

Disruptive information Communication Technologies: Trends and Characteristics

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Abstract

The capability enterprise to transform their businesses quickly in an ever changing age of disruption is critical for their survival in today's ever dynamic market. Information Communication Technology (ICT) plays a critical role in quickening the pace of disruption as consumers are exposed to more information and more choices which results in a demand for greater value. The ability of organizations to understand the technological forces at play so that they can detect and understand market disruption signals earlier and adapt their businesses transformation plans accordingly is key to enhancing the performance of today's businesses. This enables first to be proactive and not reactive. Cloud and mobile computing have emerged to be major disruptive technologies today; enabling technologies such as 3D printing, Internet of Things (IOT), data analytics, artificial intelligence and robotics. This research therefore looks at the characteristics of such technologies and impact in the market and develops a framework that can enable a firm to be proactive in identifying these disruptive signals and plan for their organization's transformation. Both primary and secondary data was considered. Descriptive and inferential statistics was used in analyzing the data and in drawing the conclusion. The framework identifies current technological state, industry specific factors, predicted market impact and opportunities for growth as key aspects that every firm should consider before adoption of new presumed disruptive technologies. The Validation of the framework is based on an expert review and opinions.

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Keywords: Disruptive technologies, business enterprise, ICT, cloud computing, analytics.

Introduction

Less than 10 percent of companies have been able to sustain the growth that creates shareholder returns for more than a few years. Once a company's growth stalls, the probability that it can successfully re-accelerate growth is only 6%. The challenge has been expounded by the fact that it has become increasingly impossible over-time to predict what innovations will successfully create new waves of growth and which will fail with the argument that less than 20% of venture capital funded innovations succeed and less than 25% of new products launched by successful companies succeed.

Disruptive technologies are a driver of leadership failure and a source of new growth opportunities. Since the development of the first practical electronic computer, the Electronic Numerical Integrator and Calculator (ENIAC) in 1946, computing technology has continued to grow rapidly and a consistent demand for even more powerful computing devices has hastened innovative ICT technologies. The prediction by Gordon Moore in 1965 that computing power would continue to double every 18 to 24 months at the same cost has been held true. These advances have been largely driven by organizational demands and the continued consideration on information as a critical organizational decision making component. The capability for information communication technologies (ICTs) to enable business managers to digitize, classify and mine hundreds of strategic business variables; providing them with quick and accurate solutions to common business problems is therefore a key driver of ICT advances today and in the future.

ICT and Economic Transformations

ICTs have been the greatest source of global economic growth in the last decade in every economy and industry. Within that time, the role of information systems, a critical tool for management of organizational information, and data analytics which has been essential in enabling enterprises and governments to make sense of the information stored within their computer systems, has been enhanced. Indeed, ICTs have become so critical that new markets

and business models have sprouted sorely driven by ICT innovations. In late 20th century, the greatest fear among most human resource managers was the impending job losses, as adoption of ICT was viewed as a means that would deem most of the human resource redundant. That view still exists today with the fear that artificial intelligence systems will surely take over the work environment. But contrary to that fear, new business models have been created that have provided more job opportunities the growing global populations. The same case can be predicted for the emergence and growth of Artificial intelligence systems (AI); it is undeniable that some traditional jobs are under threat due to the rise of intelligent agents; but these developments are bound to create more and better opportunities for the work force. Actually, better days for the global citizenry lie ahead and AI is key to this realization.

A critical area in which ICT is considered to offer great transformations is in the market place. The goal of every firm is to gain a competitive advantage. But the big question is, how can a firm gain a competitive advantage in a market environment that is so unpredictable with transformations happening every fortnight? The impact of technology on our everyday lives and economic interactions is undeniable. In conjunction with megatrends such as globalization, climate change, urbanization and aging populations, ICT is helping to transform our society and the economic structures that have formed the basis of industries since the industrial revolution [1].

Digital technologies allow new organizational forms to emerge within and outside existing industrial boundaries thereby challenging our traditional notions of economic organization in markets. Where once size was an important driver of success for firms, today, many smaller companies are able to compete both locally and globally for the same customers. Where firms strongly defined boundaries and clearly defined economic roles were necessary, now the ability to dynamically participate in a variety of networks is key to a resilient corporate strategy. ICT is transforming the rules of our world's economic value systems, and industries are being transformed as a result.

Industrial disruptions and characteristics of disruptive ICT's

Information and communication technology innovations (ICT) are considered to be of central importance to social and economic developments [2]. Information Communication Technology (ICT) is creating productivity improvements and industrial disruption in every economy today. In an increasingly interconnected commercial landscape, business leaders must carefully consider the technological, political, economic, and competitive market variances across different markets in order to target ones that offer lasting growth [2].

According to [3], disruptive ICTs are rapidly advancing, they have a broad potential scope of impact, may affect significant economic value, and they can dramatically change the status quo of the market. Even more, their development is profoundly changing the mix of skills requested in the new ICT environment, driving demand for new specialized skills to design, develop and deploy new digital services, decreasing demand for operational and practical e-skills, particularly in user industries, and stimulating an overarching demand for e-leadership skills, in order to exploit the new technologies for business growth.

Role of Business intelligence (BI) and competitive intelligence in disruptive ICTs

When evaluating whether to enter a new geographic territory, important factors for consideration include market size, economic and other trends, competitive factors, product, labor, operating and go-to-market costs, political dynamics, and regulatory regimes in the target country. According to [3], business intelligence methodologies make it possible for firms to measure, collect, analyze and act on information on a grand scale. They give an example of Continental airlines whose various business intelligence initiatives enabled the company save more than \$500 million over six years. The essence of BI is to enable the firm use data existing in its systems to understand its current position in the market; this in essence helps the enterprise react for any occurrences in the market that seem to affect its bottom line. Through the application of BI methodologies, enterprises can also be able to easily plan for the future. The needs of the customers can also be easily analyzed and products and services tailored to meet the customer demands. BI helps create a more efficient organization thus improving the competitive position of the firm.

Key drivers of disruptive ICTs

The rate of technological innovations development continues to grow exponentially across the global economies with new technologies emerging from all corners of the world [4]. Different factors will continue to drive these new innovations. [4] predicts that the global opportunities for value creation from disruptive technologies will continue to grow. With this, cities and countries will continually compete to enhance their innovation capacity; Silicon Valley will be overtaken in the next few years as the leading global tech innovation center. While in the United states more cities are competing to overtake Silicon Valley as the leading tech hub, innovations in countries like china are driven by government and industry collaboration and market demands that are combining to foster innovations in artificial intelligence (AI) and ecommerce with the aim of providing innovations for the domestic markets.

Innovations in India and most of the other developing countries on the other hand are driven by a need to serve the local market with focus being on serving the local enterprise and consumer markets. Availability of talent, capital accessibility and technology infrastructure are leading factors in innovation development in every economy. Corporate culture and customer adoption models are also considered as key innovation drivers within enterprises.

Within business enterprises, competition will be the key concern for global business innovation. In fact, this has always been the key driver and it is expected to continuously drive a firm's innovativeness. A fact about technology is that as technology becomes more powerful and more innovations are developed, the demand for customers also changes. The complexity of customers' increases and their purchase patterns becomes more difficult to predict. This means that several factors beyond what was previously considered as the key drivers of demand will continuously change the taste and preferences of customers hence influencing their purchase behavior. As new innovations are developed, demand for such products will be expected to rise initially as customers try to experience such technologies, but not all these innovations will rise to have phenomenal effects in the market; most will fizzle off and die. But history has shown that sustained innovation of these technologies can give them a lifeline and cement their position in the market. The key idea for firms therefore remains to identify technologies that will cause disruptions in the market and adopt them. This will turn the firms in to proactive institutions and not reactive in the market.

Conclusion: Can disruptive ICT's be pre-identified?

In answering this question, we need to consider the words of [3]; "If it can be performed, it can be measured; if it can be measured it can be managed." It is obvious that IT innovations can be performed; therefore we can generally assume that disruptive ICT innovations can as well be measured and managed. Rapid technological change in the information and communication technology (ICT) sector is accompanied by equally fast-changing assessments and predictions about the diffusion and impact of innovations. Simply put, there is no stability in the ICT market. It is thus the capability to understand and consistently look out for changes in the ICT market that can enable firms to effectively react to these innovations by analyzing their potential to disrupt the market and decide whether to adopt it or not based on the perceived effect in the market. Analyzing and deciding the perceived effect of a technology is critical, an inaccurate perception leading to a biased decision can ruin the existence of every firm. History has shown that you can't fight disruptive technologies.

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