Handling Disruptive Technology in Industry – A Strategic Advance in Today's Business Practices

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Abstract:

Disruptive technology has created an insight on novelty and changing environment among human resource management in various industries. Today, the technology is changing faster due to changes in work nature of businesses. Its advent in current scenario has lead to automate tasks with increased productivity and efficiency. As the world is moving towards technological advancement and people tend to adapt newer know-how for easy accomplishment of task. So, this lead to industries focuses on digitalization. Industries started to establish its way from first Industrial revolution as introducing Steam Engines (1800s), second Industrial revolution as using Electricity for Mass Production (1900s), third Industrial revolution as Digitalization & Electronic Automation (1960s). The objective of the the paper aims to study about how industries get disrupted using these three technology which are focused on the strategic influence of disruptive technology on reaching the expected performance. The key elements of disruptive technology attract industries to modify the existing with advanced technology and get familiarize with new techs for future endeavors. The study is carried out using descriptive research design in which the researcher describes the scope of disruptive technology implementation in various industries. The existing changes and development in technology will generate opportunities in industries and transform workforce culture. As industries focus on core competency to grow, technology disruption is a true domain which can stay reliable for years. The researcher have found that the paper have met the objectives by using articles, journals and blogs which supported the entire research work. The practical contribution of the study is done to see the impact of Disruptive Technology in current era. The study is carried to know the level of Disruptive technology its importance on technology inbuilt business environment. Disruptive technology has changed the way industries work using Artificial Intelligence, Cloud Computing and 3D printing.

Keywords: *Disruptive technology, Industry 4.0, Artificial Intelligence, Cloud Technology, 3D printing, Technological change.*

I. INTRODUCTION

Recent Industrial revolution is INDUSTRY 4.0 defined as Smart Automation. Industry 4.0 has plotted to adopt technology disruption as Artificial Intelligence, Cloud Technology and 3D printing for better and mass production with reducing error rating. These three technologies are widespread among industries to search out with innovation which can make them sustain and compete with other industries. Disruptive technology has key characteristics stated by Clayton Christensen in his book titled "The innovators dilemma", that it is

typically simpler, faster, affordable, reliable and convenient to use.

Several industries seek emerging technologies in altering the existing with the updated version. Often what these industries think about technology are physical means of devices that are digital or electrical. Disruptive technologies have a unique discovery that transform usual product capabilities and move towards a new or different technology as described by Anderson and Tushman (1990). Adopting technological change and integrating them have encouraged incumbents to face competitive advantage. The link between new technology and innovative technology is all about companies that have started to learn, to compete, to analyze, to improve and be unique among rivalries. The term Disruptive technology is coined by Clayton Christensen and his collaborators beginning in 1995 and is called the most persuading business idea of early 21st century. The book titled, *"Innovators Dilemma"* highly focuses on how companies depend entirely on technologies and have more impact on company growth. Major focus on technology disruption by companies is because products or services are affordable, simpler, feasible, faster and convenient to use. Application of technology has taken place not only to solve problem but also to enhance the present working methodology of equipments or machines to accomplish the specific tasks. While putting the factors of disruption it means the collection of skills, methods and processes applied to increase production of commodities and leads to achieve objectives such as in transportation of car, communication through cellphone, construction industry like infrastructural development and so on. Many of economic benefits come from adopting technology which includes the further enhancement and improvement in various industries like manufacturing, construction, health care, and others (Jia et al., 2016).

The review on handling Disruptive Technology in Industry is structured in a manner which will try to illustrate how the industries implement these technologies in their business environment to facilitate ease of work. The researcher tries to discuss about how industries incorporate Disruptive technology as a strategy using Artificial Intelligence, Cloud Technology and 3D Printing, which lead them to further growth and development. Also, it will be followed by definitions on technology disruption. Further the paper continues with explaining the importance of Industry 4.0 and its three key technologies. Conclusions are drawn on summary of impact of disruptive technology on industries.

II. INDUSTRIES INCORPORATE DISRUPTIVE TECHNOLOGY – AS A STRATEGY

What is Disruptive technology? There are several arguments differing from one another in the wide spectrum of global business scenario. The exact meaning of Disruptive technology is seeking to build new business environment facilitated with R&D that supports unique challenge and opportunity supported by commercial community. The technology begins within a smaller circle of users, but starts to elevate over a period of time at the level that it shifts previously in process technology to enhanced technology. Christensen and Raynor (2003), subsequently changed the term, "disruptive technology" to "disruptive innovation", arguing that the disruption is not an intrinsic feature of the technology, but, instead, emerges through practice. However, the term "Disruptive technology" is used in this study for sake of clarity, as the fundamental area of research is on how it influences industries in its growth and development.

III. DEFINITION ON DISRUPTIVE TECHNOLOGY

Mere an innovation, Disruption is a term used to seek attention around the globe with novel means of technology implemented to work with.

In the word of Christensen and Tellis Disruptive Technology (1997) is defined as technology which

improves and enhances the existing technologies that create value in the minds of employees handling new technology. Disruptive Technology are something which tries to disrupt existing business practices, often it begins among a few number of implemented users, but emerges into large extent by displacing the present or incumbent technology. According to Christensen and Raynor (2003) the term "Disruptive Technology" subsequently changed by them into "Disruptive Innovation", making arguments stating that disruption is about the intrinsic features of technology, but, instead, it materializes slowly when practiced.

Artificial Intelligence: According to Rob May (2017), in the area of Human Resource he stated that artificial intelligence is misunderstood as human resource. Also, highlighted on how does the combination of machine learning and natural language processing is useful in workplace setting. He adds that artificial intelligence would work like human mind which will be applied on number of common repetitive administrative function in coming year.

Cloud Technology: According to Armbrust et al(2009). "Cloud computing refers to both the applications delivered as services over the Internet and the hardware and systems software themselves have long provide those services. The services themselves have long been referred to as Software as a Service (SaaS). The datacenter hardware and software is what we will call a Cloud. When a Cloud is made available in a pay-as-you-go manner to the general public, we call it a Public Cloud; the service being sold is Utility Computing. We use the term Private Cloud to refer to internal datacenters of a business or other organization, not made available to the general public. Thus. Cloud Computing is the sum of SaaS and Utility Computing, but does not include Private Clouds"

3D printing: According to Charles Hull who coined first invention on 3D printing; he gives the name to this technique as stereo lithography. This technology has become popular in 1990s. and others technology were introduced like Fused deposition moulding and selection laser sintering. A desktop 3D printer is industry jargon for a smaller, less expensive 3D printer that a typical consumer can buy.

IV. AIM AND PURPOSE OF THE STUDY

The aim of this exploratory study is to observe how industries are taking up new innovations, processes, displacing new technology in the present global business with digitalized economy worldwide. Also, the researcher tries to come down with few examples about how disruptive technology influences various industries for instance., how industries integrate Artificial Intelligence for easy work, 3D printing for designing equipments and Cloud Computing that enables users to connect online with the help of internet.

For the sake of understanding the research tries to answer on how and why industries with difference in working nature adapt changes. To find the reasons behind what influences them to go for AI, 3D printing and Cloud Computing. As these three technology are major areas which has to be studied focused because they predict the future changes.

V. LITERATURE REVIEW

In the words of Kassicieh et.al., (2000), has stated the nature and difference between disruptive and sustaining technologies. While organizations look for disruptive technology implementation because of novel factors they input during production i.e., simple, quick and trustful process to work with. The new technologies bring an impact while commercializing a particular product. In the development or shift for new product for new customers with in near future is what disruptive technology builds capabilities creating hope among organizations to face competitive advantage.

Chan, S. (2006) in his article "Strategy development for anticipating and handling a disruptive technology", stated about today market leaders are

quick in adopting new technology and fast to deploy the novel technology.

Paul Paetz in his book Disruption by design (2014), where it creates new dimensions of value that the old product category or business model is unable to address by satisfying unmet or underserved needs. These dimensions are a different set o benefits like simplicity, convenience, accessibility, significantly lower price, or ease of use, but can occasionally include break through innovations that have redefined the product category.

Maresch, D., & Gartner, J. (2018), they state that the contribution of technology to world is abundant. Also, new potential technology can foster abundance in traditional as well in established market economies.

According to Shomool M. Al-Harbi, Dr. Afaf Bugawa, Prof. Soud Al Mahamid., (2018) state that new technologies influences more in the digital era. They adopt TAM model with few modified factors and also try to recognize three other dimension which actually leads to influence technology they are technological dimension, organizational dimension, and environmental dimension. These technology will affect adoption of new technology said to be disruptive one. The adoption of Disruptive technology for current generation seems to be rare and it has to figure out the various aspects of innovation that changes the current environment

In the words of Barman, A., & Das, M. K. (2018), they try to investigate the influence of Disruptiveness in bloggers spectacle in emerging technology influence on human resource management. Technology disruption in field of hr transforms people, capabilities and the programs when implemented.

Influence of technology on Recruitment is happens in present era said to be the Disruptive technology applied as Artificial Intelligence. The process of hiring is really a huge task to accomplish and as well more in human work need to be done. Here the author try to use new technology to encounter qualitative hiring process and gains for both clients and candidates Ashwani Kumar Upadhyay, Komal Khandelwal, (2018).

Industries try to implement new techs to cut short the work time and use the lead time to other required operations. So, industries started with first industrial revolution – Steam Power, second industrial revolution – Electrical Energy, third – Automate Production industrial revolution and fourth industrial revolution – Smart Factory. And , the researcher tries to explore major attributes contributed by Smart factory.

Even in education industry disruptive technology have made its way towards enhancing higher education through e-learning. E-learning methodology includes delivery of lectures through various multimedia platforms available. It invades a quality interactions between students and teacher, even motivates peer-peer interaction with fullest participation (Peilin Li 2017).

Industries are highly linked with technological aspect to compete with rival industries. They always try to move on with aspect of innovation in process of production. Construction industry is an sector were by it is highly labour intensive and labourers are so fragile to be handled. Impact of innovation on construction industry has led the labours to be updated with new techniques to be followed in their working condition that would enhance their aspect of work they undergo (Justinas Anelauskas, 2017).

In the words of Adner and Kapoor (2016) state that opportunity for new technology is growing by substituting the older one in a faster rate. Few Industries try to cop up with new innovations but at a slower rate and few of them at a fastest rate in the emergence of challenge and opportunity.

VI.   INDUSTRY 4.0

The term Industry 4.0 is referred as Fourth Industrial Revolution. Industry 4.0 includes Internet of Things, Cloud Computing, Cyber-Physical System

and Cognitive computing. All of these focus on building smart products, fast processes, and easy procedures. They will combine together to build global business network and accomplish tasks independently. Industry 4.0 is entirely based on the concept of "Smart Factory". Smart factory is completely a novel approach in the production and helps to operate all corners during machine operations taking place. In the area of recruitment the role of industry 4.0 is predominantly routing towards the modern face of recruitment. Modern recruitment have become a challenge for the industrial leaders while competing with technology which entirely is designed by people. Technology automation happened since industry 3.0 but the difference industry 4.0 brings is the digitalization of physical assets and integration into digital ecosystems with value chain partners. These range of new technology adopted in recruitment tries to generate, analyse and communicate data in and out among the job seekers and the recruiter seamlessly.

Present scenario for all manufacturing industry they focus on:

- Artificial Intelligence
- 3D printing
- Cloud Technology

(A) Artificial Intelligence

Aruna Deshpande (2018) stated the importance of Talent Acquisition through technology (Artificial Intelligence) plays a vital role in acquiring the right person for the right place. Artificial Intelligence leads to remove Unconscious Bias and also AI automates to evaluate the CV in a fraction of time when compared to human operator its fast enough.

In this world of digitalization, it's pure to be innovative enough to succeed or would get defeated if not being innovative. Artificial Intelligence which performs assignments frequently using robots as equal as human brain, for instance, basis leadership, visual observation, discourse acknowledgment and interpret between dialects. There are industries disrupted by Artificial Intelligence namely Agriculture – where by labor shortage issues were sorted because of automation and efficiency of AI (Jason Behrmann). Call Centers – companies developed their own chatbots to answer live chat which lead to users were able to receive their responses on time (Cristian Rennella Co-founder of Colombia-based elMejorTrato.com. Customer Experience – AI is helpful to customers by mitigating frustration faced by them during travel time (Ryan Lester –director of customer engagement technologies at Boston-based LogMeln). Energy Mining – AI helps traders to arrive at decisions about what is shipped, what is the arrival time and where they go for transporting, to locate these operations they require a rare type of machine intelligence called as Cognitive Intelligence. A cognitive intelligence is a human like reasoning machine intelligence (AJ Abdallat CEO of Glendale, Calif.-based Beyond Limits. Healthcare – AI helps to envisage diseases, categorize and find risk patients in line, diagnostic test automation, and also helps to decide the accurate treatment required (Vineet Chaturvedi co-founder of Bengaluru, India-based Edureka). Intellectual Property – AI helps in sorting out issues through image recognition space also using 2D and 3D image recognition to overcome challenge in the area of design recognition, intellectual property and protection.

(B) 3D Printing

The process of 3D printing is called as additive manufacturing. 3D printing accurately describes how this technology contributes to create new objects. The concept of additive refers to the consecutive addition of lean layers between 16 to 180 microns. Objects such as plastic, metal, resin and other types of materials which uses additive manufacturing process. In simple terms 3D printing transforms the objects design, way of manufacturing and process of distribution in industries. The technology tends to cost cutting in terms of time, labor and materials usage to convert raw materials into finished

products. The industries which are disrupted using 3D printing are Aerospace – printing parts of aircraft, Automotive – replacement of parts, Construction – build six story building to avoid over population issues, Manufacturing – bringing the ability of everyday people like artisans to print objects at home for instance., jewellery, utensils and any kind of art work, Medical – in medical additive manufacturing used to create surgical models for trial surgery, even helps people with prosthetic limbs to organs and skin.

(C) Cloud Technology

To deliver service over a network using hardware and software is called as cloud computing. Cloud computing basically uses internet to operate services for the users. It is a type of computing that purely depends on shared computing resources rather connecting using local servers or any other PC to handle applications. Cloud computing offers services that enables them to access applications via internet. Its types are Infrastructure-as-a-Service(IaaS), Platform-as-a-Service(PaaS), Software-as-a-Service(SaaS) and other benefits it facilitates to the users are storage, security, database maintenance and so on.

The technological era supports all kind of individuals to design exclusive items which entitles industries with different ways to deal with.

VII.   RESEARCH METHODOLOGY

The researcher tries to study the role of disruptive technologies in sectors which has greatest influence on its growth and development. The study is carried out using descriptive research design in which the researcher describes the scope of disruptive technology implementation in various industries.

The researcher studied the journals published in well reputed journal titled on disruptive technology and found the definitions and its usefulness in today business world. Even few studies were taken from blogs which gave clear idea on how disruptiveness has taken its place in industries for development.

These blogs were useful in finding out the appropriate sector which are actually influence by disruptive technology. Disruptive Technology is power a stated in the whole article with the help of many authors as stated in the review of literature in the article.

Since, it is a less explored research topic, the entire study is based on secondary sources. The content for the article were taken from articles published in research journals, magazines, HR blogs, survey reports, newspaper corners. Even few materials were from books and online sources too.

VIII.   FUTURE RESEARCH

Theunderstanding of Disruptive technology in the current digitalized arena in the contemporary business world, have lead to elevate the field of technology from moving further with as a more digitalized economy. Industries with new technology advancements have changed the way of doing work. Further research is necessary to focus on the deeper insights of purpose for new innovations acceptance by industries which implement disruptive technology. And, can also motivate researchers to carry out comparison between machines with innovative technology implemented in industries, with machines directly replaced to work like human. This comparative study may pave the way for effectiveness of the usage of machines and machines like humans in industries.

IX.   CONCLUSION

In the queue of dealing with Disruptive Technology, it became highly important for firms handling new technology which incorporates strategies of patterns which allow them to survive in the digitalized globe. In field of learning where students try to incorporate industrialized learning and get motivated by these technologies. Learning encounters platforms like MOOC(Massive Open Online Courses), Service-Based Learning, New learning models, flipped classroom, project based learning and many others.

Technology has influenced communication sector which can analyze, record and report data about the wearer's body and is helps many athletes, military personnel and children. The result of change happens due to the arrival of new technology. Even has influenced much on cab rides and been valued in the billions of people who prefer in using such a taxi company which actually disrupted. Fintech industries are now creating revolution and shaking up the banking industry. Today, millennial's are highly embracing these technological advancements for their day to day payments. Now generations are entirely based on gadgets dependent when compared to traditional or older generations. Innovations in Fintech have made to use smarter banking solutions which offer better solutions and predict future for better technological solutions. After the arrival of novel technologies it would lead to reduce the work of human, increase in designing objects, decrease in cost and help in increasing intelligence ability. The advent of disruptiveness happened in industries helps to manage individuals in organizations. Also, evenly helps the employee and employer towards handling machines with utmost efficiency to reduce paper work, reduce the stress of employees, and reduce the lengthier process.

REFERENCES:

1. Anderson, P., & Tushman, M. L. (1990). Technological discontinuities and dominant designs: A cyclical model of technological change. Administrative science quarterly, 604-633.
2. Anelauskas, J. (2017). Impact of innovations on human resources in the construction industry (Master's thesis).
3. Ashwani Kumar Upadhyay, Komal Khandelwal, (2018) "Applying artificial intelligence: implications for recruitment", Strategic HR Review, Vol. 17 Issue: 5, pp.255-258.
4. Barman, A., & Das, M. K. (2018). Disruptive Technology In Human Resource Management-From The Bloggers Spectacle. International Journal of Research in Engineering Applications and Management (IJREAM), 3(11).
5. Chan, S. (2006). Strategy development for anticipating and handling a disruptive technology. Journal of the American College of Radiology, 3(10), 778-786.
6. Christensen, C. M., Raynor, M. E., & Anthony, S. D. (2003). Six keys to building new markets by unleashing disruptive innovation. Harvard Management. EEUU.
7. Dhillon, G., Coss, D., & Hackney, R. (2001). Interpreting the role of disruptive technologies in e-businesses. Logistics Information Management, 14(1/2), 163-171.
8. Govindarajan, V. and Kopalle, P.K., 2006. The usefulness of measuring disruptiveness of innovations ex post in making ex ante predictions. Journal of product innovation management, 23(1), pp.12-18.
9. Jia, F., Wang, X., Mustafee, N., & Hao, L. (2016). Investigating the feasibility of supply chain-centric business models in 3D chocolate printing: A simulation study. Technological Forecasting and Social Change, 102, 202-213.
10. Kassicieh, S. K., Anderson, S. W., Romig, A., Cummings, J., McWhorter, P., & Williams, D. (2000). A model for technology assessment and commercialization for innovative disruptive technologies. In Proceedings of the 2000 IEEE Engineering Management Society. EMS-2000 (Cat. No. 00CH37139) (pp. 340-344). IEEE.
11. Maresch, D., & Gartner, J. (2018). Make disruptive technological change happen-The case of additive manufacturing. Technological Forecasting and Social Change.
12. Paetz, P. (2014). Disruption by Design. Apress.
13. Li, P. (2017). Innovation in higher education: the effectiveness of disruptive technology in e-learning.
14. Shomool M. Al-Harbi, Dr. Afaf Bugawa, Prof. Soud Al Mahamid., (2018). Disruptive Technology Adoption: An empirical investigation in Saudi Arabia. Conf. on Advances in computing, communication and information technology.
15. Tellis, G. J. (2006). Disruptive technology or visionary leadership?. Journal of Product Innovation Management, 23(1), 34-38.
16. Adner, R., & Kapoor, R. (2016). Innovation ecosystems and the pace of substitution:

Re-examining technology S-curves. Strategic management journal, 37(4), 625-648.

17. https://www.recode.net/2014/1/6/11622000/the-four-stages-of-disruption-2

18. https://www.forbes.com/sites/joshbersin/2017/11/02/hr-technology-for-2018-ten-disruptions-ahead/#6c1cfe3843b7

19. https://www.hrmagazine.co.uk/article-details/how-disruptive-technology-influences-hr

20. https://www.netatwork.com/ten-hr-technology-trends-2018/

21. http://marketing.bersin.com/HR-Technology-Disruptions-Report-Reg.html

22. https://www.cmswire.com/information-management/11-industries-being-disrupted-by-ai/

23. https://disruptionhub.com/disruptive-3d-printing-really/

24. https://greatperformersacademy.com/entrepreneurs/30-disruptive-technologies-and-ideas-that-will-transform-industries