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# Companies' Digitalization Challenges and Opportunities in a Post-COVID-19 World

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## ABSTRACT

COVID-19 has had a major impact on the world economy, company operations, and individuals. However, technology is additionally helping several businesses in adapting to and overcoming this crisis obligatory by COVID-19. The augmented usage of technology in people' and businesses' daily lives in response to the present extraordinary situation is proof of the digital acceleration process. This preliminary analysis investigates the consequences of digital transformation processes in 3 corporate areas: labor and social relations, promoting and sales, and technology. The influence of digitalization is probably going to be cross-cutting across all areas, encouraging the introduction of recent digital merchandise and services based on the flexibleness concept. Furthermore, new modes of operating will increase the demand for brand new talent no matter wherever people live. Furthermore, cybersecurity and privacy will become 2 crucial elements that may assist the integrated development of net of Things technological solutions, artificial intelligence, and machine learning.

*Keywords: Covid-19, Digitalization, Human Capital, Innovation, and Technology.*

## 1. INTRODUCTION

THE COVID-19 pandemic has been hard businesses in diverse sectors of activity. Many of those businesses were compelled to undertake new inner running practices and felt a robust stress to provide merchandise thru virtual channels. Companies have skilled profound modifications and in a completely quick time applied answers primarily based totally on virtual technologies. At the equal time, it has grow to be essential to redecorate control and collaboration fashions to make sure that no one inside businesses is left in the back of and feels excluded from this digitization manner. In [1], Berger states that a key element for the fulfillment of teamwork in COVID-19 time is the inclusion of

all group participant's within side the company's main challenges. But this manner has always grow to be extra complex, because the waft of records that obviously flowed within side the equal bodily area is now turning into a mission to attain every person in an agile and green way. The integration of bodily and virtual systems, in addition to the fusion of cutting-edge technologies, characterizes virtual transformation. Innovative enterprise strategies, modern production techniques, and the improvement of knowledge-primarily based totally services and products are the norm [2]. Although digitization isn't a brand new phenomena, the accompanying troubles and opportunities are usually changing. Prior to the advent of COVID-19, the troubles of virtual transformation had been mainly targeted at the fourth commercial revolution, as represented through the principles of Industry 4.0, Internet of Things (IoT), and Web 4.0 [3]-[5]. The troubles protected each the disruption of principles and technology, in addition to the tempo with which this virtual extrude turned into taking place. The troubles had been recognized throughout the COVID-19 era, and it's far crucial to cope with them. Furthermore, the price at which this change occurred turned into incredible. This needs to be executed independently of an employer's beyond role or familiarity with virtual transformation procedures. Organizations are inexorably pushing in the direction of virtual transformation. However, whether or not they're organized for this transition is a crucial matter. According to studies [6], [7], corporations, even the ones which might be maximum superior within side the virtual transformation in their operations and techniques, aren't but absolutely prepared to confront the problems of the virtual transformation. In order to decorate client reaction capacity, digitization necessitates manner restructuring, making the employer extra nimble, and making an investment in extra natural structures, strengthening standardization and automation. COVID-19 has added hard and unpredictable times, in addition to hastened the essential techniques of virtual transformation. At this point, it's far crucial to start considering the post-COVID-19 global and, extra importantly, to research how we'd harness and flip those troubles into new opportunities, each in enterprise and internal businesses. In this context, this studies attempts to research the limitations and possibilities that the digitalization of businesses' operations will gift through specializing in 3 simple regions in their operation: I exertions and social connections; (ii) advertising and marketing and sales; and (iii) technology. These areas had been selected due to the fact to the huge have an effect on that Ban [8] and Hasanat et al. [9] assume at the operations of corporations because of COVID-19. The motion studies method is used on this paper to research the troubles supplied through COVID-19 to those 3 crucial regions. This studies paradigm is beneficial while near touch to researchers is essential and studies limitations aren't tight.

## 2. SOCIAL RELATIONS AND LABOUR

During the COVID-19 period, social and labor relations underwent monumental upheavals. Folks had to regulate to an employment paradigm and learn to share a smaller space with their families throughout the quarantine time. Home workplaces have evolved into hybrid areas wherever family and office activities are shared. This case includes a vital influence on people's life, as they face the likelihood of getting their financial gain down or losing their employment. Consistent with poet [10], COVID-19 puts sixty million Europeans in danger of losing their jobs or having their monthly incomes reduced. This whole state of affairs is each an economic and a social drama. COVID-19's social and labor reforms haven't solely expedited digital transformation processes, however have conjointly widened the social gulf across categories [11]. Not all businesses and people have constant resources to fulfill the challenges of digital transformation. The degree to that tasks and services are dematerialized is decided by the character of every economic activity. Smaller businesses, notably microbusinesses, and industries heavily wedged by COVID-19 (e.g., restaurants and tourism) seem to be additional vulnerable. The National Statistics Institute (NSI) information confirms these findings and adds the transport and storage sector. Food, clothes, and footwear, on the opposite hand, are less affected. It's conjointly price noting the increase within the consumption of technology things [12]. Figure one examines touristy information for the primary 5 months of 2020. There was a minor rise in the variety of long stays throughout the first 2 months of the year, primarily attributable to domestic tourism in Gregorian calendar month due to the Carnival, however there was a big decrease from March onwards, peaking in April. In terms of domestic tourism, could was already a month of minor rebound.

The COVID-19-compelled fast and unplanned digitalization system is developing a belief of inadequacy amongst corporations to recruit the expertise required to confront the future [13]. Despite the position that Industry 4.zero will play in converting the worldwide commercial enterprise environment, people and their competencies will stay on the middle of financial activity, in line with Maresova et al. [14]. As a result, the virtual financial system can simplest feature if it's miles followed through a public and personal approach for digitalizing schooling and education, each at the extent of transversal expertise that the complete populace will want in records and communicate technologies, in addition to within side the education of rather specialized humans in pc science. Then its miles possible to finish that a large dedication to digitization does now no longer unavoidably entail a discount in human aid expenditure. On the contrary, it's miles essential to hire and control the maximum able and suitable employees for the rising demanding situations of the virtual financial system. As a result, this want can also additionally want a shift within side the education furnished at numerous tiers of schooling, which can also additionally entail restructuring present guides and/or

increasing quick guides. These guides ought to supply rather precise capabilities in lots of areas, inclusive of era, however additionally solutions to social difficulties, inclusive of interpersonal interactions, that personnel might face within side the post-COVID-19 age. One capability technique is to sell the boom of vocational education in near partnership with companies, each public and commercial, through encouraging the range and specialization of tutorial offerings. It is difficult to set up the staff qualification profile within side the post-COVID-19 period. Companies' virtual transformation bolsters the growing relevance of information science, virtual marketing, and cyber protection in enterprises. In addition to those elements, methodological capabilities and creativity can be required to translate information expertise into technologically sustainable commercial enterprise fashions that integrate protection and financial viability. Unlike the commercial revolution, Saracco [15] contends that during this virtual transformation system, productiveness boom is unrelated to process introduction and income, as it derives in general from the improvement of recent kinds of products/offerings and the reformulation of manufacturing processes. Finally, in spite of selecting a hybrid technique and the anticipated boom in teleworkers, it has contributed to the sustainable improvement of cities. The environmental dimension, which has suffered substantially due to globalization, can also additionally gain [16]. Not all personnel will want to stay in or close to cities, to be able to assist to decrease car visitors and beautify human's nice of life. This calls for that there be no nearby disparities within side the digitization system, especially in get entry to information networks, which would possibly bring about virtual splits throughout areas. Furthermore, in a post-COVID-19 future, era ought to be used to broaden areas which might be now excluded and economically disadvantaged, so contributing to the discount of nearby disparities.

### **3. SALES & MARKETING**

New economic opportunities are developed as a results of digital technology and therefore the changes they need dropped at the daily lives of enterprises. They created new markets for brand spanking new types of things and altered whole industries by dematerializing antecedently marketed product [17]. Grewal et al. [18] state that the digitalization of the economy necessitates the supply of extremely tailored products at abundant reduced costs. With technological advancements and the continual presence of the net in people' everyday lives, the usage of digital items is turning into a viable different to physical products. They supply nice accessibility since they'll be accessed and devoured from any location. Apps, e-books, and on-demand streaming are samples of these product and services. The COVID-19 pandemic had a considerable influence on net commerce growth, owing largely to trade closures and movement limitations. This movement has the potential to possess a broader reach and coverage. Per Klunder et al. [19], method dematerialization can facilitate organizations considerably

cut some fastened expenses. Simultaneously, the younger generations will develop their own habits for intense products and services within the digital world. The ability of recent digital product and services could be a key part in their uptake [20]. During this way, providing customers choices or models that are pliant to their demands leads to a speedier shopping for choice. There are many written agreement models for every firm, however it's projected that within the future, consumers would select models within which they need the autonomy to choose and contract their service or product while not the requirement for physical and long intermediation. Simplification could be a essential approach to a more robust client experience, and integration is as important, each to change the customer relationship and to use information intelligently. The incorporation of recent technology into organizational processes not solely aids within the development of client loyalty, however also in reaching new audiences in the worldwide market [21]. R&D procedures will shift. Within the industrial and technical sectors, the expansion of innovation could be an essential facet in the development of recent competitive blessings [22]. Brown et al. [23] claim that during an international setting of competitiveness, open innovation and cooperative invention have made probably evident edges of additional worth for the economy. These approaches are based on the sharing of investments, talents, and risks. Firms might only see the extra good thing about these innovation models if they place a high stress on cooperative technologies that change the event and sharing of data collaboratively among the various economic players.

The deliver chain control in phrases of receiving commodities, however considerably output to preserve income, suffered significantly at some point of the confinement, and could possibly face even greater pressure to make certain the achievement of corporations carrying out e-commerce [24]. The maximum urgent want is for integration and automation among the extraordinary participants (shop clerk and distributor), especially on structures that permit the shop clerk to steady the most inexpensive price, and distribution in their items would possibly cause the start of recent enterprise models. As a result, the price structures enterprise model, which has been a barrier to the increase of recent groups for a few micro groups, will possibly to make bigger in turnover. This may also bring about the advent of recent gamers and, as a result, extended negotiating strength for corporations that favor to shift to new advertising channels, considerably social networks. Companies use this to diversify their income retailers and, as a result, restriction dangers within side the occasion of some other in all likelihood destiny closure in their bodily income retailers.

## 4. TECHNOLOGY

Processes of digital transformation are addicted to the personnel and therefore the tools at their disposal. Technology is crucial within the digital shift. There's an embarrassment of developing technologies that have already contributed to the digital transformation of the many enterprises and industries, however can become additional relevant in an exceedingly post-COVID-19 future. The net of Things (IoT) is also outlined as a network of physical things that contain technology and package that enable them to speak and move showing intelligence with each other and with their external setting via the net [25]. IoT may be employed in a variety of domains, together with personal, business, and industrial. In step with Maple [26], IoT has the potential to disrupt business realities and cause vital operational improvements, still because the provision of recent styles of services to customers and high-quality products. The supply of information and information, as a results of observation and activity all action, allows IoT to essentially revolutionize the vision and perception of the activity, providing multiple competitive blessings and a more thorough and actual understanding of the business. This information are going to be vital in overcoming the hurdles and issues dropped at businesses by the expansion of COVID-19. As IOT progresses and therefore the range data } out there to businesses grows, there's a desire for brand new ways to judge the big volume of heterogeneous information which will inevitably emerge. Huge knowledge may be a phrase which will be wont to ask this improbably Brobdingnag Ian quantity of data, that necessitates the utilization of specialized technologies to store, retrieve, organize, and remodel the information into information which will be loosely and quickly studied [27]. Attributable to the event of additional refined algorithms and the continuous improvement of power and machine storage, the flexibility to capture large volumes of information and analyze it properly and effectively has evolved persistently in recent years. However, in an exceedingly post-COVID-19 world, there'll be a big increase within the volume of data on the Internet, and therefore the use of massive data knowledge and techniques are going to be vital for business survival. A shift in the big data paradigm is predicted as a part of the method of developing a competitive advantage for a replacement paradigm during which big data may be a determinant of company survival in an ever-expanding vary of sectors. At this level, an exponential increase in the use of big knowledge to forecast product or service sales, predict client behavior, analyze client flight in physical and virtual spaces, and establish machine security risks is expected.

Another field that's foreseen to expand greatly is robotics. Robots can progressively be utilized to have interaction with humans still on replace human labor [28]. Robots are already being utilized to handle difficult jobs, however their utility and application will inevitably evolve. Robots are predicted to become increasingly independent, adaptable, and cooperative. As a consequence, robots are ready to connect with folks whereas also operating aboard them and firmly learning from them.

Trade 4.0 includes an important potential for growth not simply within the realm of robots, but also in the digital property of producing processes, provide chains, and distribution channels. As digital technology becomes a lot of pervasive within the business and thus, so do its risks. It's crucial to safeguard Net against mishaps, malicious activities, and misappropriation. However, whether or not deliberate or unintentional, cyber-security incidents are developing at an atrocious rate and might impair each company operations and basic services (e.g., water, power, and health). In line with Martins [29], the challenges related to cyber-security which generate apprehension in the adoption of recent digital technologies by enterprises is also classified into 3 categories:

- (i) A scarcity of subject awareness and knowledge.
- (ii) The prevalence of difficult settings within which ancient and new technology coexist.
- (iii) Insufficient time and resources to speculate in cyber security.

During a post-COVID-19 environment, it's envisaged that organization's perceptions of cyber-security would shift significantly. From one purpose of view, info on the problem will inevitably develop, however from another, we are going to have a rising non uniformity of kit joined to the network, which can raise these concerns. Several of those hazards can solely be reduced by major efforts in human training, as an oversized portion of cyber-security issues are because of careless human conduct. Customers are way more interested and troubled concerning cyber-security threats, and that they can wish technologically inventive solutions that don't threaten the protection of their personal data. Privacy by design, as visualized by van Rest [30], will be a crucial criterion within the development of technology solutions.

## **5. CONCLUSION**

COVID-19 has increased the ramifications associated pace of technology disruption in enterprises. Firms must be ready for this challenge, and thereto end, they have to cultivate an innovative culture that includes the company' workers within the process. In reality, COVID-19 has accelerated digital transformation processes not simply in businesses, however conjointly in folks and public institutions. The good problem for managers is to get involved during this transition whereas still endeavor to stay the firm entering into the face of a brand new and unpredictable future. Furthermore, it's necessary to stress that the 3 essential factors of labor/society, market/sales, and technology are inextricably linked. Companies' digital selling and sales channels will become a lot of necessary as they become more digitized. It'll conjointly encourage work and technical product consumption as more people connect utilizing hybrid communication mechanisms on the market from everywhere, instead of simply within



the physical world of enterprises and their homes. The finished study assisted in the investigation of the influence of digitalization on labor and social relations, marketing and sales, and technological elements. Digitization has a control on all of those domains. The adoption of the community, notably its workers, suppliers, partners, and customers, will be crucial to the success of a company' digital transformation initiatives. Among the difficulties encountered is that the adoption of telework and a distance operating paradigm that enables for top interaction and teamwork, within which talent overcomes physical location. Another problem is the enlargement of e-commerce, which brings with it a whole price chain that has got to be effectively integrated so as to allow a differentiated searching expertise for the client. The ability of digital product and services also will play a job in their uptake. On the technology front, the increase of IoT-enabled technologies, artificial intelligence, massive data, and robots. Furthermore, cybersecurity and privacy are viewed as necessary factors within the adoption of recent technology solutions. This analysis primarily provides sensible contributions by delving into a rising topic of nice connectedness to firms and people alike. This study may be a valuable tool for enterprises getting ready for the challenges provided by the post-COVID-19 era, further as a helpful study for governments in developing business support measures. There are some drawbacks to the current study as well. First, at the time of this study, COVID-19 was still removed from being mitigated, and bound nations' limitations on commercial activity and other people quality had only in the near past been eased. For several businesses, the short-run effects of COVID-19 could render their operations unviable. It might be attention-grabbing to follow abreast of this work with Associate in nursing empirical investigation with the business to get input from enterprises on their future digitalization ambitions. Also, it would be ideal to section this study and apply it to numerous circumstances, adore bound nations and economic sectors.

## REFERENCES:-

- [1]. R. Berger, Digital workplace in the era of COVID-19, Accessed: May 5, 2020. [Online]. Available: <https://www.rolandberger.com/en/Point-of-View/Digitalworkplace-in-the-era-of-Covid-19.html>
- [2]. P. C. Verhoef et al., “Digital transformation: A multidisciplinary reflection and research agenda,” *J. Bus. Res.*, to be published.
- [3]. F. Almeida, “Concept and dimensions of web 4.0,” *Int. J. Compute. Technol.*, vol. 16, no. 7, pp. 7040–7046, 2017.
- [4]. L. M. Fonseca, “Industry 4.0 and the digital society: Concepts, dimensions and envisioned benefits,” in *Proc. 12th Int. Conf. Bus. Excellence*, 2018, pp. 585–590.
- [5]. A. Pflaum and P. Gölzer, “The IoT and digital transformation: Toward the data-driven enterprise,” *IEEE Pervasive Comput.*, vol. 17, no. 1, pp. 87–91, Jan.–Mar. 2018.
- [6]. D. T. Matt and E. Rauch, “SME 4.0: The role of small- and medium-sized enterprises in the digital transformation,” in *The Digital Transformation*, D. Matt, V. Modrak, and H. Zsifkovits, Eds. Cham, Switzerland: Palgrave Macmillan, 2020, pp. 3–36.
- [7]. G. Pearce, Digital transformation? Boards are not ready for it! Accessed: May 5, 2020. [Online]. Available: <https://www.isaca.org/resources/isaca-journal/issues/2018/volume-5/digital-transformation-boards-are-not-ready-for-it>
- [8]. X. Ban, Responding to the impact of COVID-19 on labor relationship in China. Accessed: May 8, 2020. [Online]. Available: [http://www.cielolaboral.com/wpcontent/uploads/2020/04/china\\_noticias\\_cielo\\_coronavirus.pdf](http://www.cielolaboral.com/wpcontent/uploads/2020/04/china_noticias_cielo_coronavirus.pdf)
- [9]. M. W. Hasanat, A. Hoque, F. A. Shikha, M. Anwar, A. B. Hamid, and H. H. Tat, “The impact of Coronavirus (COVID-19) on E-business in Malaysia,” *Asian J. Multidisciplinary Stud.*, vol. 3, no. 1, pp. 85–90, 2020.
- [10]. C. Riley, 60 million Europeans could suffer furloughs, layoffs or wage cuts. Accessed: May 8, 2020. [Online]. Available: <https://edition.cnn.com/2020/04/19/business/europe-jobs-coronavirus-mckinsey/index.html>
- [11]. C. Milanese, Digital transformation and digital divide post COVID-19. Accessed: May 8, 2020. [Online]. Available: <https://www.forbes.com/sites/carolinamilanesi/2020/05/11/digital-transformation-and-digital-divide-post-covid-19/#6b142e8a1656>
- [12]. NSI, Statistics Portugal. Accessed: Jul. 24, 2020. [Online]. Available: <https://www.ine.pt/>
- [13]. L. Dahlander and M. Walin, “The barriers to recruiting and employing digital talent,” *Harvard Business Review*, Cambridge, MA, USA: Harvard Business Publishing, 2018. [Online].

- Available: <https://hbr.org/2018/07/the-barriers-to-recruiting-andemploying-digital-talent>
- [14]. P. Maresova et al., “Consequences of industry 4.0 in business and economies,” *Economies*, vol. 6, no. 46, pp. 1–14, 2018.
- [15]. R. Saracco, “Digital transformation vs. jobs,” *IEEE Future Directions*, 2018. [Online]. Available: <https://cmt.ee.org/futuredirections/2018/11/29/digitaltransformation-vs-jobs/>.
- [16]. L. Figge, K. Oebels, and A. Offermans, “The effects of globalization on ecological footprints: An empirical analysis,” *Environ., Develop. Sustainability*, vol. 19, pp. 863–876, 2017.
- [17]. M. Rachinger, R. Rauter, C. M€uller, W. Vorraber, and E. Schirgi, “Digitalization and its Influence on business model innovation,” *J. Manuf. Technol. Manage.*, vol. 30, no. 8, pp. 1143–1160, 2019.
- [18]. D. Grewal, J. Hulland, P. K. Kopalle, and E. Karahanna, “The future of technology and marketing: A multidisciplinary perspective,” *J. Acad. Marketing Sci.*, vol. 48, pp. 1–8, 2020.
- [19]. T. Kl€under, J. N. D€orseln, and M. Steven, “Procurement 4.0: How the digital disruption supports cost-reduction in procurement,” *Production*, vol.29, pp. 1–11, 2019.
- [20]. K. Lyytinen, Y. Yoo, and R. J. Boland, “Digital product innovation within four classes of innovation networks,” *Inf. Syst. J.*, vol. 26, no. 1, pp. 47–75, 2016.
- [21]. E. R. Banalieva and C. Dhanaraj, “Internalization theory for the digital economy,” *J. Int. Bus. Stud.*, vol. 50, pp. 1372–1387, 2019.
- [22]. M. Fransman, *Innovation Ecosystems: Increasing Competitiveness*. Cambridge, U.K.: Cambridge Univ. Press, 2018.
- [23]. P. Brown, N. Bocken, and R. Balkenende, “How do companies collaborate for circular oriented innovation?” *Sustainability*, vol. 12, pp. 1–21, 2020.
- [24]. J. Rheude, How COVID-19 is changing the E-commerce supply chain, Accessed: May 10, 2020. [Online]. Available: <https://www.supplychainbrain.com/blogs/1-think-tank/post/31142-Covid-19-is-changing-the-e-commerce-supply-chain>
- [25]. M. Kranz, “Building the Internet of Things: Implement new business models, disrupt competitors,” in *Transform Your Industry*. Hoboken, NJ, USA: Wiley, 2016.
- [26]. C. Maple, “Security and privacy in the Internet of Things,” *J. Cyber Policy*, vol. 2, no. 2, pp. 155–184, 2017.
- [27]. A. Gorelik, *The Enterprise Big Data Lake: Delivering the Promise of Big Data and Data Science*. Sebastopol, CA, USA: O’Reilly Media, 2019.
- [28]. T. B. Sheridan, “Human-robot interaction: Status and challenges,” *Human Factors: J. Human Factors Ergonomics Soc.*, vol. 58, no. 4, pp. 525–532, 2016.
- [29]. A. Martins, Cyber threats named the most concerning issue for businesses, Accessed: May 12,

2020. [Online]. Available: <https://www.businessnewsdaily.com/15295-cyberthreats-biggest-Business-concern.html>

- [30]. J. van Rest, D. Boonstra, M. Everts, M. van Rijn, and R. van Paassen, “Designing privacy-by-design,” in *Privacy Technologies and Policy*, B. Preneel and D. Ikonou, Eds. Berlin, Germany: Springer, 2014, pp. 55–72.