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DISRUPTING DIGITAL FUTURE OF PRODUCT LIFECYCLE

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ABSTRACT

Fast changing digital technologies are disrupting and changing business, product life cycles are becoming shorter and putting pressure on companies to bring a new product to market quick still cheaper and better this new technological wave warrant companies to put product innovation and development at the forefront. Data has become vital for business leaders across every industry; they are looking for a digital model to increase the efficiency and effectiveness of product lifecycle. These new trends in digital technology are shaping future of product lifecycle, Big data, Internet of things, cognitive and text analytics has come forward to the new edge of digital enabled innovation over the past few years. Big data analytics has become vital for business leaders across every industry sector. While many companies have used it to extract new insights and create new forms of value, other companies have yet to leverage big data to extend the life cycle of their products.

1. INTRODUCTION

With the fast-changing digital world, Product life cycles are becoming shorter (Cormican and O'Connor, 2009). It puts digital pressure on companies to bring new products to market faster, cheaper, smarter and better than their competitors. Organizations not just have to plan for the introduction of new products and but also have to think how to keep it alive for a longer period. Companies must ensure that they have a portfolio of products at different stages in their lifecycles to ensure a constant income. Companies also require a constant flow of information, and that is where digital innovation in trends and technology comes into the picture.

"Big data," Internet of things, cognitive and text analytics has come forward to the new edge of digital enabled innovation over the past few years. Big data analytics has become vital for business leaders across every industry sector. While many companies have used it to extract new insights and create new forms of value, other companies have yet to leverage big data to extend the life cycle of their products. Wal-Mart, eBay, and Target and so on had used big data analytics to extend its product life cycle and created new forms of digital value. When a company decides to launch new products in the marketplace, it is challenging to predict whether it will be accepted, it will achieve the number in sales, or it will sustain in market or not and give desired results. In the world of digital, predictive analytics using analytical tool can provide the answer.

This article aims to show the importance such technological innovation, its growing influence on companies and its application in the product lifecycle. It also shows the nature and volume of data used in extending product

life cycle. We can also see how much are the companies willing to invest in big data and how much are they currently gaining from their big data.

2. LITERATURE REVIEW

2.1. Product Lifecycle and Extension

Acquiring a leadership in an industry or a market niche fast, and successfully, companies need to analyze and extend its product lifecycle. According to the various studies, 66% of products fail within the first two years (Booz & Co.), 80% of new products stay on store shelves for less than 12 months (Harvard Business Review), 96% of all innovations fail to return their cost of capital.

From the birth or launch of the product to the decline, every offering undergoes what the business world calls the Product Life Cycle. The Product Life Cycle shows the variation in the sales of any given product change over time. The success of any products depends on: One, what is the launch; and how a company prepared for the launch and positioned it; two, who is the target audience and three, how to manage demand over a period.

Product Life Cycle changes with products, situation, and the market factors, all the products do not follow life cycle precisely. Each product spends different time spans in each stage. Marion *et al.* (2015) indicated the enhancement of R&D productivity and effectiveness by digital design tools used for product development and its estimated life cycle. However, how one goes about specific business-related activities could affect how one's product travels through the Product Life Cycle. There are various ways to extend Product Life Cycle, to manage product lifecycle successfully, one needs to plan carefully, and thorough understanding of its characteristics at the various points of the curve is needed. It helps to respond quickly and to en-cash new situations, leaving competitors behind. For all these minutest details is needed. Big Data provides information to the companies to create efficiencies, unleash new capabilities, and tap unrealized opportunities. Kukulies *et al.* (2014) opined that quality testing activities need to be planned and harmonized throughout the entire product lifecycle by the introduction of the digital configuration system. This step would reduce the financial efforts and avoid testing overheads.

What can businesses do to extend the product lifecycle? Extension strategies extend the life of the product before it goes into decline. Again businesses use marketing techniques to improve sales. Examples of the techniques are:

i. Advertising – try to gain a new audience or remind the current audience
ii. Price reduction – more attractive to customers
iii. Adding value – add new features to the current product, e.g., improving the specifications on a smartphone
iv. Explore new markets – selling the product into new geographical areas or creating a version targeted at different segments
v. New packaging – brightening up old packaging or subtle changes

Growth Stage

The Growth stage is the stage for establishing a product's position in a market, increasing sales, and improving profit margins. It is market acceptance stage. The companies can do it by continued development of consumer demand through the use of marketing and promotional activity, combined with the reduction of manufacturing costs. The time requires to move from introduction to growth stage differs from product to product in particular market. As there will be a rise in the awareness of the new product in the market and the size of the market will start to increase, and there will be a higher demand for the product; all of which leads to the relatively sharp decrease in production cost and increase in sales in the Growth stage. However, there will be an increase in the competition, which puts pressure on the companies to reduce the price to achieve the desired increase in sales. With lower costs and a significant increase in sales, there will be an increase in profits during the Growth stage, both regarding the overall amount of profit they make and the profit margin on each product they sell. For all these

results, companies need to implement a more sophisticated marketing approach to make the most of the growth potential of this phase.

According to Peter (Winter 93), At Growth phase, as awareness and sales both start to spurt and distribution increase to keep pace with physical demand. To extend the growth phase, Company either brings real improvements to the product; try to target it to new markets, occasionally offering discount or promotion pricing or adding perceived value such as exotic packaging. Hence the core aim is to keep a competitive advantage. Pet Rocks, for example, and Cabbage Patch dolls were born, grew, matured and started to die very quickly. The Barbie doll, by contrast, continues to mature with new features being added continuously to maintain market interest.

During the Growth phase of product life cycle, sales and profits of the company are increasing. Companies try to reinvest some of those profits in marketing and promotional activity during this stage, to help guarantee continued growth, increase market share and reduce the threat of the competition. Extension of this stage requires continuous improvement in existing product or emphasis should be on differentiation to beat rising competition and seek brand preference. Ensuring product has as long a life as possible and obtains excellent results, companies are adopting IoT, cloud computing and Big Data extensively nowadays. "Amazon and its noteworthy and effective personalized marketing powered by big data analytics—use big data-based marketing analytics to outthink their competitors."

2.2. Changing Consumer Perception Factors

In today's era, consumer behavior identified as a progressive concept. The modern-day consumers have become more sophisticated, knowledgeable, and powerful. The ever growing importance of consumer buying behavioral patterns constitutes –(i) Identifying the right audience and (ii) comprehending their buying patterns (Kotler and Keller, 2012).

Various studies aim at recognizing and constructing a process through which they can ascertain the way a consumer thinks, feels and chooses alternatives. They endeavor to learn and calculate the customer's response to sales promotion techniques. These patterns get influenced by social, political, cultural and psychological factors. Most these factors are beyond the control of the marketers, but they still have to inculcate them while analyzing a specific consumer's behavior. The marketers use these complex analyses in an organization to solve an array of issues related to trends and market needs. Through their rapid development in the coming decades, they are also gaining importance in the field of market research. Research in the retailing industry involves many corporate brands around the world to drive profitability. Since it helps decode a consumer's requirements and to deliver a suitable experience.

A consumer resolute his/her purchase based on the risks and the pestle factors mentioned above. Alongside, the retailers first identify and analyze the information of their target audience; they then market the products in a way that customers would want to purchase. It is the fundamental information that allows a company to carry forward with their sales effortlessly. However, in a competitive market like today, companies spend an inordinate amount of time to grab the more significant market share by tracking their customer's buying behavior patterns. The perception of the occasional classic bridge of marketing is still very different from what the reality is. The difference includes issues that arise after using a product/ service, how it impacts people and their rate of satisfaction. Business today utilize the Big Data (Grove, 2010) and cognitive analytics to make personalized, relevant and precisely timed packages to their customers. Cognitive analytics provides a concrete platform for the marketers to exhort the concept of "knowing the consumer well (Bose, 2002). It helps the business to treat each consumer as an individual entity based on his or her preferences and trends.

Consumer expectations influenced by the current and the past product/service evaluations and experiences. Some of these essential consumer expectations include explicit and implicit attributes such as features, performance standards in comparison to other companies respectively. Then there are the static attributes that deal with the

dependability and accessibility of the product/service followed by the dynamic expectations that evolve that include support services or maintenance of the product. Technological expectations are one such critical performance indicators that not only attract a broader audience but also provide a competitive edge to one's product/service. For example, online shopping is becoming more popular unlike the conventional way of retail shops which in turn enhance status or self-image of the consumer. Similarly, situational expectations are the pre and post notions about the brand, product/service that may or may not get fulfilled. For instance, the way companies advertise their dishes on media; very different from the reality of how a dish looks like (Ransbotham *et al.*, 2016).

From the above concepts and expectations, certain retailers easily win the spot for their target market by matching the consumer preferences with that of the organization's goals. Consequently, analytics also solves many problems for retailers. For instance, it helps to determine the decision points for each customer while he/she shops online (Hu and Liu, 2004). The retailer is unaware of the potential customers and thus treats everyone the same. Subsequently, a customer while making a purchase chooses a product/service based on his/her need; this is likely to trigger an action performed by the customer due to the initiation of the retailer. In such cases, consumers end up differentiating themselves according to their buying patterns, whereas the retailers can grasp only specific customers that exhibit similar behavior while purchasing. However, if we use cognitive and text analytics, retailers can make targeted offers on a larger scale that gets executed in both relevancy and accuracy. These aspects enable retailers to now place themselves distinctively above each other by loyalty and profit margins.

2.3. Data-Driven Decision-Making

The framework used by IBM utilized extensively as a part of promoting and deals offices. Along these lines, they pick up a comprehension in how to hold their clients monitoring, their shortcomings and making decisions. In the meantime, they can pull in new clients by bringing diverse items and benefits. Marketing Department does division examination (consumer segmenting) by utilizing the structured data. They regularly portion their client into taking account using different cluster analysis. As of late, there is seen a blast in internet shopping, the quantity of audit per item is having a quick development, which makes it more troublesome for a client to buy, as the surveys fluctuate it makes it more troublesome for an intrigued client to settle on a choice whether to buy or no. The researchers did help in picking up data, how the content examinations get utilized and how they advantage the retail business (Oliver, 1981).

It likewise demonstrates to us the significance of knowing clients sentiments, and in what capacity can these audits can be useful for the organizations. Driven data analysis gives a chance to the ventures in having a complete perspective of their clients and their operations. This information offers them in guiding, some assistance with optimizing, and mechanizing their choice making to accomplish their objectives efficiently. Web mining and text analytics likewise help in auditing their present state and the issues confronting and gained from their practice.

Practical choices in the advanced world require subjective data blended with quantitative confirmation. Among different advantages, organizations have possessed the capacity to utilize descriptive data to decrease working expenses and expand income. Customers that utilization investigation has reduced client beat by almost and enhanced income through benefit and estimating.

The potential outcomes are enormous. Data can on a fundamental level change conventional organizations. In retail for occurrence, deals information has consistently been a crucial resource. In any case, the investigation now permits them to study that database to touch base at a more precise perspective of their center client base, and sort out their advertising.

The test of examination, in any case, is in getting knowledge from existing information, as well as in having the capacity to actualize and complete the consequences of that understanding. Organizations can utilize examination to recognize the client encounters that matter most and offer them some assistance with designing encounters that will bid best to their clients. Hence, this approach gives company knowledge of the best approach to attract new

productive clients, hold its existing pool of clients, and furthermore develop business edges. Particularly in a domain where clients have challenges articulating what they mean by a "good" or "bad" experience and where their desires are changing at an extraordinary pace, the significance of examination has turned out to be much more self-evident.

Through measuring the traits that shape the customer experience, organizations can then assess distinctive client experience techniques and see the potential impact on their organizations, accordingly enabling them to settle on better business choices to build benefit and client maintenance.

2.4. Cognitive and Text Analytics

The field of business analytics emerged in the mid-1950s, with the invention of first database builders in 1960's and 1970's (RDBMS). Analytics 1.0 was a period of real advancement in picking up an objective, profound comprehension of the essential business phenomenon and giving administrators the fact-based understanding to go beyond instinct to make decisions. Data from production processes, sales, customer interaction, operations and more were recorded, aggregated and analyzed for the first time in the process of evolution of data analytics. For this, new computing advancements were vital. The first custom-built data systems built by organizations where venture information distribution center, used to catch data, and of business insight programming, used to question and report it Delgado (2016).

This process of extraction of data from the output of traditional data systems like spreadsheets, databases to generate a report containing a description of quantitative data record captured in the past is called descriptive analytics. It helps to provide a comparative analysis of past data and current data for any domain's activities (Map, n.d)(Map, n.d)

Descriptive Analytics provides the insight of consumer behavior in the past, used when businesses have to comprehend at a total level what is happening in the organization (consumer behavior), and when businesses require a summarized data and depict distinctive parts of your business. Descriptive Analytics did not help the company to find out solutions for what could happen and what should be done to avoid issues faced by consumer behavior. Additionally, lack of data and less available data sources often caused an error in summarized quantitative data. The next stage of analytics solved to issue of lack of data; this was the stage when big data came into the picture.

The fundamental states of the Analytics 1.0 period prevailed for a significant portion of a century, until the mid-2000s, when web-based and interpersonal organization firms principally in Silicon Valley—Google, eBay, started to store up and dissect new sorts of data (Big Data). The Big Data system is evolved and provides a much deeper understanding of quantitative picture of any domain.

As analytics entered the 2.0 stage, the requirement for active new techniques and tools —and the chance to profit by giving them — rapidly got to be noticeable. Organizations hurried to fabricate new abilities and procure clients. The full acknowledgment of the favorable position of the first mover could gain up to a fantastic level of hype and additionally provoked an exceptional speeding up of new offerings (Delgado, 2016).

There are many challenges in the new era of big data. When introduced in the early 2000s, Blumberg and Atre (2003) pointed out that the unstructured data and the use of taxonomy can pose the challenge of being time-consuming and expensive. Moreover, it also leads to an unacceptably low accuracy level of the automated classification systems employed by a commercial product. Chen *et al.* (2015) introduced direct digital manufacturing as a paradigm which is analyzed and compared with craft production, mass production, and mass customization. Direct digital manufacturing's sustainability aspects related to social, economic and environmental dimensions are gathered and analyzed for a better insight of this technique to product lifecycle management.

Currently, the principal challenge is that companies face the overwhelming amount of data that gets generated amid the lack of talents in the field. The supply of scientists cannot match the demand from the advanced data

platform (Delgado, 2016) also argues that mountains of big data can be overwhelming and the real challenge is that there are more complex data than ever.

Cognitive analytics innovation turns out to be a great deal more practical than the past (Big Data). On top of the "organized" information, organizations can now utilize the recently accessible "unstructured" information to drive productivity and viability. Information is progressively labeled and arranged on the Web, encouraging the preparation of machine learning calculations without requesting that the machine-learning specialists physically inventory and record the world. Development of cognitive analytics marks the third stage of evolution of analytics which helped to solve the problems faced by big data. Cognitive Analytics/Computing is the production of self-learning frameworks that utilizes information mining, design acknowledgment and normal language processing (NLP) to reflect the way the human mind works. The motivation behind mental processing is to make registering frameworks that can take care of confused issues without consistent human oversight (Davenport, 2013). Big Data information system frameworks consolidate information from numerous sources (external and internal data of organization), various channels (social media, blogs, and customer service interaction), and different perspectives (context, content, sentiment, location, time). As a result, predictive model of the behavior of things like consumers, or machinery, or business activities built inside business space. It is suggested, however, that the solution is cognitive computing; training the computers to manage data tools using natural language processing (NLP) to mimic the way human brain work. Traditionally, we need mathematicians and engineers, the quant's who can create 1 or 2 models a week, to make the models and analyze the data. Currently, AI can do the same job with much more efficiency: thousands of models per week.

On-gadget intelligence from cognitive platform decreases the measure of transmissions forward and backward to the cloud. It implies gadgets can save money on power, while likewise enhancing execution and security. Also, progressions in intellectual registering, and mixing Artificial Intelligence and machine learning into large information stages and devices, won't just empower less experienced staff to handle the complexities of information examination, additionally enhance the nature of results. With such a considerable amount of data to handle, exchanging a significant part of the work to our machines will empower us to respond quickly and transform real-time analytics into real-time decisions (Delgado, 2016).

Big Data is nothing but handling and using a large volume of data ably; it is a new power that changes everything it interacts. Volume is the prime attribute of Big Data. The second attribute is the variety of data. It happens because data come from a variety of sources like logs, streams, social media, text data, and semi-structured data from B2B processes. The last attribute of big data is the velocity which refers to the low-latency, real-time speed at which analytics need to be applied. Li *et al.* (2015) identified that the various data involved in "Big Data" could get incorporated in the three main phases of product lifecycle management i.e.Beginning of life, Middle of Life and End of Life. To enhance the digital intelligence, efficiency of the design and production and potential applications during shorter product life.

Firms like Google, eBay, LinkedIn, and Facebook, were the pioneers to embrace it and were built from the beginning around big data. These firms collected tons of data in a new and less structured format (click streams, web server logs, and social network relationships) and had no choice but to implement new technologies and management approaches. All other industries are facing such problems, such as travel industry, airline reservation, hotel stay, rental car or train reservation left a data trail, and that data over the years adds up to hundreds of terabytes or petabytes of structured transaction data. All of them have gathered large pools of data for a strategic purpose. Mobile phones, PCs, and the Internet are all tools that collect data today at an unprecedented rate. With 40% of the world, the population has an internet connection today in 2016, and most businesses are operating through the web, collecting data has become a simple question of software tracking tools and databases. In the digital economy, more emphasis placed on eco-system and less in industries. Creation and sustainability of markets

and products are the primary focus for organizations and industries to provide a platform around other system members (Teece, 2018).

2.5. Internet of Things

IoT is a network that links hardware and objects we interact with every day– able to communicate directly with one another. By 2020, it is expected to connect at least 26 billion things, according to the Gartner research analyst group. IoT data helps to have a deeper understanding of customer requirements and monitors product performance in real life. It tracks and researches how customers are experiencing products in all industries. IOT helps aerospace, automotive, consumer electronics, fashion and various others in product monitoring in real-time. IOT helps in track and enhance the product and its features throughout the lifecycle. Runge *et al.* (2016) opine that digital product assurance for model-based open manufacturing of small satellites to be small, inexpensive and relatively fast to produce short-term space assets having shorter PLC quickly and cheaply.

IoT applications can expand existing product lifecycle applications and technologies in three fundamental ways:

i. Maintenance, repair, and overhaul (MRO)
ii. Requirements management
iii. Product performance monitoring

As IoT connected to a physical product environment equipped with sensors, which enables companies to create virtual environment associated with product design, engineering, and manufacturing. Big data provides new information about how devices are performing in the field. Based on IoT-based configurable information service platform, information encapsulating, composing, discomposing, transferring, trading, and interacting with Product Lifecycle Management could be carried out (Cai *et al.*, 2014).

2.6. Cloud Computing

One the information collected through IoT in real time; it needed storage for processing and further use. Traditionally companies have to buy software or services at a one-time, relatively high cost. Also, need to upgrade it from time to time. Because of its limitation, Cloud-based software and services have evolved. Data can be stored on third-party host systems and are delivered and operated over the Internet with standard technologies such as a Web browser

Next-generation systems of engagement

i. Speed up change and innovation
ii. Automation in a hybrid cloud environment

All stages of product lifecycle especially Growth phase are in continual need for speed and performance improvements, and cloud computing can bring entirely new value to businesses. With its critical nature, companies have to take a crucial decision, and Cloud computing for product lifecycle has the potential to provide rewards and a competitive advantage. In the growth phase, where competition is on rising, companies need to modify existing product, have to add more features, address the need of consumers. Cloud computing provides faster and more efficient access to data, and shorter time to market, resulting in increased competitiveness and address such needs.There is the continual need for speed and performance improvements. Data must be readily available wherever and whenever it is needed. Cloud computing can help streamline product modification, improve product lifecycle management systems and processes, and enable virtual engineering teams to collaborate in real time. Cloud computing accelerates innovation, improves time-to-market successes, and offers added flexibility.

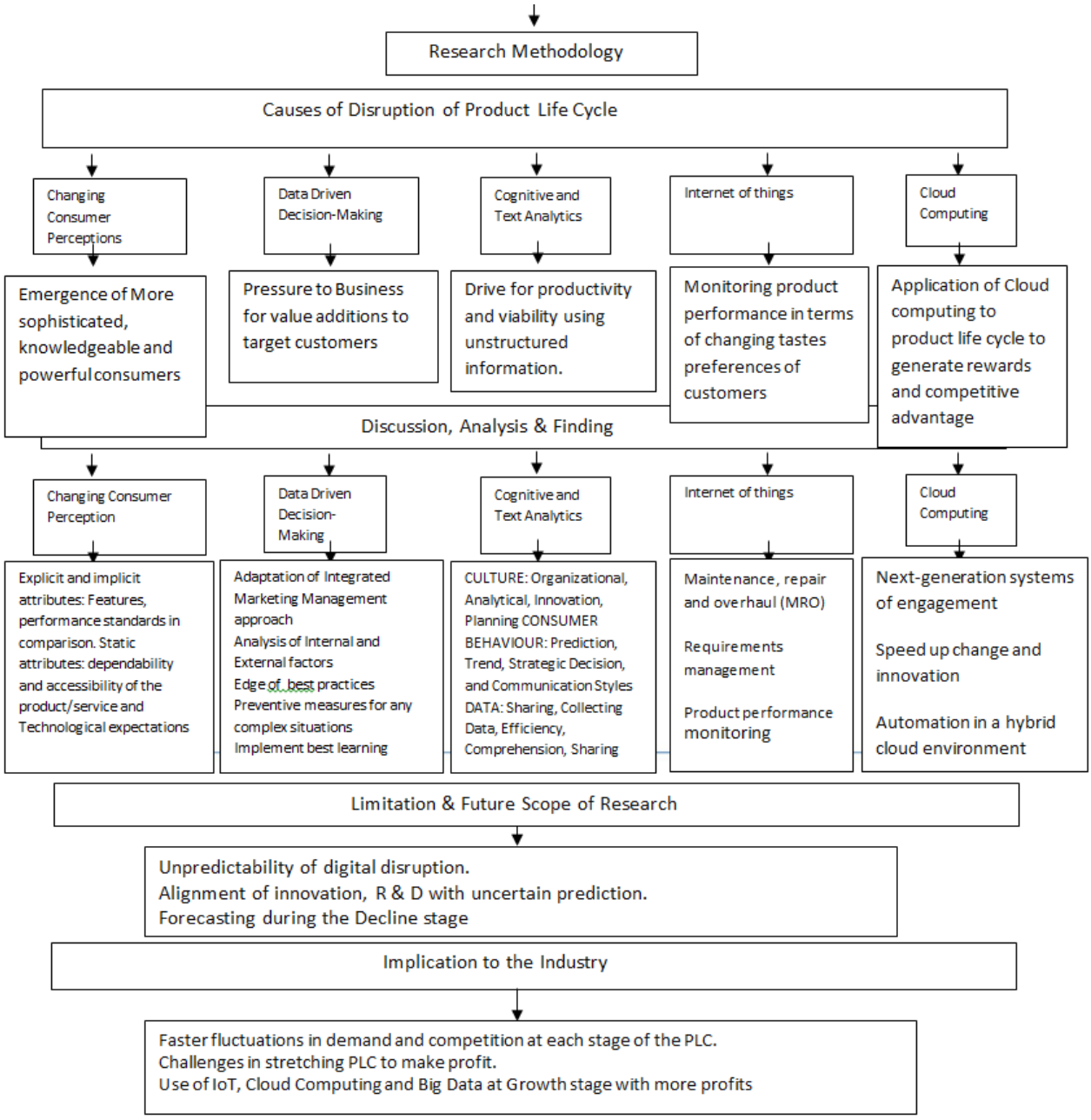
3. RESEARCH PROBLEM

Generating and using information for lifecycle extension is a complex activity and companies face many problems in this regard. Factors such as the volume, variety, and velocity of information are the prime concern of

the companies now a day. Organizations must understand how to use information generated from Big Data efficiently at the Growth Stage of Product life Cycle where there is a continuous flow of income.

Research Approach

The lack of published work in the area of IoT, Cloud Computing and Big Data and Product lifecycle motivates descriptive research. Case examples are suitable for performing this research because they allow for an in-depth analysis of a particular context



4. FINDINGS, ANALYSIS, AND DISCUSSION

With the increase in competition and awareness among consumers, there is a constant shift in the demand which leads to shrinking in Product life cycles. Companies are always under pressure either bring new products to market or keep existing product alive and to beat competitors. Companies must ensure that they have a portfolio of products at different stages in their lifecycles so that they maintain a constant income stream. At each stage demand

and competition changes. It is very challenging to stretch product lifecycle and make a profit out of it. With this paper, it is an attempt to use IoT, Cloud Computing, and Big data at Growth stage and bring income for the company.

In the growth stage, there is not only increase product awareness and sales as well. It attracts many new entrants. Companies need to update products to keep and escalate Customer Relationships. For upgrading and updating products, companies may include technology or R&D (research and development) efforts. Like what Apple did. In 2001, the iPod was a significant offering that consumers loved. After that, Apple has continuously updated and released "better and more updated" versions of that same product.

Once the product designed for recognition of the life cycle phases, companies have to work on a subsequent marketing plan that will keep the product on the market for years. Satisfied first-triers customer in growth phase become repeat purchasers, and delayed first tries become new buyers. It creates a "critical mass" of customers. Sales and profits mount up. Competitors may come with an exact duplicate of the product and create tension in the market in the growth phase. So market expands at a faster pace.

When competition intensifies, growth could be short-lived. During the growth phase, the firm should reconsider the strategic marketing questions like are we smaller (financially and competitively) than our emerging competition? If so what specific actions are required to maintain our position? Companies need extraordinary managerial talent, and large funds for advertising, promotion, research, and development.

With deep-pocketed competition, companies are forced to do thorough and thoughtful planning long before the future arrives. A company can extend growth phase by skillfully building up its reputation in a specific market segment by creating differential advantages in the eyes of the customer. If a company creates a superior and unique product, charges a premium price, reduce customer risks and develops a relatively high market share in its selected market segments, then the probability of high profits and high returns on the invested capital will be maximized.

Companies who could use more successfully are the television market; Zenith concentrated on a segment of the television market, which emphasized reliability and superior quality of other benefits. Perdue, Inc., appealed to the market segment that wanted quality chickens and the guarantee if unsatisfactory get returned.

Multi-billion dollar businesses such as Yelp, Zagat, TripAdvisor, Uber, eBay, Netflix, and Amazon crunch quantities of data including ratings of service providers and sellers to reduce customers' risk. Uber's entire business model optimized Big Data principle of crowdsourcing: anyone with a car who is willing to help someone get to where he or she wants to go can offer to help get them there. With in-depth analysis of public transport networks, they give a more excellent choice for those who live in areas where there is little public transport and helps to cut the number of cars on our busy streets by pooling journeys. With a vast database of drivers in all of the cities they, they can instantly match one with the most suitable drivers. Hartmann *et al.* (2015) see that the digital revolution is now breaching the walls of manufacturing as it continues to disrupt media, finance, consumer products, healthcare, and other sectors. In the wake unleashing innovation of new products and services, data not only get expanded but exploded due to human-machine interactions making PLC shorter.

Uber stores and monitors data on every journey their users take and use it to determine demand, allocate resources and set fares. The company has developed algorithms to monitor traffic conditions and journey times in real time, meaning prices can get adjusted as demand for rides changes, and traffic conditions mean journeys are likely to take longer. The company has applied for a patent on this method of Big Data-informed pricing, which they call "surge pricing," i.e. adjust the price to meet demand. It uses predictive modeling to estimate demand in real time.

Advances in cognitive analysis help organizations move from retrospective data analysis to one where the system makes inferences and predictions. The ability of any organization to put into action these insights help them to be ahead in the race with a new and innovative product.

5. CONCLUSIONS

With all above transformation of digitalization, forward-thinking leaders across sectors should begin aggressively to build their organizations Big Data capabilities. In this competitive world, the scale of Big Data, the real-time and high-frequency nature of the data is significant. Recently, 'nowcasting,' is getting used more extensively as it helps to estimate metrics such as consumer confidence, immediately, something which previously could only be done retrospectively, adding considerable power to prediction. Similarly, the high frequency of data allows users to test theories in near real-time and to a level never before possible. Blume *et al.* (2014) stress the need for a digital product memory besides a life cycle data harvesting to facilitate such seamless integration; this is using presenting semantics of operations to an external system

American Express is using sophisticated predictive models to analyze historical transactions and 115 variables to forecast customer churn. Big data analytics enabled American Express large amounts of data to uncover hidden patterns, correlations and other insights. With today's technology- IoT, Cloud Computing and Big Data, it is possible to collect, store and analyze data and get answers from it almost immediately – an effort that's slower and less efficient with more traditional business intelligence solutions. Today business can identify insights for immediate decisions. The ability to work faster – and stay agile – gives organizations a competitive edge they did not have before. This concept applies to other retailers who can also aggregate feeds from social networks to build an understanding of how new products received by new or existing markets, or even how their products and company reputation accepted among the public.

A look at startups that create new forms of value using big data is instructive. Opower allows customers to share their utility bills with Facebook friends to determine how they rank about other customers like them. INRIX aggregates traffic data from customers' mobile phones and other sources to provide real-time traffic reports. Zillow combines information from an array of sources to provide consolidated insight into home attributes and values, competitive properties, and other market characteristics to buyers, sellers, and brokers. These companies are big-data natives, and their success should be a wake-up call to all businesses: These new digital innovations are shaping the future of PLC and taking the trends to another level. Companies now recognize that a digital approach can boost the effectiveness of the PLC dramatically. These leaders understand that analytics and digital enablers—social, mobile, analytics and cloud computing, IoT can drive significantly more rapid, scalable and intelligent.

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