

DIGITAL TECHNOLOGY – THE 4TH INDUSTRIAL REVOLUTION & BEYOND

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Abstract— The growth of Digital technology has seen a significant growth in emerging as well as developed nations over the past two decades. This journal report examines the opportunities for India’s future digital growth in verticals like Retail, Finance, and Agriculture. This also covers the need of adoption of digital technology during the crisis and challenges faced by the consumers in digital era.

Keywords— Digital Technology, UPI, Fintech, Innovation, Aadhar, Digital Trends, Digital Economy

I. INTRODUCTION

India being one of the largest populated countries in the world ranks 2nd in the list of digital adopters standing behind China. The growth of Indian based technology companies and the Indian Prime Minister Mr. Modi’s “Make in India” has fueled the digitalization transformation of every sector in India. The introduction of Aadhar – a unique digital record for citizens of India to create a unique identification and use the digital records in every digital transactions like – Linking the Aadhar with PAN (Permanent Account Number). Bank Accounts, Land Registration, Agriculture, etc.

II. BACK GROUND

India being one of the largest populated countries in the world ranks 2nd in the list of digital adopters standing behind China. The growth of Indian based technology companies and the Indian Prime Minister Mr. Modi’s “Make in India” has fueled the digitalization transformation of every sector in India. The introduction of Aadhar – a unique digital record for citizens of India to create a unique identification and use the digital records in every digital transactions like – Linking the Aadhar with PAN (Permanent Account Number), Bank Accounts, Land Registration, Agriculture, etc.

India is among the top two countries globally on many key dimensions of digital adoption.



Fig. 1. India’s Digital Adoption Ranking

Analysis : In this paper we will analyze the future trends in the few verticals.

Agriculture: Agriculture being the backbone of the Indian economy where 40% of the workforce is in this sector. There is a need of digital adoption for farmers and workforce dependent on the agriculture. Agritech is the term used for the digital technology used in the agriculture is growing in a slow pace in India. The challenges faced by the adopters include lack of digital skills knowledge among majority of the people working in the agriculture sector. The availability of the internet services in rural and urban areas has improved significantly which led to rapid adoption of smartphones, but the use of smartphones was very much limited to only certain activities like making phone call, video streaming, video call services. The true adoption of digital technology will bring the farmers market to the consumers directly by using the various digital Channels. Digital innovations in Indian agriculture can help add \$50 billion to \$65 billion of economic value by 2025.

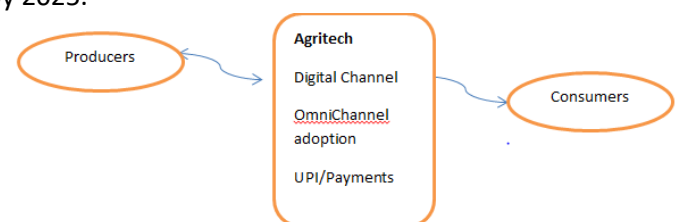


Fig. 2. Agriculture Digital Channels

- After that we select the ordered coefficient from 1 to N to get N coefficient. The formulae of watermark embedding are as follows. The use of digital channel to bring the gap between Consumers and the producers.
- The adopting to use the Omni channel for sales and customer engagement.
- The use of UPI or digital payments to increase the ease of transaction.

Retail

Indian FMCG is one the largest sectors in the world. Consumers demand and supply is increasing at exponential rate. The increase in standard of living, the presence of retail markets in non-metro and rural areas, increase in the use of online shopping etc. helped to the growth of FMCG sector in India. FMCG market was the one of the initial adopters of the digitalization in India. The raise of the internet and availability of the smartphones for economical price along with the data services helped the retail industry to grow in the ecommerce space.

The ecommerce in India which is US \$39 Billion in 2017 is expected to cross \$200 Billion by 2026, by growing rate more than 68 percent which is the highest in the world.

Reports from IBEF org suggests that number of internet connection in India as increased to 760 million in the wake of Digital India Programme. There are number of opportunities in this market especially when the retail companies having the required data to analyze the customers purchasing activities and tailoring the engagement programmes which helps in higher customer satisfaction and reduces the attrition by in turn will help the growth of the company's profitability.

Finance

The financial sector is the key player in the digital transformation in India. The introduction of ATM, online banking, SMS banking, App banking, UPI (Unified Payment Infra), mobile payments etc. has reduced the gap between users and the financial institution. The user's need of everyday banking was done without even visiting the bank. There is a gap between the products developed and customer service.

The Fintech plays a major role in reducing the gaps and by introducing more consumers centric approaches like open banking, Baas - banking as a service, PaaS - payment as a service, payment infrastructure, security etc.

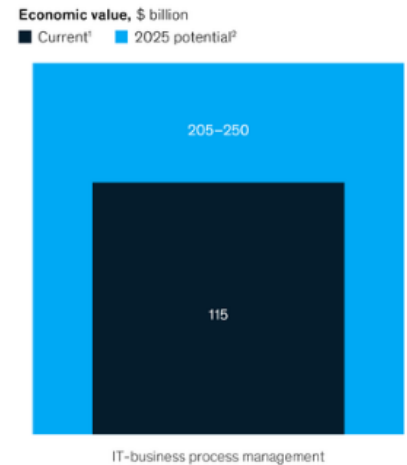


Fig5. Economic Value of Digital IT

III. CONCLUSION

The need of customer centric approaches should be adopted by all the verticals and Fintech's, Agritech or any technology companies providing services to the customer. The government should also provide the platform to the unbanked, unskilled people to encourage the use of digital technologies. As in coming years, the use of digital skills will be a surviving instinct. The failure in adoption will have adverse effects in the development of the country and the GDP.

This journal discussed about the role of Fintech, Agritech and Retail technologies in bridging the gap between the customers/consumer's and the producer's



IV. REFERENCE

- [1] Sachithra Lokuge, Theoretical Opportunities for Rural Innovation and Entrepreneurship Research, Rural Entrepreneurship and Innovation in the Digital Era, 10.4018/978-1-7998-4942-1.ch015, (270-287), (2021).
- [2] Sutirtha Chatterjee, Suranjan Chakraborty, H. Kevin Fulk, Suprateek Sarker, Building a compassionate



- workplace using information technology: Considerations for information systems research, *International Journal of Information Management*, 10.1016/j.ijinfomgt.2020.102261, 56, (1022-61), (2021).
- [3] Roman Zeiss, Anne Ixmeier, Jan Recker, Johann Kranz, Mobilising information systems scholarship for a circular economy: Review, synthesis, and directions for future research, *Information Systems Journal*, 10.1111/isj.12305, 31, 1, (148-183), (2020).
- [4] Sutirtha Chatterjee, Gregory Moody, Paul Benjamin Lowry, Suranjan Chakraborty, Andrew Hardin, The nonlinear influence of harmonious information technology affordance on organisational innovation, *Information Systems Journal*, 10.1111/isj.12311, 31, 2, (294-322), (2020).
- [5] Ricarda Bouncken, Roman Barwinski, Shared digital identity and rich knowledge ties in global 3D printing—A drizzle in the clouds?, *Global Strategy Journal*, 10.1002/gsj.1370, 11, 1, (81-108), (2020).
- [6] Sutirtha Chatterjee, Gregory Moody, Paul Benjamin Lowry, Suranjan Chakraborty, Andrew Hardin, Information Technology and organizational innovation: Harmonious information technology affordance and courage-based actualization, *The Journal of Strategic Information Systems*, 10.1016/j.jsis.2020.101596, (101596), (2020).
- [7] Bastian Kindermann, Sebastian Beutel, Gonzalo Garcia de Lomana, Steffen Strese, David Bendig, Malte Brettel, Digital Orientation: Conceptualization and Operationalization of a New Strategic Orientation, *European Management Journal*, 10.1016/j.emj.2020.10.009, (2020).
- [8] Stefanie Steinhauser, Claudia Dobliger, Stefan Hüsig, The Relative Role of Digital Complementary Assets and Regulation in Discontinuous Telemedicine Innovation in European Hospitals, *Journal of Information Management Systems*, 10.1080/07421222.2020.1831778, 37, 4, (1155-1183), (2020).
- [9] Florian Wiesböck, Thomas Hess, Jelena Spanjol, The Dual Role of IT Capabilities in the Development of Digital Products and Services, *Information & Management*, 10.1016/j.im.2020.103389, (103389), (2020).
- [10] Alan Hevner, Shirley Gregor, Envisioning entrepreneurship and digital innovation through a design science research lens: A matrix approach, *Information & Management*, 10.1016/j.im.2020.103350, (103350), (2020).
- [11] Mahari Hadistian, Lily Sudhiarto, Impact of Digital Capability to Strategic Change in SME's Retail Business in Indonesia, *SSRN Electronic Journal*, 10.2139/ssrn.3584235, (2020).
- [12] Galena Pisoni, Going digital: case study of an Italian insurance company, *Journal of Business Strategy*, 10.1108/JBS-11-2019-0225, ahead-of-print, ahead-of-print, (2020).
- [13] Qian Liu, Qianzhou Du, Yili Hong, Weiguo Fan, Shuang Wu, User idea implementation in open innovation communities: Evidence from a new product development crowdsourcing community, *Information Systems Journal*, 10.1111/isj.12286, 30, 5, (899-927), (2020).
- [14] Aya Rizk, Anna Ståhlbröst, Ahmed Elragal, Data-driven innovation processes within federated networks, *European Journal of Innovation Management*, 10.1108/EJIM-05-2020-0190, ahead-of-print, ahead-of-print, (2020).
- [15] Alona Natorina, ONLINE BUSINESS INTENTIONALITY: INNOVATION AND PROGRESSIVE DEVELOPMENT, PROBLEMS OF SYSTEMIC APPROACH IN THE ECONOMY, 10.32782/2520-2200/2020-4-15, 4(78), (2020).
- [16] Lena Hylving, Ulrike Schultze, Accomplishing the layered modular architecture in digital innovation: The case of the car's driver information module, *The Journal of Strategic Information Systems*, 10.1016/j.jsis.2020.101621, 29, 3, (101621), (2020).
- [17] Hai Guo, Chao Wang, Zhongfeng Su, Donghan Wang, Technology Push or Market Pull? Strategic Orientation in Business Model Design and Digital Start-up Performance*, *Journal of Product Innovation Management*, 10.1111/jpim.12526, 37, 4, (352-372), (2020).
- [18] João Reis, Marlene Amorim, Nuno Melão, Yuval Cohen, Mário Rodrigues, Digitalization: A Literature Review and Research Agenda, *Proceedings on 25th International Joint Conference on Industrial Engineering and Operations Management – IJCIEOM*, 10.1007/978-3-030-43616-2_47, (443-456), (2020).
- [19] Swen Nadkarni, Reinhard Prügl, Digital transformation: a review, synthesis and opportunities for future research, *Management Review Quarterly*, 10.1007/s11301-020-00185-7, (2020).
- [20] Mina Nasiri, Minna Saunila, Juhani Ukko, Tero Rantala, Hannu Rantanen, Shaping Digital Innovation Via Digital-related Capabilities, *Information Systems Frontiers*, 10.1007/s10796-020-10089-2, (2020).
- [21] STEFANIE STEINHAUSER, ENABLING THE UTILIZATION OF POTENTIALLY DISRUPTIVE DIGITAL INNOVATIONS BY INCUMBENTS: THE IMPACT OF CONTEXTUAL, ORGANISATIONAL, AND INDIVIDUAL FACTORS IN REGULATED CONTEXTS, *International Journal of Innovation*



- Management, 10.1142/S1363919621500158, (2150015), (2020).
- [22] Micha Bosler, Wolfgang Burr, Leonie Ihring, Digital Innovation in Incumbent Firms: An Exploratory Analysis of Value Creation, *International Journal of Innovation and Technology Management*, 10.1142/S0219877020400039, (2040003), (2020).
- [23] Yossi Maaravi, Ben Heller, Yael Shoham, Shay Mohar, Baruch Deutsch, Ideation in the digital age: literature review and integrative model for electronic brainstorming, *Review of Managerial Science*, 10.1007/s11846-020-00400-5, (2020).
- [24] André Hanelt, Sebastian Firik, Björn Hilebrandt, Lutz M. Kolbe, Digital M&A, digital innovation, and firm performance: an empirical investigation, *European Journal of Information Systems*, 10.1080/0960085X.2020.1747365, (1-24), (2020).
- [25] Carla Bonina, David López-Berzosa, Mariarosa Scarlata, Social, commercial, or both? An exploratory study of the identity orientation of digital social innovations, *Information Systems Journal*, 10.1111/isj.12290, 0, 0, (2020).
- [26] Maren Gierlich-Joas, Thomas Hess, Rahild Neuburger, More self-organization, more control—or even both? Inverse transparency as a digital leadership concept, *Business Research*, 10.1007/s40685-020-00130-0, (2020).
- [27] A Kurilova, D Antipov, Impact of digital innovation on company performance, *IOP Conference Series: Materials Science and Engineering*, 10.1088/1757-899X/986/1/012022, 986, (012022), (2020).
- [28] Rodrigo Martín-Rojas, Aurora Garrido-Moreno, Víctor J. García-Morales, Fostering Corporate Entrepreneurship with the use of social media tools, *Journal of Business Research*, 10.1016/j.jbusres.2019.11.072, (2019).
- [29] Evangelos Katsamakos, Aditya Saharia, Digital Innovation to Transform the Customer Experience, *International Journal of Strategic Information Technology Applications*, 10.4018/IJSITA.2019070103, 10, 3, (38-52), (2019).
- [30] Wei-Hung Hsiao, Tsung-Sheng Chang, Exploring the opportunity of digital voice assistants in the logistics and transportation industry, *Journal of Enterprise Information Management*, 10.1108/JEIM-12-2018-0271, 32, 6, (1034-1050), (2019).
- [31] João Barata, Paulo Rupino da Cunha, In Search for a Viable Smart Product Model, *Business Information Systems Workshops*, 10.1007/978-3-030-36691-9_9, (101-112), (2019).
- [32] Florian Wiesböck, Thomas Hess, Digital innovations, *Electronic Markets*, 10.1007/s12525-019-00364-9, (2019).
- [33] Ricarda B. Bouncken, Sascha Kraus, Norat Roig-Tierno, Knowledge- and innovation-based business models for future growth: digitalized business models and portfolio considerations, *Review of Managerial Science*, 10.1007/s11846-019-00366-z, (2019).
- [34] MARIO Schaarschmidt, MATTHIAS BERTRAM, DIGITAL BUSINESS INTENSITY AND CONSTRUCTIVE PROCESS DEVIANCE: A STUDY OF REACTIONS TO DIGITISATION-FOCUSED PROCESS INNOVATION, *International Journal of Innovation Management*, 10.1142/S1363919620500656, (2050065), (2019).
- [35] João Barata, Paulo Rupino da Cunha, The Viable Smart Product Model: Designing Products that Undergo Disruptive Transformations, *Cybernetics and Systems*, 10.1080/01969722.2019.1646021, (1-27), (2019).
- [36] Robert M. Davison, The art of vivacious variance, *Information Systems Journal*, 10.1111/isj.12224, 29, 1, (1-5), (2018).
- [37] Carla Bonina, Kari Koskinen, Ben Eaton, Annabelle Gawer, Digital platforms for development: Foundations and research agenda, *Information Systems Journal*, 10.1111/isj.12326, 0, 0,
- [38] John Qi Dong, Sebastian Johannes Götz, Project leaders as boundary spanners in open source software development: A resource dependence perspective, *Information Systems Journal*, 10.1111/isj.12313, 0, 0,
- [39] Higgins, S., Xiao, Z., & Katsipatakis, M. (2012). *The Impact of Digital Technology on Learning: A Summary for the Education Endowment Foundation*. Durham University. Retrieved October 22, 2017 from [https://educationendowmentfoundation.org.uk/public/files/Publications/The_Impact_of_Digital_Technologies_on_Learning_\(2012\).pdf](https://educationendowmentfoundation.org.uk/public/files/Publications/The_Impact_of_Digital_Technologies_on_Learning_(2012).pdf) *Innovating Education and Educating for Innovation. The Power of Digital Technologies and*
- [40] Skills. (2016). Retrieved October 22, 2017 from <http://www.oecd.org/edu/cei/GEIS2016-Background-document.pdf>
- [41] *Ten Technologies which would change Our Lives. Potential Impacts and Policy Implications.* (2015). European Parliamentary Research Service. Retrieved October 22, 2017 from http://www.europarl.europa.eu/EPRS/EPRS_IDAN_5274_17_ten_trends_to_change_your_life.pdf
- [42] Hakan Eroglu (2018, Aug 16) *The American way of Open Banking regulation.* Retrieved from



- <https://www.finextra.com/blogposting/15665/the-american-way-of-open-banking-regulation>
- [43] PCT Research (2017, Jul 4) Three Key Benefits of Banking in the Cloud. Retrieved from <http://paymentct.com/news/three-keybenefits-of-cloud-based-banking>
- [44] McKinsey (2021) – Digital report - <https://www.mckinsey.com/business-functions/mckinsey-digital/our-insights/digital-india-technology-to-transform-a-connected-nation#>
- [45] The Digital Workplace: Think, Share, Do. Transform your Employee Experience. (n.d.). Retrieved October 22, 2017 from https://www2.deloitte.com/content/dam/Deloitte/mx/Documents/human-capital/The_digital_workplace.pdf
- [46] Capaldo, C., Flanagan, K., & Littrell, D. (2008). Teacher Interview 7377 – Introduction to Technology in Schools. Retrieved October 23, 2017 from <http://philaliteracy.org/wp-content/uploads/2014/05/2013-What-are-the-different-types-of-technology-you-use-in-your-classroom.pdf>
- [47] Digital Technology. Safe and Responsible use in Schools. (2015). Retrieved October 22, 2017 from <http://www.education.govt.nz/assets/Documents/School/Managing-and-supporting-students/DigitalTechnologySafeAndResponsibleUseInSchools.pdf>