary to structurally design and implement an Industry 5.0 strategy.

This paper will benefit researchers and practitioners by examining the newest and most revolutionary concept of the Industry 5.0 phenomenon in the context of supply chain management, which is a relatively unexplored area. Finally, the impact of Industry 5.0 on the Malaysian manufacturing industry and the overall economy will be discussed from an economic and productivity point of view.

This research would like to identify a research gap in the intersections between Industry 4.0 and Industry 5.0 in regards to supply chain management through SLR to recommend how manufacturing companies should approach the introduction of new digital technologies with the human touch. Theoretically, this research is expected to recommend a framework to the current literature and the body of knowledge with humanizing factors.

Keywords: Industry 4.0 · Industry 5.0 · Humanizing factors · Sustainable supply chain

1 Introduction

In January 2022, the Industrial Production Index (IPI) increased by 4.3 percent over the same month the previous year. The increase in the IPI was aided by a 6.8% increase

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in the manufacturing index and a 7.7% increase in the Electricity index. Meanwhile, the Mining Index fell 5.1%. However, Malaysia's manufacturing sales in January 2022 totaled RM139.0 billion, up 13.1% year on year. In January 2022, the increase in sales value was driven by increases in Food, Beverages, and Tobacco Products (20.6 percent), Petroleum, Chemicals, Rubber, and Plastic Products (15.7 percent), and Electrical & Electronics Products (10.6 percent) [1].

Malaysia's economy remains reliant on manufacturing. It contributes about 23% of the country's Gross Domestic Product on average. Additionally, 98.5 percent of manufacturers are Small, Medium-Sized Enterprises (SMEs), the largest business segment in the country. The manufacturing sector is critical to the government's goal of transforming Malaysia into a high-income nation by 2030 and positioning the country as a new Asian Tiger. The sector will be critical in transforming Malaysia into a high- value economy that is competitive, ethical, and dignified [2].

It has been demonstrated that Manufacturing firms are frequently embedded in a highly competitive environment, where new problems, such as the introduction of disruptive concepts and technology, regularly appear [3] [4]. Manufacturers must operate at a high level of quality, efficiency, and cost-effectiveness in this environment. Additionally, businesses must be able to adapt quickly to changing market conditions [5]. As a result, a variety of methodologies, including Lean Manufacturing (LM) and, more recently, Industry 4.0 (I4.0), have been created to assist producers in achieving these objectives.

Industry 4.0 is all about making processes more efficient and introducing intelligent edge computing. Its main goal is to increase process efficiency, and as a result, it overlooks the human cost that comes with process optimization [6]. When Industry 4.0 is fully implemented in a few years, this will be the most pressing issue.

The Fifth Industrial Revolution will bring back human workers to the factory floor, where they will be paired with intelligent devices to boost process efficiency by integrating processes with human brainpower and creativity. Automation is the primary focus of Industry 4.0, but in Industry 5.0, humans and autonomous robots will work together.

2 Purpose of the Study

Industry 4.0 technologies are critical in the quest for Industry 5.0, which emphasizes sustainability and is enabled by disruptive technology. Industry 5.0 encompasses two visions: one is concerned with human-robot interaction, while the other is concerned with the challenges of a sustainable bio-economy [7]. Industry 5.0's concept is to place a premium on sustainable supply chain management, which includes employee education and training, working conditions, the relationship between productivity and wages, technology versus human redundancy, optimal products, sustainable governance, and a code of business ethics [8]. Organizational leaders, policymakers, and other supply chain practitioners are currently operating under Industry 4 programs due to a lack of clarity regarding the dimensions required to structurally design and implement Industry 5.0 initiatives.

However, Industry 5.0 has the potential to improve the strategic outcomes of sustainable supply chains by enabling the mass personalization of products and services.

Thus, in order to close the gaps that now exist, this study will recommend a framework to present the impacts of implementing Industry 5.0 in sustainable supply chain process in terms of Industry, Innovation & technologies, Society & sustainability, the transmission issues from Industry 4.0 to Industry 5.0 wave and how to align humans with technology.

3 Literature Review

Merriam-Webster, delivers an excellent definition which is “An industrial revolution is a rapid major change in an economy (as in England in the late 18th century) marked by the general introduction of power-driven machinery or by an important change in the prevailing types and methods of use of such machines” [9].

Science and technology advancements bolster global industrialization trends in the context of Industrial Manufacturing [10]. The first industrial revolution began with the introduction of steam power and the widespread use of water in industrial settings in the second half of the 18th century and lasted nearly the entire 19th century [11]. They relocated from their homes to central factories in response to increased demand for fabric production. The Second Industrial Revolution began with the adoption of electrically powered technologies [10], which enabled the mass production model to be sustained through employee division [12]. By initiating the use of electronics and information technology such as computers, networks, and interfaces, we initiated the concepts of the third industrial revolution, enabling manufacturing automation and generating extremely flexible and efficient systems [12] [13]. The term "Industry 4.0," or the fourth industrial revolution, refers to the connection of physical devices and a business’s assets via technology [14], which increases the complexity of a system through the combination and coordination of Cyber-Physical Systems (CPS) [15].

Although much study has been conducted on the topic of Industry 4.0, the managerial techniques and organizational culture, which have the greatest impact on the success of Industry 4.0, have received little to no attention [16]. In addition to a lack of necessary skills and knowledge for Industry 4.0 implementation, this challenge is one of the most difficult to overcome in a company’s shift to Industry 4.0 [16] [17]. Another problem is that workers are afraid of losing their employment as automation and robotics take hold [17]. As a result of these security and dependability concerns, as well as the fear of IoT failures, enterprises have seen remarkable transformations [17].

3.1 Human Factor in IR 4.0

Industry 4.0 has become a buzzword, referring to the fusion of the physical and virtual worlds with the goal of digitalizing and automating manufacturing environments [18] [19]. While there is no universally accepted definition of Industry 4.0, it can be defined as a collection of technologies, devices, and processes capable of operating seamlessly across several stages of the manufacturing process and different stages of the supply chain by enabling mass production, integrated operations, decentralized decision- making, and minimal human intervention throughout the process [20].

The Internet of Things (IoT), Cyber-Physical Systems (CPS), autonomous robots, visualization technologies (virtual and augmented reality), cloud computing, blockchain

technology, big data analytics, additive manufacturing, and digital twins are just some of the technologies being developed [21] [10].

According to Romero et al. (2016), the transition to Industry 4.0 will involve new design and engineering philosophies that are human- centric and emphasize expanding and boosting the human physical, sensory, and cognitive capacities, rather than unmanned autonomous factories [22]. Utilizing a human-centered design approach for developing Industry 4.0 work systems has the potential to improve the worldwide performance of complex socio- technical systems and the well-being of workers [23].

Richter et al. (2018), on the other hand, advise that there is a need for research on the process of analyzing and developing tools and digital environments, how businesses may incorporate digital support for workers, and the contexts in which digital work design occurs [24]. Thus, it is unknown how the future factory's combination of technology and organizational structure will emerge. When employees connect with digital gadgets, they should feel secure and comfortable, and their psychological components must be kept and handled [25]. In Industry 4.0, firms must assure the quality of work and the safety of their employees. Any issues that develop must be properly controlled [26].

3.2 Manufacturing Industry of Malaysia and the Current State of Industry 4.0

The Malaysian Digital Economy Blueprint and the National 4IR Policy complement one another in promoting inclusive, balanced, responsible, and sustainable economic growth. Only 30% of manufacturers in Malaysia are familiar with the concept of Industry 4.0. [27]. While manufacturers recognize the value of Industry 4.0 for future improvement and competitiveness opportunities, the state of readiness for implementation varies significantly by country, sector, or even individual company. However, a sizable proportion of Malaysian executives remain optimistic about the fourth industrial revolution [28].

Malaysia is closing the gap in global competitiveness, moving from 25th (2016–2017) to 23rd (2017–2018) out of 137 global economies, according to the Global Competitiveness Index 2017–2018 [29]. Malaysia is ahead of countries such as the Republic of Korea (26), China (27), Thailand (32), and Indonesia (32), among 17 economies in East Asia and the Pacific (36). Malaysia's manufacturing sector contributed 23% to the country's gross domestic product (GDP) [30]. Despite its ignorance of Industry 4.0, Malaysia maintains a strong and competitive position relative to global competitors.

Recently, Malaysia's government launched Industry4RWD to assist local manufacturers, particularly SMEs, in adapting to the global trend of Industry 4.0. The Ministry of International Trade and Industry (MITI) leads this high-level task force, followed by the Ministry of Communications and Multimedia Malaysia (MCMM), which is responsible for digital infrastructure and ecosystem development, the Ministry of Finance (MOF), which is responsible for funding and incentives, the Ministry of Human Resource (MOHR) and the Ministry of Higher Education (MOHE), which are responsible for talent and human capital, and, finally, the Ministry of Energy, Science, Technology, and Environment. Industry4WRD promises a 30% increase in manufacturing productivity per person and a doubling of manufacturing industries' contribution to the Malaysian economy from MYR254 billion to MYR392 billion [31].

3.3 The Concept of the Fifth Industrial Revolution (Industry 5.0) and Why is It Required?

While Industry 5.0 is a relatively new concept, there is some early academic material detailing its key characteristics. Industry 5.0 literature review reveals much doubt regarding what it will deliver and how it will disrupt business in particular, as well as about its potential to dissolve borders between the real world and the virtual world [32].

According to the literature, it is believed that Industry 5.0 will be characterized by a rediscovered and expanded purposefulness that transcends the production of goods and services for profit. This broader objective is composed of three critical components: human-centricity, sustainability, and resilience [32].

A profit-driven strategy has grown increasingly unsustainable. In a globalized society, a narrow focus on profit obscures the true costs and benefits of environmental and societal activities. To transform the industry into a meaningful source of prosperity, its true mission must incorporate social, environmental, and societal concerns. This includes responsible innovation that is not solely or predominantly focused on cost-cutting or profit maximization, but also on maximizing prosperity for all stakeholders: investors, workers, customers, society, and the environment [32].

Thus, Industry 5.0 will enhance collaboration between humans and intelligent digital systems such as robots, particularly in the manufacturing industry's supply chain processes. In this regard, machine-based work is viewed as monotonous, whereas humans use their creative side to assume increased responsibility and supervision of systems in order to improve overall product quality. Ostergaard (2018) stated that the products that bear the distinctive mark of human care and craftsmanship are those that customers will pay the most for, such as designer items of all types, fine watches, craft beers, and Icelandic black salt hand-dyed with local coal. This demand for the human touch will continue to grow in the future, as consumers seek to express their uniqueness through the products they purchase. This demonstrates a new level of personalization, a sense of luxury society, with which business must contend [33].

Additionally, the European Economic and Social Committee (EESC) defines Industry 5.0 as a process that combines the creativity and craftsmanship of humans with the speed, productivity, and consistency of robots [34]. Another vision describes Industry 5.0 as being faster, more scalable, and more people-centric than Industry 4.0, based on the technology at their disposal [35]. This will drive future business toward more advanced human-machine interfaces through improved integration, automation, and creativity of robots [36], all of which will increase productivity.

4 Research Question and Objective

According to Zikmund (2013, 2000, p.56), "the research process begins with problem discovery, and identifying the problem is the first step toward its solution" [37]. The research problem, which drives the research enterprise could be empirical or capable of being solved by the research [38]. The selection of a research problem depends on several factors, it's the duty of a researcher to ensure that the problem at hand is defined precisely and presented in the form of a question for investigation [39].

Research issues "grow out of the discussions" as gaps in the body of knowledge are discovered [40]. Research issues serve to give direction to the research, point to the data that is required, and set the boundaries for the research. They also assist with the development of the hypothesis for testing by the research [41]. Based on the research problem, the tentative **research question is**:

1. How to combine humans, technology, and organization to ensure human well-being and system performance in industrial work systems in the transition to industry 5.0?

The research objectives explain the purpose of the research and define what the research tries to achieve [37]. Based on the research problem and the research question, the goals and objectives of this research are to develop a comprehensive framework to assist in ensuring human well-being and system performance in the design of work systems in transition to Industry 5.0.

5 Methodology

According to Machi & McEvoy (2016), there are two categories of literature reviews: simple and sophisticated. A simple literature review entails the critical examination of pertinent literature on a particular study topic and the presentation of a logical case based on the current understanding of the subject. A complicated literature review, on the other hand, seeks to expand on the work of a simple review by identifying and stating outstanding concerns and exposing research challenges that require additional study. This paper utilized both simple and complex literature reviews to get a comprehension of the study topic's current state and evolution, as well as related disciplines and concepts. Based on the review of literature, the following conceptual framework is proposed (Fig. 1) [42].

Understanding and analyzing Industry 5.0 from a humanizing perspective and addressing the "how" question is the primary goals of this research. As a result, qualitative research methods are the best option for gathering and analyzing empirical data.

5.1 Underlying Theory

Theory testing and theory construction are inextricably linked in the process of disciplinary knowledge generation [43]. It is vital to strike a delicate balance between theory development, which allows for the introduction of novel concepts, and theory testing, which may overlook critical features of a new event by applying the lenses of established paradigms [44]. The establishment of a "stable conceptual foundation" [45] can aid in the clarification of SSC's scope and aims as an academic and practice-based discipline.

Several scholars [43] [46] [47]have recognized a link between a theory's validity and power and its relationship to empirical reality. It is commonly acknowledged that the empirical feeds the conceptual, as data are utilized to substantiate a theory, and that involvement with real problems creates opportunities for excellent theory to arise [47].

According to the analysis of the literature through SLR, organizational sustainability comprehends three dimensions: environmental, society, and economic performance. These three components are depicted visually in Fig. 1. This perspective aligns with the

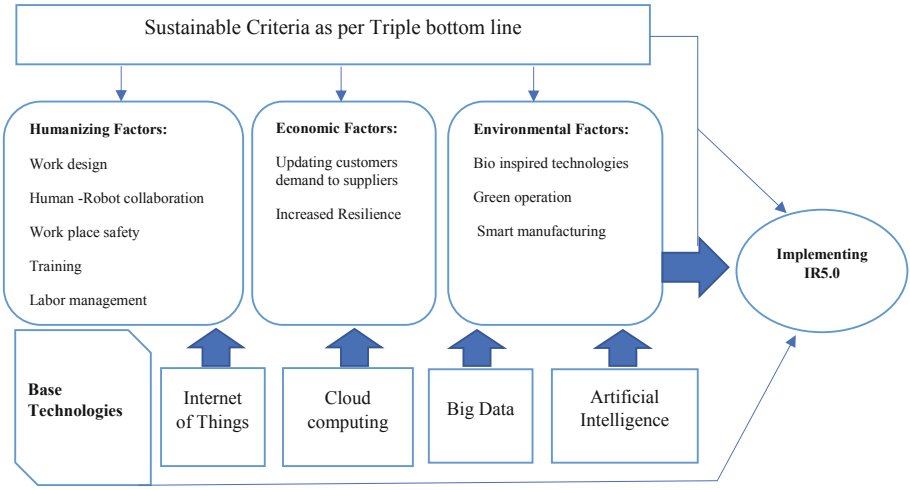

Fig. 1. Conceptual Framework

concept of the triple bottom line, which was created by Elkington (1998, 2004), who evaluates and balances economic, social, and political factors simultaneously from a microeconomic perspective, environmental and social aims [48].

Acknowledgments. None of the past studies have added humanizing factors in Industry revolution 4.0 in Malaysian manufacturing sectors in terms of supply chain management. There is no proper empirical data and theoretical framework in the context of the industry 5.0 phenomenon in supply chains.

Authors' Contribution. This research would like to identify a research gap in the intersections between Industry 4.0 and Industry 5.0 in regards to supply chain management through SLR to recommend how manufacturing companies should approach the introduction of new digital technologies with the human touch. Theoretically, this research is expected to recommend a framework to the current literature and the body of knowledge with humanizing factors.

References

1. Department of Statistics Malaysia (2022). Malaysia economic performance first quarter 2022. Available: https://www.dosm.gov.my/v1/index.php?r=column/cthemeByCat&cat=82&bul_id=eEwwR1RBcHJQVGIvbS81a3o4VEZBQT09&menu_id=YmJrMEFKT0p0WUIxbDl1bzZydW9JQT09
2. MIDA and IHS Markit Malaysia Manufacturing Purchasing Managers' Index (2020). Available: https://www.mida.gov.my/mida-news/malaysia-manufacturing-pmi-hits-4-month-high-in-dec-2020/
3. M. Gligor David, C. Holcomb Mary. Understanding the role of logistics capabilities in achieving supply chain agility: a systematic literature review Supp Chain Mnagmnt, 17 (4) (Jun 2012), pp. 438-453. Available: https://doi.org/10.1108/13598541211246594/full/html

4. A. Schumacher, S. Erol dan W. Sihn, "A Maturity Model for Assessing Industry 4.0 Readiness and Maturity of Manufacturing Enterprises," ScienceDirect, vol. 52, pp. 161-166, 28 April 2016. Available: https://www.sciencedirect.com/science/article/pii/S2212827116307909.
5. Y. Lu, "Industry 4.0: A survey on technologies, applications and open research issues," sciencedirect, vol. 6, pp. 1-10, June 2017. DOI: https://doi.org/10.1016/j.jii.2017.04.005
6. Alzoubi, I, Almaliki, S, Mirzaei, F, (2019). Prediction of environmental indicators in land leveling using artificial intelligence techniques. Available: https://doi.org/10.1186/s40538-019-0142-7
7. Demir, K.A.; Döven, G.; Sezen, B. Industry 5.0 and human-robot co-working. Procedia Comput. Sci. **2019**, 158, 688–695. DOI: https://doi.org/10.1016/j.procs.2019.09.104
8. Doyle-Kent, M.; Kopacek, P. (2020) Industry 5.0: Is the Manufacturing Industry on the Cusp of a New Revolution. In Lecture Notes in Mechanical Engineering, Proceedings of the International Symposium for Production Research 2019; ISPR 2019; Durakbasa, N., Gençyılmaz, M., Eds.; Springer: Cham, Switzerland. Available: https://doi.org/10.1007/978-3-030-31343-2_38
9. Merriam-Webster. (2020). *Definition of Industrial Revolution.* Merriam- Webster.Com. Available: https://www.merriam-webster.com/dictionary/industrialrevolution
10. Liao, Y., Deschamps, F., Loures, E. de F. R., & Ramos, L. F. P. (2017). Past, present and future of Industry 4.0 - a systematic literature review and research agenda proposal. *International Journal of Production Research*, *55*(12), 3609–3629. DOI: https://doi.org/10.1080/00207543.2017.1308576
11. Hermann, M., Pentek, T., & Otto, B. (2016). Design principles for industrie 4.0 scenarios. *Proceedings of the Annual Hawaii International Conference on System Sciences*, *2016- March*, 3928–3937. DOI: https://doi.org/10.1109/HICSS.2016.488
12. DRATH, R., & HORCH, A. (2014). Industrie 4.0: Hit or hype? *IEEE industrial electronics magazine*, *8*(2), 56-58. DOI: https://doi.org/10.1109/MIE.2014.2312079
13. BARRETO, L., AMARAL, A., & PEREIRA, T. (2017). Industry 4.0 implications in logistics: an overview. Procedia Manufacturing, 13, 1245-1252. DOI: https://doi.org/10.1016/j.promfg.2017.09.045
14. VAIDYA, S., AMBAD, P., & BHOSLE, S. (2018). Industry 4.0–a glimpse. Procedia Manufacturing, 20, 233-238. DOI: https://doi.org/10.1016/j.promfg.2018.02.034
15. COLOMBO, A. W., KARNOUSKOS, S., KAYNAK, O., SHI, Y., & YIN, S. (2017). Industrial cyber physical systems: A backbone of the fourth industrial revolution. *IEEE Industrial Electronics Magazine*, 11(1), 6-16. DOI: https://doi.org/10.1109/MIE.2017.2648857
16. Mohelska, H., Sokolova,M.(2018). MANAGEMENT APPROACHES FOR INDUSTRY 4.0 – THE ORGANIZATIONAL CULTURE PERSPECTIVE, Technological and Economic Development of Economy, VGTU Press. DOI: https://doi.org/10.3846/tede.2018.6397
17. Manufacturing Blog Archives. Global Electronic Services. (n.d.). Available: https://gesrepair.com/category/manufacturing-blog/
18. Oesterreich, T.D. and Teuteberg, F. (2016), "Understanding the implications of digitisation and automation in the context of Industry 4.0: a triangulation approach and elements of a research agenda for the construction industry", Computers in Industry, Vol. 83, pp. 121-139. DOI: https://doi.org/10.1016/j.compind.2016.09.006
19. Sreedharan, V.R. and Unnikrishnan, A. (2017), "Moving towards industry 4.0: a systematic review", International Journal of Pure and Applied Mathematics, Vol. 117 No. 20, pp. 929-936. DOI: https://doi.org/10.1108/BIJ-09-2018-0281
20. Castelo-Branco, I., Cruz-Jesus, F., Oliveira, T., 2019. Assessing industry 4.0 readiness in manufacturing: evidence for the European union. Compute. Ind. 107, 22–32. DOI: https://doi.org/10.1016/j.compind.2019.01.007
21. BCG, 2019. Nine technologies transforming industrial production. Boston Consulting Group. Available: https://www.bcg.com/press/12march2020-bcg-revenues-reach-85-billion

22. Romero et al. (2016). The Operator 4.0 - Towards Socially Sustainable Factories of the Future. Available: https://www.researchgate.net/project/The-Operator-40-Towards-Socially-Sustainable-Factories-of-the-Future
23. Pacaux-Lemoine et al. (2017). Designing Intelligent Manufacturing Systems through Human-Machine Cooperation Principles: A Human-Centered Approach. DOI: https://doi.org/10.1016/j.cie.2017.05.014
24. Richter et al. (2018). Dataset for "Trade- offs with Longer Lifetimes? The case of LED lamps considering product development and energy contexts". DOI: https://doi.org/10.1016/j.jclepro.2019.03.331
25. Robla-Gomez et al. (2017). Working Together: A Review on Safe Human-Robot Collaboration in Industrial Environments. DOI: https://doi.org/10.1109/ACCESS.2017.2773127
26. Stadnicka; Litwin; Antonelli (2019). Human factor in intelligent manufacturing systems - knowledge acquisition and motivation. DOI: https://doi.org/10.1016/j.procir.2019.02.023
27. United Nation Industrial Development Organization (2021). Available: https://www.un.org/press/en/2021/sgsm2109.doc.htm
28. GE Reports (2016). GE global innovation barometer 2016. Available: https://www.ge.com/jp/sites/www.ge.com.jp/files/2016-GEIB-Full-Findings_FINAL.pdf
29. Schwab, K. (2017). The Global Competitiveness Report 2017–2018 Available: https://www.scirp.org/%28S%28351jmbntvnsjt1aadkposzje%29%29/reference/referencespapers.aspx?referenceid=2097936
30. Department of Statistics Malaysia (2018). Malaysia economic performance third quarter 2018. Available: https://www.dosm.gov.my/v1/index.php?r=column/cthemeByCat&cat=100&bul_id=NUtDV2RPTktsZXRjMlcxWXpHS0RYZz09&menu_id=TE5CRUZCblh4ZTZMODZIbmk2aWRRQT09
31. Manokaran, M. (2019). IR4.0: On the brink of technological revolution. Star Online. Available: https://www.thestar.com.my/business/business-news/2019/05/25/ir40-on-the-brink-of-technological-revolution
32. Maija Breque, (2021). European Commission, Available: https://ec.europa.eu/info/publications/industry-50_en
33. Ostergaard, E.H. (2018). Welcome to Industry 5.0, Available: https://info.universal-robots.com/hubfs/Enablers/White%20papers/Welcome%20to%20Industry%205.0_Esben%20%C3%98stergaard.pdf?submissionGuid=00c4d11f-80f2-4683-a12a-e821221793e3
34. EESC (2018). Industry 5.0. Available: https://www.eesc.europa.eu/en
35. Rundle, E. (2017). The 5th Industrial Revolution, When It Will Happen and How, Available: https://devops.com/5th-industrial-revolution-will-happen/
36. "What is industry 5.0 - and how will it affect manufacturers?," 22 January 2019. [Online] Available: https://gesrepair.com/industry-5-0-will-affect-manufacturers/
37. Zikmund, W. G., Babin, B. J., Carr, J. C., & Griffin, M. (2013). Business Research Methods (9th ed.). USA: Cengage Learning. Available: https://www.amazon.com/Business-Research-Methods-Learning-Hardcover/dp/B00DU8D3KS
38. Caulley, D. N. (1992). Writing a critical review of the literature. Bundoora: La Trobe University. Available: https://www.dlsweb.rmit.edu.au/bus/pr472/img/omgt1135gifs/Reviewing_the%20_Literature.pdf
39. Cooper, D.R. and Schindler, P.S. 2003, Business Research Methods. Available: https://cmc.marmot.org/Record/.b31073761
40. Perry, C. (2001). A Structured Approach to Presenting Theses: Notes for Students and Their Supervisors. Australia: Southern Cross University. DOI: https://doi.org/10.4135/9781849209625
41. Punch, K.F., 1988, An introduction to Qualitative Research. Available: https://www.scirp.org/(S(351jmbntvnsjt1aadkposzje))/reference/ReferencesPapers.aspx?ReferenceID=1631096

42. Machi, L. and McEvoy, B., 2016. The literature review: Six Steps to Success. Corwin Press, p.192. Available: https://books.google.com.my/books/about/The_Literature_Review.html?id=d3uzDAAAQBAJ&redir_esc=y
43. Colquitt and Zapata-Phelan, (2007). Trends in Theory Building and Theory Testing: A Five Decade Study of the Academy of Management journal. DOI: https://doi.org/10.5465/AMJ.2007.28165855
44. Sachsenmeier, P. (2016). Industry 5.0 – The Relevance and Implications of Bionics and synthetic Biology, Elsevier Engineering 2. DOI: https://doi.org/10.1016/J.ENG.2016.02.015
45. Chen and Paulraj, 2004, (p. 120). Supply chain management: Developments, theories and models. DOI: https://doi.org/10.1016/j.jom.2003.12.007
46. ALVESSON, M. & KÄRREMAN, D. A. N. 2007. Constructing mystery: Empirical matters in theory development. Academy of Management Review, 32, 1265-1281. DOI: https://doi.org/10.2307/20159366
47. VAN MAANEN, J., SORENSEN, J. B. & MITCHELL, T. R. 2007. The interplay between theory and method. Academy of Management Review, 32, 1145-1154. DOI: https://doi.org/10.5465/amr.2007.26586080
48. Elkington, J., 1998. Partnerships from cannibals with forks: the triple bottom line of 21st-century business. Environ. Qual. Manag. 6, 37–51. DOI: https://doi.org/10.1002/tqem.3310080106