

Implementation of AI in Business Models: A Conceptual Study

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Abstract

This paper attempts to study factors that hinder the implementation, profitability and performance of Artificial Intelligence in Cost Leaders, Differentiators and Innovators and examine methods to overcome the failure factors. Artificial intelligence (AI) replicates human logic by using connected and programmed devices. Its implementation aids operational efficiencies and business decisions based on outputs from cognitive technologies, resulting in consistent product quality and manufacturing costs without significant human intervention. Moreover, implementing AI in all business environments may not always be profitable, as updating complex devices, software, and associated methodology inculcate financial implications.

Keywords

Artificial Intelligence, Business Strategy, Cost Leader; Differentiator, Innovators

1. Introduction

Artificial Intelligence was pre assumed when Catalan theologian and poet Ramon Llull vaguely communicated the concept of assisted intelligence in his works (Llull, 1308), describing knowledge as a combination of concepts. Six hundred years later, Nikola Tesla, in 1898, came up with the world's first radio-controlled vessel with "a borrowed mind.". Further, Warren S. McCulloch and Walter Pitts published (Warren & Walter Pitts, 1943) wherein they discussed networks of idealised and simplified artificial "neurons" "mimicking the brain."

Alan Mathison Turing, an English mathematician, assisted the Allied Forces to win World War II by decoding messages sent by the Nazi encryption machine "Enigma" using a counter Group "Ultra". A decade later, he conducted the Turing test and subsequently published a scholarly article (Turing, 1950) with a concept of "Thinking Machines". The term "Artificial Intelligence" was coined at a conference at Dartmouth College in the United States in 1955; it is a sub-branch of Computer Science and Engineering that designs controlled actions for machines and devices similar to human interpretation and replicates its characteristics. This science understands the human brain's complicated processes and interprets those cognitive steps to equivalent logical strategies that help computers solve problems and situations.

Opinions on how AI can replace the human brain functions, especially in complex decision making, are scarce and differ in statement and objectives. (Bouyssou & Pirlot, 2008); Nils J. Nilsson(2010); Hung T. Nguyen, E. Walker, 1996 ; (Wright &Schultz,2018) Nevertheless, a programmed machine can achieve limitations risky for human life. For example, an A Robot can go to Mars, defuse a bomb, explore the deepest parts of oceans, assist in relief work during disasters, and change its course and actions as desired by the controlling desk (Darrell and Allen, 2018).

Automated systems, when deployed, work round the clock without getting bored, unlike humans. Emotional and practical factors influence human decisions; this is not the case with connected devices; they act and deliver results faster. Knowledge Engineering has also been instrumental in altering industrial setup as experienced by the companies that operate online and have implemented AI at multiple levels to expand business roles (Lai, 2007).

Gartner (2018) predicted that 85 per cent of the proposed projects with AI would not be successful; out of the 20 companies implementing projects with the help of AI, only three may deliver (Kidd, 2018). There is a common consensus that not all firms implementing AI for their projects are successful. The hurdles mainly include reluctance on implementation from the senior management group as the management is said to concentrate only on the return on investment. Companies that invest in data mining fear risk and confusion, which are significant factors contributing to the failure of AI projects (Trunk et al.,2013). Ambitious enterprises gather dust due to a lack of support for the implementation of expert systems. Investment in training and time is a considerable risk that the management is unwilling to take quickly.

With its multiple variables and uncertainty, AI is challenging as it comprises a complicated setup of interdependent modules that cannot solve a problem independently. In case of a system breakdown, the unserviceable module must be identified, isolated, and detached from the mainstream and treated for an end-to-end solution. Implementation of AI is specialised; risks and obstacles associated with its performance are like the two faces of a coin. However, on the flip side, it has long term opportunities for business Entities.AI implementation focusing only on financial returns can hinder growth. On the other hand, it fosters new business opportunities, responsibilities, and insights, all of which

require a fresh approach to leadership. The Business houses must respond quickly and decisively, think and act digitally. They must strive, adapt, and innovate technology. Organisations on board with AI should not expect an AI module to reflect the intricacies of a human brain; it can only predict solutions for reducing humane effort.

Digital platforms work only based on data/ information pumped in the systems; data is the 'new oil' or 'new coal', which drives digital economies forward in the same way coal and oil drove industrial economies. Data does not deliver an answer but illuminates the path and provides a valuable feedback mechanism for continuous improvement, assisted initially by human work.

Devices and data can never replace the specialisation offered by human tasking; instead, they augment our intellectual reach. The machines have helped to enhance the physical capability of our predecessors right from the advent of the first Industrial Revolution. AI and humans joining hands tend to belt out better results. (Trunk et al.,2013) (Lawrence,1991). This literature also covers factors that hinder the profitability and implementation of AI in various Organisations, focusing on different Business Models of the world market.

2. Theoretical Underpinnings

This section discusses the relevant literature, An analysis of the segregated business models, followed by a discussion on the advantages and hindrances of AI implementation. Porter (1985) introduced generic strategies for business models of "Cost Leader" (no frills), "Differentiator" (creating unique products and services) and "Focus" (specialised service in a niche market). He then subdivided the Focus strategy into two parts: "Cost Focus" and "Differentiation Focus." as shown in the figure below.

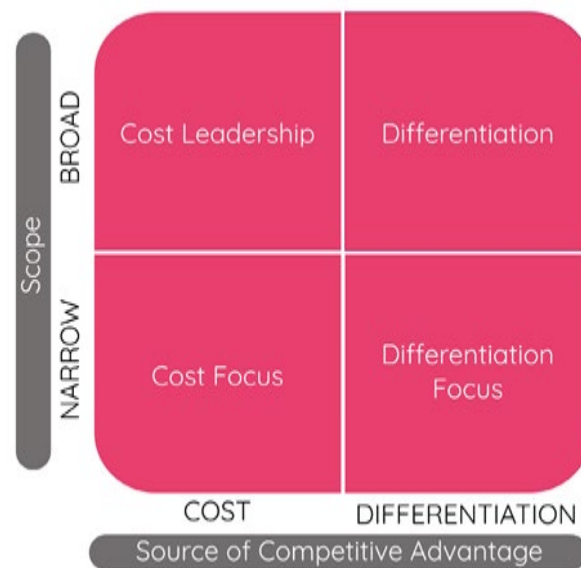


Figure 1. Generic strategies for business models

2.1. Cost Leaders, Differentiators And Innovators

Based on the theory of Porter, four methods emerged, which are (a) Cost leadership, (b) Differentiation, (c) Focused cost leadership, (d) Focused differentiation.

Low cost relative to competitors becomes the theme running through the entire strategy.

- (a) Cost leadership is the strategy to increase efficiencies and reduce production costs below the industry average or their closest competitor. It aims at a sustainable cost advantage over competitors, using lower cost and gaining market share at their expense or earning a higher profit margin selling at the going price.
- (b) Differentiators: Focused differentiation is the second of two focus strategies. A focused differentiation strategy requires offering unique features that fulfil the demands of a narrow market. As with a focused low-cost approach, limited markets are defined differently. Some firms using a focused differentiation strategy concentrate their efforts on a particular sales channel, such as selling over the Internet.

- (c) Focused cost leadership: Focused cost leadership is a strategy competing to target a narrow market based on the cost of a product, achieved by competing at a relatively lower price than a competitor in the target market)
- (d) Focused differentiation: Focused differentiation strategy fulfils the demands of a market by using a non-conventional mode of promoting/marketing their product/services. Firms using this strategy may sell their products online only when their competitors target the demographic markets) In cases, offering both low prices and unique features that customers find desirable is rare. These firms follow a best-cost strategy. Alternatively, firms that do not offer low prices or special features for their products /services are stuck where competition is most significant. (business balls, 2019) A firm on cost leadership will have a different value chain than a firm whose focus is on differentiation. For example, a firm's marketing and sales strategy call for an extensive effort compared to the firms that follow cost leadership. (Valos and Bednall, 2010)

Organisations regularly update their business methods and specify the system's marketing, operations, and financial strategies. Without a plan, companies will have trouble designing a coherent innovation system that fits their competitive needs. Innovation initiatives tend to backfire, and the efforts invested are futile as only a handful succeed; they too have a hard time sustaining the outcome. Countless multinationals have reported that the innovations lack a strategy (Vrdoljak et al., 2015).

Innovation is the introduction of a new/remodelled product/service in an industry. The innovation process converts an idea into a successful concept. An organisation's urge for innovation develops from interdependent processes and structures that define solutions to novel problems and merge ideas into a business concept and product designs (Bereznoy, 2017). Aping the successful model is not an answer. "There is no one which formula fits all" this is a process that has to be initiated and taken forward on a case-to-case basis matching competitive needs. In the absence of a strategy to align common priorities, the power of diversity is non-effective (Kahn, 2018). A strong relationship exists between innovation and strategy; when combined, they increase profits and catalyse successful value creation. Despite being the opposites, innovation and design amalgamate to create a positive relationship and lead the organisations to achieve profitability (Rüßmann, et al., 2015). Organisations follow management concept that replaces current market products, services, and business models to create new markets. Radical innovation goes further than incremental innovation and is a concept with long-term growth over the next decade. (Souto, 2015) explained that radical innovation is an innovation with a high degree of novelty compared to the product/service that existed previously and is the outcome of a non-obvious idea. Continuous innovation is an ongoing interaction between operations in the organisation, incremental improvement, learning, and radical innovation to combine operational effectiveness and strategic flexibility effectively. (Boer and Gertsen, 2003) stated that continuous innovation is a factor that can result in superior firm performance. (Madonsela, et al., 2017), The study on continuous innovation opined that innovation, when instilled in organisational culture by management across all organisational levels, provides the ability to manage knowledge for sustaining competitive advantage.

Innovations allow companies to function in an ever-changing environment. The cognitive value of innovation lies in the possibility of its implementation strategy and application in various enterprises. The crucial element of innovation capability tends to shift along with the emergence of a new environmental order in the world of business and industry. To survive and to compete in a dynamic environment, companies must change their paradigm. The paradigm can only be applied if companies possess the high capability and knowledge capital. The innovation strategy is a plan of company development to encourage and achieve advancements by investing in financial and human assets. Scholars have emphasised a positive impact of innovation with considerable variations in the results generated (Expósito et al., 2019; Mtar et al., 2021). Strategic Innovations of products and services are indicators of positive performance, unlike marketing and organisational innovations, which are less related to productivity (Bartelsman et al., 2019). Innovation and entrepreneurship depend primarily on people, skills, and knowledge. According to Mckelvey (2018), people create knowledge-intensive innovative entrepreneurship. Innovation strategy includes activities regarding the introduction of a product, service, into the market that meets desired needs of potential consumers (Reymen, 2008; Sjödi and Kristensson, 2012). Innovation helps build a strategic advantage over time. An effective strategy is the uniqueness of the company among competitors in the market. An unprecedented level of economic change is the motivating factor to implement innovation in business models (Bereznoy, 2019).

The quantitative research indicates that some changes outperform others, generating many new gaps in the company's operation. Innovation comprises of all the business subsets viz. product, process, organisation and marketing. Competitive strategy is all about achieving a competitive advantage. It offers value to the customer by reducing the prices or providing benefits and services that justify higher prices. The possible way to excel in a business environment

is to either adopt a cost leader strategy or a differentiation strategy, both in a narrow or broad scope of business activities.

2.1.1. Cost Leader

Cost leader strives towards cutting costs to provide customers with lower prices and boost savings. Its prerequisites relate to high technical capabilities and capital for the company to invest in technology and assure economies of scale. When a company projects itself as a product or service provider in an atmosphere of competition, the organisation or company aiming to follow a cost leadership strategy produces good (s) in bulk at comparatively cheaper rates and targets a large-scale consumer market. Some methods of acquiring cost advantages are improving process efficiencies, gaining unique access to raw material at a lower cost by increasing the target production quantity, optimising outsourcing and vertical integration decisions, or avoiding costs altogether. Building a strategy for costs minimisation requires a company to achieve: (a) High productivity, (b) High capacity utilisation, (c) Lean production methods (e.g. JIT), (d) Effective production process (e) Effective distribution channels.

2.1.2. Differentiator

A differentiation strategy is developing a consumable product or a desirable service that offers unique costing and value for money. Goods produced and supplied with the differentiation strategy are valued by customers and deemed par with the competition's products. (Miles and Snow, 1978) called them the Prospectors. A process on a differentiation requires continuous investment in (a) product quality (b) Branding (c) Marketing

2.1.3. Analyser

Analysers types of organisations work with the prospectors' and defenders' innovativeness to serve the established markets with existing products. These organisations handle efficiency in the markets they do and are adaptive to the dynamic change in the markets. However, rather than being first movers, the adaptive strategy of analysers tends to focus on the quick adoption of new concepts launched by prospector companies (Lieberman & Montgomery, 2007)

3. Factors for the failure of AI implementation

Artificial Intelligence (AI) fundamentally changes operations among all sectors of production transportation, and IT Developments in knowledge engineering over the last decade are opportunities for companies to automate processes and grow fast among the competitors. Google and Amazon, the AI pioneers, are reaping the benefits of AI implementation strategies.

AI as a technology is evolving continuously. However, projects infused with AI tend to be unsuccessful as there is a gradual shift in conventional business models to achieve financial goals. It is a documented fact that not all companies using AI are successful. A staggering 85% of the firms are reported to be lagging.

Following superset of factors contribute to the failure of AI implementation (Mckinsey,2020)

- a) Cross-Cultural Factors.
- b) Technical Factors.
- c) Operational Factors.
- d) Factors related to data.
- e) E Cross-Cultural Factors

Implementation of AI is a continuous team effort. It requires human resources from a specialised skill-set and a diversified cultural background. It is the responsibility of the team leaders to motivate employees and inculcate organisational maturity to handle data-intensive projects and clear the obstacles proactively. This challenge in failure of AI implementation can be overcome if data handling culture is followed based on the policies of "data-based decision making "within the length and breadth of organisations and is shared (Korolov, 2015)

3.1. Technical Factors

AI system implementation needs prerequisites and efficient groundwork; This is possible with a team well-versed in overcoming the unpredictable contingencies of business. The choice of the development software and architecture is vital to have development and maintenance teams collaborate closely. Customer involvement is the key; satisfied customers provide the best feedback for making AI viable. Data availability in Artificial Intelligence plays a significant part in the success of a project; primarily, hundreds of data codings are responsible for a seamless AI system. Faulty engineering results in an inaccurate neural network setting, even though the data is accurate.

3.2. Operational Factors

The operational roadblock faced while AI implementation is the talent gap and access to relevant data; as AI is a multi-dimensional field, success depends on cooperation among the organisational levels (Ahmad et al., 2021). Lack of updated knowledge about AI and associated regulations is one of the challenges employees face regularly. Risk and confusion also contribute to the operational factors as employees already familiar with the working process are reluctant to accept and work along with the new initiatives. However, operational challenges can be achieved by coordination between all the verticals of the organisation.

3.3. Factors related to data

Data quality and artificial intelligence (FRA Focus, 2019) and classification can be problematic for implementing AI initiatives. If the data is not available in the required dimensions, algorithms will behave erratically and lead to wastage of money and person-hours. Data consolidation and maintenance can reduce the hurdles faced during AI Implementations.

4. Reduce AI failure related to business strategy: Conceptual framework

Insufficient data is the factor that hinders enterprises from adopting AI as a way of business. For successful AI projects, organisations have to develop agile and rapid innovation methodologies. Its implementation requires continuous experimenting and testing hypotheses. Leading Management Expert and Economist Porter described that "Competitive advantages determine success or failure of a company" (Turner, 1991). A company has a cost advantage or offers its customers a unique benefit, while the competitive advantage is on the supply side, while the other is on the demand side. "To achieve a cost leadership position, strategy of a steady increase in efficiency along with the orientation of the employees are to be followed. AI faces many challenges; though counter techniques are available, machine learning implementation requires continuous human effort to gather data and build adaptation techniques. AI techniques do not support a smooth transition from one platform to another, so adoption is uneven across sectors. Respondents for the McKinsey (2018) survey on AI adoption conveyed that their organisations have adopted at least one automation feature for their processes. Out of all the respondents, only 21 per cent of organisations reported AI embedded in parts of their business and only 3 per cent integration of AI across their workflow.

In implementing automation, obstacles are achieved by combining AI and cost leadership strategies, which will be a boon to ensure success for the firms. The government portals and vendees prefer firms following the cost leadership strategy and AI implementation. In the private sector, Walmart, a leading chain of supermarkets and a Cost Leader, has invested massive investment in using AI to gain statistical advantages. A Robot christened "TALLY" employed by Walmart independently scans shelves and products in American Walmart branches (Techcrunch.com, 2019). In contrast, a Walmart employee needs on average 25 hours for such an inventory check and achieves 65 per cent. On the contrary, Tally needs half an hour for a complete inventory check and achieves an efficiency of 95 per cent. (Walmart, 2017).

In innovation and competition to sustain business and consumers, AI plays a critical role that decides enterprise winners and non-winners among the market competition(Edwards,2014). Companies are bound to invest and deploy AI across multiple functions to stay ahead. However, some early-stage companies register only a moderate success rate, as they delay the integration of AI into their supply chain and business plans. The two leading reasons for the failure of AI projects in the Differentiator firms can be (a) A lack of required skills and (b) uncertain expectations. Mistakes that the companies miss in implementing technology focus on bottlenecks and defining use cases before AI deployment (Edwards, 2014). Non-Compliance to data maintenance is also the neglected area of implementation that hinders enterprises from successful experimentation to make AI-led business a way of life and gain statistical advantages over rival firms.

Organisations must be willing to establish use cases, experiment with multiple use cases, and develop agile and rapid innovation methodologies for successful implementation of AI Focus on data strategy, infrastructure, architecture, and governance makes the difference between successful proofs of concept that do not scale vs enterprises that are cognitive and truly AI-led.

H1: AI failure is low with Cost Leadership Strategy

4.72 billion people worldwide were active internet users in April 2021, which is sixty per cent of the total worlds population (Datarepotal, 2021)

The majority were mercurial on the social media platforms, which is almost one in every four persons in the world, who is constantly updating status, tweeting/retweeting their moves and thoughts, and this is a piece of extensive information that marketers use to target customers and sell products to them by using AI.

Statista is a German online portal for statistics, which compiles data collected by the market, opinion research institutes, and data derived from the economic sector (Stastica, 2021). Social Media platforms usage is expected to grow multi-folds due to the easy accessibility of social media on mobile platforms. As reported, January 2021 saw 59.5 per cent of the global population active on the Internet. Out of this, 92.6 per cent (4.32 billion) accessed the Internet via mobile devices. Facebook is the most popular; WhatsApp seconds the race with 2 billion users. Tumblr, Instagram, and Twitter also mention the list of social media networks (Huatong, 2020). Statista further revealed that "Due to a constant presence in the lives of their users, social networks may have a direct impact on the requirements and preferences of the users.

AI can also help us know the preferences and requirements of users by a study of the website(s)/pages and frequency of visits. In addition, there are online tools available to analyse the traffic on a particular web page or view and give out the results. Some of the tools include on-platform analytics, Kiss Metrics, and Google Analytics. These tools allow businesses to engage with consumers by understanding their thoughts and needs and displaying the content as per their preferences.

Social media has captured the way societies communicate; an exuberant data exchange takes place on the Internet. As a mitigator, AI has several tools that help capture the information that can help decide consumer preferences to enable the firms to implement preferences /choices and reduce AI failure (Lam, et al. 2018).

A firm's profitability in its segment determines if it is above or below the industrial standard. In this regard, the implementation of AI plays an acritical role and is evident from the table above. The impact of the factors that affect AI implementation in the cost leader type of firm is minimalistic. The cross-cultural factors, the operational characteristics, technical factors or the factors related to data implementation have a low impact. On the contrary, the listed factors have a high to moderate effect on the firms with differentiation and innovator strategy. For practical implementation, of AI the production and delivery systems that serve the target consumers must differ from other industry segments.

H2: Use of ESM (Electronic and Social Media) can reduce AI failure.

5. Conclusion

The authors opine that this literature will contribute to developing knowledge as it deliberates on understanding the effects of AI on the organisations/leadership and management roles. It is identified that successful leadership traits and organisational development, in conjunction with AI, are not entirely conveyed. For someone looking to gain insight and do research on AI's influence organisation and its implications, and more specifically on how the implementation of AI traits will be successful, this literature will serve as a solid starting point. It will also give managers insight on preparing for the digital change.

5.1. Theoretical Contribution

Many alarms have sounded on the potential for artificial intelligence (AI) technologies to upend the workforce, especially for easy-to-automate jobs. AI plays a significant role for all organisations (McAfee and Brynjolfsson, 2016). As the internet protocols continue to proliferate, providing ample space for the growth of artificial intelligence techniques, offering the consumers updated products, cost leader firms can gain a foothold in the market with full utilisation of AI. This study contemplated the factors that led to the failure of more than 75 % of the differentiator companies who had tried implementing AI with their marketing strategy but could not sustain the market boom as they used AI factors and their in-house talent pool. If the differentiator firms aim to implement the AI factors in phases strategically, failure rates will slump considerably.

5.2. Managerial Implication

The presented study does a partial analysis of research factors and has been designed as groundwork for the literature to be understood for future scope on the topic. The objective is to critically evaluate the available literature, limited to the hurdles faced by uncertain business models among the cost leaders, innovators and differentiators. Porter's model conveys that the cost leadership, differentiation and innovators strategies are valid independently of industry or

environment and can be incompatible for some while reconcilable in a set of industries. The details conveyed can be enhanced by empirical evidence enabling the business strategists to survive, increase profit and market share. The conjectures provided can be used to study factors that can be implemented to considerably reduce the failure of AI in firms with differentiation strategies in future studies.

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