

Disruptive Technologies, Business Models and Emerging Risks

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Abstract

Disruptive technologies have altogether changed the way of doing business and handling the business activities. These technologies are evolving dynamically and are responsible for shocks to the conventional business models. With the growth of e-commerce, technological disruptions create new market place for business firms. Adoption of these technologies creates new risks different from one that is well-structured conventionally. In this paper, we examine the disruptive technologies and their effect on various business models and also analyse some cases of their applications. We also examine the new and potential risks that are created by these technologies. We establish that disruptive technologies bring rewards and risk simultaneously and the speed of their intervention is tremendous. Thus, the adoption of these technologies for business model transformations requires a well thought planned approach.

Keywords: Disruptive Technologies, Business Models, Risks, IOT, AI

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1. INTRODUCTION

Innovation leads to two types of technological frameworks - sustaining and disruptive. Sustaining essentially revolves around the incremental improvements to a technology that is already established. Disruptive technology is perceptually premature with limited audiences (users) and the practical application has yet to be established. Disruptive technology can altogether replace the existing technology and is capable of creating a new industry or market. As such, these technologies create threats to the existing business models and loss of businesses for the existing players. Such disruptive are now common feature with growth of e-commerce.

In today's technological world many new technologies are emerging as disruptive for businesses. Technologies like Internet of Things (IOT) and Artificial Intelligence (AI) are changing the business models. The way of doing business is changing fast, which has its own advantages and disadvantages. This is giving rise to a whole new set of risks.

According to Techopedia (2018), "Disruptive technology refers to any enhanced or completely new technology that replaces and disrupts an existing technology, rendering it obsolete. It is designed to succeed similar technology that is already in use." Disruptive technologies are unused, unapplied and untested alternative, it takes time for disruptive technology to be dominantly deployed, ultimately degenerating existing technology".

Companies that are looking for innovations in their way of doing business, take a risk of using new technology, to survive in the business model. The new technology is typically disruptive, through carrying its own advantages over its competitors. Many companies that have kept them aloof from implementing the emerging new technologies have been forced to shut down or they are fighting

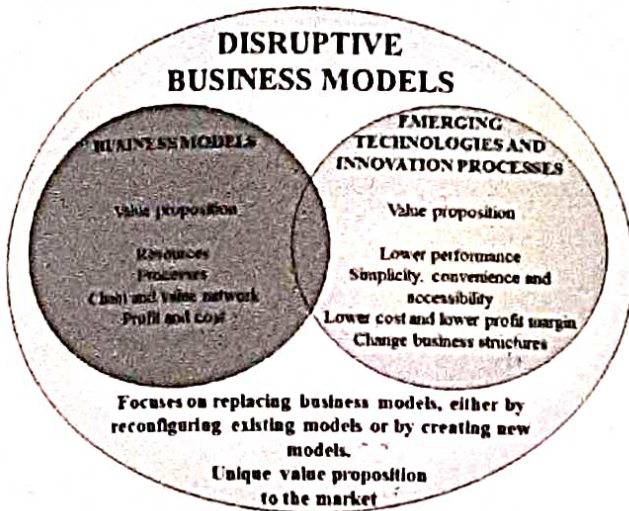
for survival. Some of the frequently quoted examples are Blackberry, Nokia, and Yahoo. After Visa in 1958, we find a large number of business models disruptions based on technology. In 2013, co-founders Isabella and Christian Lane designed their own Wi-Fi-connected kettle. Uber has been a wonderful example of innovating on public transport.

Netflix is an example of one of the most disruptive brands in the world market place. "They started off as a pretty boring business idea, mailing out DVDs to customers who wanted a blockbuster-like experience without going to Blockbuster" as quoted. Amazon has been one of the most disruptive offering an umbrella of products using a variety of disruptive technologies.

According to OECD (2015) "New technologies or business models can profoundly affect the functioning of existing industries. The most visible examples are internet-based sharing services that are disrupting conventional taxi and hotel markets, but there are many others in diverse areas such as finance, retail electricity and automobiles. These disruptive innovations can deliver important benefits to competition and consumers, in terms of new and better services, and can stimulate innovation and price competition from established providers". Da Silva *et al.* (2013) suggest that "disruptive technology per se is not the reason for the collapse of large corporations, but rather the failure to adapt or create new business models to incorporate novel technology". According to Smith (2019) - "While incumbent companies often plan to make incremental improvements to the way they conduct business to improve efficiency, they're unlikely to be able to thoroughly prepare for disruptive technologies because they can appear suddenly or may not be initially economical to target".

Authors like Tripsas & Gavetti (2000) caution that

Figure 1 – Disruptive Business Models



Source: Schiavi & Behr (2018)

“disruptive business models as shown in Figure 1 can go against managerial beliefs about success factors in the industry, resulting in strong opposition to business model innovation” and therefore it is essential to evaluate and re-adapt business models in wake of disruptive technologies (Dasilva & Trkman, 2014). It is now a common phenomenon for risk taking companies to recognize the potential of disruptive technology and target new markets to try and find ways to incorporate it into their business processes. However, investing in firms that use and deliver disruptive technology carries significant risk. We are motivated to examine and present the cases of some selected business model innovations due to disruptive technologies and the consequent risk created by them.

2. LITERATURE REVIEW

The researchers in recent times have been immensely attracted by the impact of disruptive technologies on the business models of different companies. There are differing views of researchers on how disruptive technologies impact businesses positively and as well negatively. However, there is consent to the view that security of data is critical issue that poses risks to the business models based on these technologies.

A review of various perspectives on impact of disruptive technologies can be found in the works of Giovanna & Ariel (2018) on architecture and entities that arise due to disruptive business

models “replacing the existing business models, adapting the organizational structures to the products and services offered and emphasizing the proposition of unique value”.

Zott *et al.* (2010) have identified that “organizational transformations have benefited from the agility of new technologies, providing the development of new ways of creating value for the market through an innovation process, which expands the boundaries of organizations and contributes to the generation of new business models”. Hwang and Christensen (2008) argue that “disruptive business models arise at a stage in which emerging technologies and innovations become critical, requiring new organizational structures to the products and services offered which emphasize the proposition of a unique value to the market and replace the existing business models”. Christensen & Bower (1996), Christensen (1997) show that that “the initial studies on disruptions in the market focused on the analysis of the previously highlighted technologies and discontinuous”. Christensen & Raynor (2003) linked business models to technological innovation and thus extended the concept of disruptive business models. Moore (2004) establishes that “the disruption of business models arises at a time when emerging technologies and innovations become critical through an existing business model”. “Commercialization of a new technology or an innovation process requires companies to understand the cognitive role of business models, especially when the opportunities presented by them do not fit into existing business models” (Rosenbloom, 2002). In a recent work Simmons *et al.* (2013) opine that “Business models have traditionally been considered a management tool that enables the organization of business structures, ensuring the flow of business”.

“Preserving an existing business model given the commercialization of a disruptive technology or innovation causes several limitations in the conduction of business” as suggested by Rodrigues *et al.* (2013). Construction of “new business structures or the reconfiguration of existing structures provide new ways of managing the value attributes offered, focusing on meeting the new demands made by customers” according to Pereira *et al.* (2015). Innovations in the business

models are a major factor these days, to be considered in the strategies of companies (Foss & Saebi, 2017).

A disruptive technology as applied to innovate a business model brings new risk since understanding of one or more constituent elements of the risk's current dynamics is not developed (Ruth, 2015). In a study conducted by Deloitte Touche Tohmatsu Limited in 2016 it is shown that "Companies identified disruptions to their business model as the second-highest strategic risk they face, after reputational risk." (Deloitte, 2016). Authors like Stefan Vorbach *et al.* (2017) show that there is a little research on this issue and authors like Kalevi *et al.* (2018) establish that "business model inertia hinders companies from adopting the new technological possibilities". It has also been observed in various reports that technology enablers and disrupters that are emerging in a big way could in smaller time threaten the established business models of the more robust companies. We are therefore motivated to examine the impact of disruptive technologies on the business models of companies and their consequent impact on risk postures.

3. DATA SOURCES AND METHODS

In view of our research motivation we first highlight the new technologies that are disruptive and show cases of some businesses that have innovated on the business models using the disruptive technologies and have analysed the benefits and shortcomings of the adoption. We also highlight the new risks that have emerged out the new business model adopted. The data has primarily been derived from the published material on websites, reports and magazines. We have conducted the content analysis and carried out comparisons as shown in Table 1.

4. RESULTS AND DISCUSSION

Disruptive technologies are now being used extensively compared to the conventional philosophy of using an established business model particularly for new companies and products. We

find variety of disruptive models as evolved recently. In a classical *freemium model*, the customer enjoys free basic services and pays for the premium services like Spotify, LinkedIn, Xing, Canva.com, MailChimp. However, it is observed that basic service user is usually dissatisfied and also do not want to shift to premium services. Frequent threats have also been observed while using basic services. *Subscriptions based approach* typically adopted by Amazon, Netflix and others focus more on longer customer education on new products thus challenging the classical conventional model of physical inspections and purchases. However, in case of some sensitive products, it also exposes to new risks. Floods of information may also force the customers to conventional models.

Google, Facebook in *free offering mode* has been disruptive leading to closure of various businesses that existed for years. Frequent technological updates pose critical risks. *Marketplace Model* has a great disruptive potential wherein a digital marketplace is able to connect the seller and the buyer working on a common platform. They generate money typically via brokerage fees, commissions or fixed transaction costs like Alibaba, eBay, Uber etc. Companies like AirBnB, Sharoo, Mobility, Lyft are suing a sharing economy – Access-over-Ownership form for services like renting and leasing. Though this form has generated better use of assets, it has also increase the legal risks. The *user experience* created by Apple technologies has also been disruptive. Companies like Tesla and Premium-Marken have also been able to strategically position themselves. Technology based billing has provided an opportunity to companies like Microsoft, Dropbox etc. to survive on the *pyramids*. To avoid competition, some companies have been able to create an eco-system for their products and services like Google, Apple etc. On demand platform used by Amazon Prime, Uber, Upwork etc. has also been disruptive, challenging the conventional models.

Table 1: Typical Examples of Disruptive Technologies, Business Models and Related Risks

Disruptive Technology Descriptors	Conventional Model	New Business Model	Pros / Cons	New Risks
Technologies				
Interconnection of Hardware devices and Applications	Large procedural steps for connecting the devices.	IOT – Convergence of multiple technologies (Kilkki <i>et al.</i> , 2018)	Ease and large widespread uses coupled with high risk of hackers and vulnerable activities.	Huge Cyber risk evolved with the new technologies
Artificial Intelligence	Use of physical devices for work and other activities within somewhat manual procedures	Numerous applications based on Auto data collection from search histories, past orders, previously searched or purchased products, or even overheard conversations. Autonomous vehicles can reduce accidents and may bring fuel efficiency, reduce traffic congestion.	People can focus on their work more efficiently with a reliance on computers with a variety of business and daily life applications	Human replacement leading to unemployment and a host of security concerns.
Data Dissemination	Fragmented, Piece meal transfer of data with significant controls	Block chain based transfer of data at real time with full transparency.	Transparency and Reliability. Loss of control	Frequent frauds like in currency and other investment markets
Applications				
Taxi Services	Taxi available on the road, as you move around	Companies like Uber, asking for a cab, anytime, anywhere using an App enabled smart phone.	Advantage is for the customer, cab is easily available as and when required through the mobile App	Local Taxi drivers are losing their business
Local Shop Keepers and Grocery Stores	People go to the market, visit different shops and stores to buy various products.	People now prefer to sit at home and shop on line using shopping websites or even mobile App for example , Amazon, flipkart, snapdeal, myntra or homeshop18 etc.	Local grocery stores and retail stores are losing their customers to these on line companies that provide the products at the door steps of the consumers and that	People are going jobless. Stores are being shut down.

Disruptive Technology Descriptors	Conventional Model	New Business Model	Pros / Cons	New Risks
		Even grocery and fruits and vegetables are also available on line through Grofers, Big Basket etc.	too with a variety of schemes and cash backs and many other similar attractive offers.	
Local market shopping	Hard cash	Paytm ,Mobikwik , freecharge , Phonepe	No need to carry hard cash and getting some bonus amount on shopping.	There may be a compromise on the information when linked to bank account. All apps are third party app no legal authentication and security of wallet money.
Bonus/Wallet /Easyshop Cards	Cash/credit cards ,debit cards	Product/Store specific cards	Misguide to customer by creating some fake offers	Linked directly to the account which is most vulnerable.
Insurance Companies	Offer by agents	Companies specific app's	One can do self-inspection of our vehicle, however personal details are subject to leakage threat.	May be misguide or interpret images before uploading on app
Foreign Exchange	Hard currency need to carry when we travel in foreign countries	In forex card like Niyo, one can add money in this card and withdraw money in any country through ATM without any charges (Ruth, 2015)	Round the clock facility and facilitates NEFT/IMPS transactions. Lock and Unlock Card Options and instant ATM Pin Reset with multiple payment options.	Money theft because of password leakage and fraudulent apps.
Banking	Visit the Bank for any kind of transaction, deposit money, withdraw money, update your passbook, etc.	On Line Banking available. No need to visit the bank (Ruth, 2015).	Any time anywhere banking facility via internet. Convenience of the customer is a big advantage. But security is an issue.	Frauds and hacked accounts are a big threat due to lost/hacked or stolen passwords by the use of malware.

Disruptive Technology Descriptors	Conventional Model	New Business Model	Pros / Cons	New Risks
Cloud storage	Need to store data on physical storage or secondary storage device	By cloud storage there is no dependence on physical device and one can relocate easily.	We can move and enlarge the size of business and it's accessibility from any location and any time.	Possible threats of fraudulent data manipulation and security braches
Connectivity of communication	Landline phone, SMS, call	Emergence of apps like instagram, telegram, skype, google talk	Now lots of options and choices are there for communication	Few app's may access the mobile device data which makes it vulnerable
Product Marketing	Direct & Indirect	E-Marketing/ Digital marketing target the more customers of almost all age groups	Wide range coverage	Needs special skills and knowledge of market as well as Technology

The above table has been constructed on the basis of analysis by authors from real life cases with due support from literature.

It can be inferred that technological development are changing the way of doing business and posing a threat to the conventional business models. It is projected that most industries will be taken over by IOT in 2025. Many businesses who fail to adopt because of affordability or otherwise will be wiped off by the disruptive revolutions. The AI will penetrate more and more however, it is not likely to completely remove human, yet it would act as facilitator.

5. CONCLUSION

Disruptive technologies drastically change the business models and create threat for survival of even long existing organisations. Disruptive technologies create new market place for businesses and organisations. Disruption technology empowers the new business models establishments to conquer the probable risks and to keep on buoyant in the cut-throat environment. We have shown that technological disruptions altogether create a new business model which is difficult to imitate in short run. Investment on

disruptive technology is significantly generating risk also along with the benefits. The impact of such disruptive technologies on business models is like both faces of the coin. Many businesses get closed due to these technologies and many of them entered into the market and growing much better way as compare to earlier established companies but these new technologies added new risk factors. We conclude that strategic adoption of disruptive technologies for obvious benefits must also been seen in light of potential risks otherwise it may wash out the whole businesses.

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