

Industry 4.0 and Marketing 4.0: The Fourth Industrial Revolution

Prof. Namita Parab and Rai Deepshikha Manoj

Jai Bharat College of Commerce (Night), Mumbai, Maharashtra, India

Abstract: *The Fourth Industrial Revolution, often known as Industry 4.0, is being propelled by cutting-edge technologies that have a significant impact on both business models and production processes. Disruptive technology and practises have been added during this revolution. These elements of Industry 4.0 have a big impact on marketing and have prompted an evolution to make sure that promotional efforts match up with technical developments and cater to current consumer expectations. This paper's goal is to identify and discuss potential directions for future marketing research in light of the changes brought on by Industry 4.0. The method used in the article is a survey of the pertinent literature with a special emphasis on the main ideas that will be of the utmost significance for future research on Industry 4.0 and marketing. As a result, the most significant peer-reviewed journal database in the academic world, SCOPUS, was used as the foundation for a systematic bibliometric literature evaluation. The study concludes that while there are many potential topics of examination for marketing researchers, the five marketing principles of Industry 4.0—cooperation, communication, co-creation, cognitivity, and connectivity—are the most crucial ones. The quantitative analysis of these five concepts should be the main focus of future research.*

Keywords: Industry 4.0, connectivity, marketing, and technology

REFERENCES

- [1]. Guven, H. Industry 4.0 and Marketing 4.0: In Perspective of Digitalization and E-Commerce. In *Agile Business Leadership Methods for Industry 4.0*; Emerald Publishing Limited: West Yorkshire, UK, 2020; pp. 25–46. [Google Scholar] [CrossRef]
- [2]. Bettiol, M.; Capestro, M.; Di Maria, E. Industry 4.0: The strategic role of marketing. In Proceedings of the XIV Convegno Annuale SIM, Bergamo, Italy, 26 October 2017; pp. 26–27. [Google Scholar]
- [3]. Sterev, N. Marketing leadership: The industry 4.0 need of next generation marketing. *Trakia J. Sci.* 2017, 15, 99–103. [Google Scholar] [CrossRef]
- [4]. Mehdiabadi, A.; Tabatabeinasab, M.; Spulbar, C.; Yazdi, A.K.; Birau, R. Are We Ready for the Challenge of Banks 4.0? Designing a Roadmap for Banking Systems in Industry 4.0. *Int. J. Financ. Stud.* 2020, 8, 32. [Google Scholar] [CrossRef]
- [5]. Ungerman, O.; Dedkova, J.; Gurinova, K. The impact of marketing innovation on the competitiveness of enterprises in the context of industry 4.0. *J. Compet.* 2018, 10, 132–148. [Google Scholar] [CrossRef]
- [6]. Princes, E.; Manurung, A.H.; So, I.G.; Abdinagoro, S.B. A closer look at the consumer conformity in industry 4.0: Purchase intention redefined. *Pol. J. Manag. Stud.* 2020, 22, 401–417. [Google Scholar] [CrossRef]
- [7]. Nosalska, K.; Mazurek, G. Marketing principles for Industry 4.0—A conceptual framework. *Eng. Manag. Prod. Serv.* 2019, 11, 9–20. [Google Scholar] [CrossRef][Green Version]
- [8]. Ungerman, O.; Dědková, J. Marketing innovations in Industry 4.0 and their impacts on current enterprises. *Appl. Sci.* 2019, 9, 3685. [Google Scholar] [CrossRef][Green Version]
- [9]. Ryan, W.G.; Fenton, A.; Ahmed, W.; Scarf, P. Recognizing events 4.0: The digital maturity of events. *Int. J. Event Festiv. Manag.* 2020, 11, 47–68. [Google Scholar] [CrossRef]
- [10]. Ardito, L.; Petruzzelli, A.M.; Panniello, U.; Garavelli, A.C. Towards industry 4.0: Mapping digital technologies for supply chain management-marketing integration. *Bus. Process Manag. J.* 2019, 25, 323–346. [Google Scholar] [CrossRef]

- [11]. Arromba, I.F.; Martin, P.S.; Ordoñez, R.C.; Anholon, R.; Rampasso, I.S.; Santa-Eulalia, L.A.; Martins, V.W.B.; Quelhas, O.L.G. Industry 4.0 in the product development process: Benefits, difficulties and its impact in marketing strategies and operations. *J. Bus. Ind. Mark.* 2021, *36*, 522–534. [Google Scholar] [CrossRef]
- [12]. Omar, Y.M.; Minoufekar, M.; Plapper, P. Business analytics in manufacturing: Current trends, challenges and pathway to market leadership. *Oper. Res. Perspect.* 2019, *6*, 100127. [Google Scholar] [CrossRef]
- [13]. Pant, Y. Application of cloud computing in businesses. In *Innovations and Challenges in Human Resource Management for HR4.0*; Nova Science Publishers: New York, NY, USA, 2020; pp. 159–189. [Google Scholar]
- [14]. Chen, C. Cross-disciplinary innovations by Taiwanese manufacturing SMEs in the context of industry 4.0. *J. Manuf. Technol. Manag.* 2020, *31*, 1145–1168. [Google Scholar] [CrossRef]
- [15]. Buestán, G.; Cañizares, K.; Camacho, C.; Suárez-Núñez, C. Distribution trends in industry 4.0: Case study of a major soft drink multinational enterprise in Latin America. [Verteilungstendenzen in industrie 4.0: Fallstudie eines multinationalen Großunternehmens für erfrischungsgetränke in Lateinamerika]. *Logist. J.* 2020, *2020*. [Google Scholar] [CrossRef]
- [16]. Paiola, M.; Schiavone, F.; Khvatova, T.; Grandinetti, R. Prior knowledge, industry 4.0 and digital servitization. an inductive framework. *Technol. Forecast. Soc. Change* 2021, *171*, 120963. [Google Scholar] [CrossRef]
- [17]. Rahim, S.A.; Fernando, M. Digitalization and leap frogging strategy among the supply chain member: Facing GIG economy and why should logistics players care? *Int. J. Supply Chain. Manag.* 2019, *8*, 1042–1048. [Google Scholar]
- [18]. Kotler, P.; Keller, K.L. *A Framework for Marketing Management*, 6th ed.; Pearson: London, UK, 2016. [Google Scholar]
- [19]. Rajagopal; Behl, R. *Innovation, Technology, and Market Ecosystems: Managing Industrial Growth in Emerging Markets*; Springer International Publishing: Berlin/Heidelberg, Germany, 2019. [Google Scholar] [CrossRef]
- [20]. Bala, M.; Verma, D. A critical review of digital marketing. M. Bala, D. Verma (2018). A Critical Review of Digital Marketing. *Int. J. Manag. IT Eng.* 2018, *8*, 321–339. [Google Scholar]
- [21]. Ganji, E.N.; Shah, S.; Coutroubis, A.; Gestring, I. Towards a sustainable demand chain framework: Successful product development integration and drivers. In Proceedings of the 2018 IEEE International Conference on Technology Management, Operations and Decisions, ICTMOD, Marrakech, Morocco, 21–23 November 2018; pp. 166–171. [Google Scholar] [CrossRef]
- [22]. Gornostaeva, Z.V.; Lazareva, N.V.; Bugaeva, M.V.; Gribova, O.V.; Zibrova, N.M. Directions and tools of industry marketization in contemporary Russia. *Qual.-Access Success* 2018, *19*, 33–37. [Google Scholar]
- [23]. Xiao, Y.; Watson, M. Guidance on conducting a systematic literature review. *J. Plan. Educ. Res.* 2019, *39*, 93–112. [Google Scholar] [CrossRef]
- [24]. Rosário, A.; Moniz, L.; Cruz, R. Data Science Applied to Marketing: A Literature Review. *J. Inf. Sci. Eng.* 2021, *37*, 1067–1081. [Google Scholar] [CrossRef]
- [25]. Raimundo, R.; Rosário, A. Blockchain System in the Higher Education. *Eur. J. Investig. Health Psychol. Educ.* 2021, *11*, 21. [Google Scholar] [CrossRef]
- [26]. Thomé, A.M.T.; Scavarda, L.F.; Scavarda, A.J. Conducting systematic literature review in operations management. *Prod. Plan. Control.* 2016, *27*, 408–420. [Google Scholar] [CrossRef]
- [27]. Kraus, S.; Breier, M.; Dasi-Rodríguez, S. The art of crafting a systematic literature review in entrepreneurship research. *Int. Entrep. Manag. J.* 2020, *16*, 1023–1042. [Google Scholar] [CrossRef] [Green Version]
- [28]. Raimundo, R.; Rosário, A. The Impact of Artificial Intelligence on Data System Security: A Literature Review. *Sensors* 2021, *21*, 7029. [Google Scholar] [CrossRef] [PubMed]
- [29]. Rosário, A.; Raimundo, R. Consumer Marketing Strategy and E-Commerce in the Last Decade: A Literature Review. *J. Theor. Appl. Electron. Commer. Res.* 2021, *16*, 164. [Google Scholar] [CrossRef]

- [30]. Raimundo, R.J.; Rosário, A.T. Cybersecurity in the Internet of Things in Industrial Management. *Appl. Sci.* 2022, 12, 1598. [Google Scholar] [CrossRef]
- [31]. Nica, E. Cyber-physical production networks and advanced digitalization in industry 4.0 manufacturing systems: Sustainable supply chain management, organizational resilience, and data-driven innovation. *J. Self-Gov. Manag. Econ.* 2019, 7, 27–33. [Google Scholar] [CrossRef]
- [32]. Corallo, A.; Latino, M.E.; Menegoli, M. Agriculture 4.0: How use traceability data to tell food product to the consumers. In Proceedings of the ICITM 2020—2020 9th International Conference on Industrial Technology and Management, Oxford, UK, 11–13 February 2020; pp. 197–201. [Google Scholar] [CrossRef]
- [33]. Jančíková, K.; Milichovský, F. Hr marketing as a supporting tool of new managerial staff in industry 4.0. *Adm. Sci.* 2019, 9, 60. [Google Scholar] [CrossRef][Green Version]
- [34]. Bigliardi, B.; Bottani, E.; Casella, G. Enabling technologies, application areas and impact of industry 4.0: A bibliographic analysis. *Procedia Manuf.* 2020, 42, 322–326. [Google Scholar] [CrossRef]
- [35]. Jemala, M. Long-term research on technology innovation in the form of new technology patents. *Int. J. Innov. Stud.* 2021, 5, 148–160. [Google Scholar] [CrossRef]
- [36]. Aydinocak, E.U. Internet of things (IoT) in marketing logistics. In *Logistics 4.0 and Future of Supply Chains*; Springer: Singapore, 2022; pp. 153–169. [Google Scholar] [CrossRef]
- [37]. Kamp, B. Expanding international business via smart services: Insights from ‘hidden champions’ in the machine tool industry. In *International Business in the Information and Digital Age*; Emerald Publishing Limited: West Yorkshire, UK, 2018. [Google Scholar] [CrossRef]
- [38]. Ahlemeyer-Stubbe, A.; Müller, A. How to leverage internet of things data to generate benefits for sales and marketing. *Appl. Mark. Anal.* 2020, 5, 233–242. [Google Scholar]
- [39]. Jonny, K.; Toshio, M. Modeling IoT and big data implementation. In Proceedings of the 2021 International Conference on Information Management and Technology, ICIMTech, Jakarta, Indonesia, 19–20 August 2021; Volume 2021, pp. 645–650. [Google Scholar] [CrossRef]
- [40]. Jonny, K.; Toshio, M. Building an implementation model of IoT and big data and its improvement. *Int. J. Technol.* 2021, 12, 1000–1008. [Google Scholar] [CrossRef]
- [41]. Lee, C.; Chen, C.; Lee, Y.; Xu, G.; Li, F.; Zhao, X. Accelerating retail-innovation design for smart services via foresight approach and case-based design. *Adv. Transdiscipl. Eng.* 2017, 5, 813–820. [Google Scholar] [CrossRef]
- [42]. Alakaş, H.M.; Eren, T. *Integrated Systems and Utilization in Logistics*; Springer: Berlin/Heidelberg, Germany, 2022. [Google Scholar] [CrossRef]
- [43]. Cagle, M.N.; Yilmaz, K.; Dođru, H. Digitalization of business functions under industry 4.0. In *Digital Business Strategies in Blockchain Ecosystems*; Springer: Cham, Switzerland, 2020; pp. 105–132. [Google Scholar] [CrossRef]
- [44]. Lobova, S.V.; Alekseev, A.N.; Litvinova, T.N.; Sadovnikova, N.A. Labor division and advantages and limits of participation in creation of intangible assets in industry 4.0: Humans versus machines. *J. Intellect. Cap.* 2020, 21, 623–638. [Google Scholar] [CrossRef]
- [45]. Attaran, M.; Attaran, S. Digital transformation and economic contributions of 5G networks. *Int. J. Enterp. Inf. Syst.* 2020, 16, 58–79. [Google Scholar] [CrossRef]
- [46]. Lu, C.; Chang, F.; Rong, K.; Shi, Y.; Yu, X. Deprecated in policy, abundant in market? the frugal innovation of chinese low-speed EV industry. *Int. J. Prod. Econ.* 2020, 225, 107583. [Google Scholar] [CrossRef]
- [47]. Gupta, S.; Justy, T.; Kamboj, S.; Kumar, A.; Kristoffersen, E. Big data and firm marketing performance: Findings from knowledge-based view. *Technol. Forecast. Soc. Chang.* 2021, 171, 120986. [Google Scholar] [CrossRef]
- [48]. Matthyssens, P. Reconceptualizing value innovation for industry 4.0 and the industrial internet of things. *J. Bus. Ind. Mark.* 2019, 34, 1203–1209. [Google Scholar] [CrossRef]
- [49]. Fan, S.; Lau, R.Y.; Zhao, J.L. Demystifying big data analytics for business intelligence through the lens of marketing mix. *Big Data Res.* 2015, 2, 28–32. [Google Scholar] [CrossRef]

- [50]. Erevelles, S.; Fukawa, N.; Swayne, L. Big Data consumer analytics and the transformation of marketing. *J. Bus. Res.* 2016, *69*, 897–904. [Google Scholar] [CrossRef]
- [51]. Moors, J.; Rogiest, S. Implementing big data analytics in a manufacturing environment: A theoretical framework. In Proceedings of the 14th European Conference on Management, Leadership and Governance, ECMLG 2018, Utrecht, The Netherlands, 18–19 October 2018; pp. 180–187. [Google Scholar]
- [52]. Ramadhani, H.A.D.; Erwin Widodo, S.T. A data analytics model of banking performance and economic condition: East java region case. In Proceedings of the International Conference on Industrial Engineering and Operations Management, Bangkok, Thailand, 5–7 March 2019; pp. 2532–2541. [Google Scholar]
- [53]. Ruiz-Real, J.L.; Uribe-Toril, J.; Torres, J.A.; Pablo, J.D.E. Artificial intelligence in business and economics research: Trends and future. *J. Bus. Econ. Manag.* 2021, *22*, 98–117. [Google Scholar] [CrossRef]
- [54]. Vlačić, B.; Corbo, L.; Silva, S.C.; Dabić, M. The evolving role of artificial intelligence in marketing: A review and research agenda. *J. Bus. Res.* 2021, *128*, 187–203. [Google Scholar] [CrossRef]
- [55]. Lee, J.J. Development of craft copyright industry using blockchain technology. In Proceedings of the 2021 21st ACIS International Semi-Virtual Winter Conference on Software Engineering, Artificial Intelligence, Networking and Parallel/Distributed Computing, SNP-D-Winter, Ho Chi Minh City, Vietnam, 28–30 January 2021; pp. 263–264. [Google Scholar] [CrossRef]
- [56]. Popkova, E.G.; Sergi, B.S. Human capital and AI in industry 4.0. convergence and divergence in social entrepreneurship in Russia. *J. Intellect. Cap.* 2020, *21*, 565–581. [Google Scholar] [CrossRef]
- [57]. Khan, M.A.; Wuest, T. Mapping of PSS research: A bibliometric analysis. In Proceedings of the International Conference on Industrial Engineering and Operations Management, Bandung, Indonesia, 6–8 March 2018; pp. 398–406. [Google Scholar]
- [58]. Baryshnikova, N.; Kiriliuk, O.; Klimecka-Tatar, D. Enterprises' strategies transformation in the real sector of the economy in the context of the COVID-19 pandemic. *Prod. Eng. Arch.* 2021, *27*, 8–15. [Google Scholar] [CrossRef]
- [59]. Menon, S.; Shah, S. Are SMEs ready for industry 4.0 technologies: An exploratory study of i 4.0 technological impacts. In Proceedings of the International Conference on Computation, Automation and Knowledge Management, ICCAKM, Dubai, United Arab Emirates, 9–10 January 2020; pp. 203–208. [Google Scholar] [CrossRef]
- [60]. Bilbao-Ubillos, J.; Camino-Beldarrain, V.; Intxaurburu, G. A technology-based explanation of industrial output processes: The automotive, machine-tool and “other transport material” industries. *J. Knowl. Manag.* 2020, *25*, 1640–1661. [Google Scholar] [CrossRef]
- [61]. Boccia, F.; Covino, D.; Di Pietro, B. Industry 4.0: Food supply chain, sustainability and servitization. *Riv. Studi Sulla Sostenibilita* 2019, *9*, 77–92. [Google Scholar] [CrossRef]
- [62]. Caliskan, A.; ÖzkanÖzen, Y.D.; Ozturkoglu, Y. Digital transformation of traditional marketing business model in new industry era. *J. Enterp. Inf. Manag.* 2020, *34*, 1252–1273. [Google Scholar] [CrossRef]
- [63]. Fremont, V.H.J.; Frick, J.E.; Åge, L.; Osarenkhoe, A. Interaction through boundary objects: Controversy and friction within digitalization. *Mark. Intell. Plan.* 2019, *37*, 111–124. [Google Scholar] [CrossRef]
- [64]. Navakitkanok, P.; Aramvith, S.; Chandrachai, A. Innovative entrepreneurship model for agricultural processing SMEs in Thailand's digital and industries 4.0 era. *Acad. Entrep. J.* 2020, *26*, 1–15. [Google Scholar]
- [65]. Carvalho, A.; Charrua-Santos, F.; Lima, T.M. Augmented reality in industrial applications: Technologies and challenges. In Proceedings of the International Conference on Industrial Engineering and Operations Management, Bangkok, Thailand, 5–7 March 2019; pp. 875–883. [Google Scholar]
- [66]. Cobelli, N.; Wilkinson, G. Online wine purchasing: A comparison between South Africa and Italy. *TQM J.* 2020, *32*, 837–847. [Google Scholar] [CrossRef]
- [67]. Naglič, A.; Tominc, P.; Logožar, K. The impact of industry 4.0 on export market orientation, market diversification, and export performance. *Organizacija* 2020, *53*, 227–244. [Google Scholar] [CrossRef]
- [68]. Dalkiran, G.B. The effects of industry 4.0 components on the tourism sector. In *Logistics 4.0 and Future of Supply*; Springer: Singapore, 2022; pp. 235–250. [Google Scholar]