EFFECT OF FIRM'S BIG DATA ANALYTICS CAPABILITY ON COMPETITIVE ADVANTAGE: MEDIATING EFFECT OF BUSINESS MODEL INNOVATION AND MODERATING EFFECT OF ENVIRONMENTAL UNCERTAINTY

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INTRODUCTION

Big Data (BD) also plays a very pivotal role in the success of the business through targeted marketing and customized service provision. Big Data, has been the focus of research interests in recent times because of its ability to analyze a large amount of data and transform it into valuable information which eventually enables the business to make better and informed business decisions that lead to improved goods and services and also cost reductions.

The success of any business depends upon the Business Model adopted, as based on their Business Model firms materialize the available opportunities to improve their turnover and earn profits. Business Model provides the base for the firms to implement their innovative ideas through the use of technology and thus achieve a competitive advantage. However, considering the rapidly changing external environment even a successful Business Model adopted by any firm cannot be used permanently, and to cope with the changing dynamics of the business firms should innovate their Business Models.

The focus of the Business Model is limited to the firm level while Business Model Innovation is focused on the customer`s value proposition and structural redesigning of the firm. Thus, through Business Model Innovation firms can address the changing dynamics and environmental uncertainty while maintaining their market share and can also achieve competitive advantage. As per the research firms having Big Data Capabilities perform better when it comes to innovation and differentiating in the market.

PURPOSE SCOPE OF THE STUDY

Globally, organizations tend to outperform each other based on profitability, innovativeness, efficiency, and overall market share. Competitiveness is thus a multi-faceted concept which allows organizations to flourish in the market. In Pakistan, businesses have faced issues due to considerable challenges faced by the industrial sector in the past years. The telecommunication sector which had shown enormous growth and competitiveness in the past, the recent exit of a

major mobile operator from the market has not only raised a flag about the fierce competition in the telecommunication sector but also the capacity of the organizations to innovate their business model and capabilities of the organizations to gain a competitive advantage over their competitors. In this era of technology, where organizations depend on knowledge-based decisions, it is important that the organizations develop their capabilities to handle the data appropriately and make decisions based on the information. Therefore, the purpose of the study is to address the following research questions:

- Does firm's big data analytics capability significantly affect competitive advantage?
- Does business model innovation mediate between firm's big data analytics capability and competitive advantage?
- Does environmental uncertainty moderate the relationship between firm's big data analytics and competitive advantage?

MATERIALS AND METHODS

For this study, multistage sampling technique is used in telecommunication sector. In the first stage, 9 telecommunication firms (main offices located in big cities like Karachi, Lahore and Islamabad) were selected using random sampling from the sample frame of a total of 18 telecom companies in Pakistan. Letters to all the randomly selected companies were written to participate in this research, through emails and post. In response to the letter, 7 companies responded to participate in the research. In the second stage, the focal persons from the middle and high organizational tier were contacted. These focal persons were also requested to select the branches of their respective firms randomly to collect the data. In the 3rd stage, a random selection of the respondents was done by the firms from the lower, middle and higher tiers based on the criteria that employees are directly or indirectly involved in the usage of big data analytics in the firm operations. In total, 304 responses were collected based on random sampling by all the telecommunication firms.

To validate the data collected through survey, triangulation technique is used by conducting semi-structured interviews with the top and middle management. The interviews are used to validate the findings of quantitative responses, identify the reasoning and gain in-depth knowledge of the phenomenon. A total of 8 individuals from the high-level and middle-level management were interviewed.

CONCLUSION BASED ON FINDINGS

The telecommunication firms have developed big data analytics capabilities which contribute to the competitive advantage of telecommunication firms. The telecommunication firms have established their local cloud and hired competent human resources who can perform data analytics based on the data stored on the cloud. The big data analytics run by the firms are either for the improvement of their existing products or to identify their target market for their new products/ services to be

offered in the market. By doing so, the telecommunication firms have enabled themselves to innovate their business model, where they are offering more than just a medium to communicate to their customers. The telecommunication firms based on their innovative business models, have managed to gain a competitive advantage where they are able to differentiate themselves in the market. However, insights from the respondents from the telecommunication firms point towards multiple challenges towards the big data analytics capabilities, especially infrastructure and human resources due to the dynamically changing market (customers' requirements change rapidly) and rapid change in the technology.

To address the dynamically changing requirements of the customers and the evolution of technology, telecommunication firms need to improve their infrastructure continuously. The infrastructure which includes the hardware, costs in US dollars and due to the fragile Pakistani economy, the rate of the Pakistani Rupee does not remain stable. The telecommunication firms in Pakistan, which acquire spectrum licenses in US dollars, are earning in Pakistani Rupee. Pakistan has one of the lowest ARPU in the world and the ARPU has declined in USD terms over the last few years. As the ARPU of telecommunication firms is decreasing in this hyper-competitive market and overall macroeconomic challenges, the telecommunication firms have faced a considerable reduction in revenue in USD, which is threatening the telecommunication sector survival. Along with this, there are heavy taxes and embargos on hardware imports.

Along with the infrastructure, there are issues related human resource capabilities as well. Telecommunication firms are finding it difficult to hold a good human resource. One of the reasons for this is the heavy taxes being imposed by the government and little facilities being provided. Due to these reasons, any good and experienced human resource finding a good opportunity abroad leaves the country. The telecommunication firms face the challenges due to the lack of experienced human resource.

Although telecommunication firms currently have big data analytics capabilities in place, through which they are gaining competitive advantage using big data analytics capabilities and through business model innovation. Their overall competitive advantage is negatively affected due to the environmental uncertainties caused by market turbulence, technological turbulence and competitive intensity. The rapid change in the technology also change the customer preferences/ requirements, causing an intense competition. The underlying reason is the government policies, unstable Pakistani Rupee, heavy taxation, and lack of facilities. Although the government is encouraging to develop the local clouds, it needs to facilitate the firms to develop the clouds where they can compete in the international market.

POLICY RECOMMENDATIONS

Although telecommunication firms were found to have a capability to operate the big data analytics and gain competitive advantage and innovate their business model. Following concerns were noted during research, for which following recommendations are made for the policy reforms.

1. Concern

Clouds at the national level are not mature in comparison to the international clouds. One of the reasons is the lack of improvement in the infrastructure capabilities. Keeping in view the rapidly growing technology, telecommunication firms are unable to provide innovative big bata analytics solutions. The reasons are, high taxation, custom duties and embargos on the hardware equipment.

Recommendations: To take the cloud services to maturity, it is important that telecommunication firms are provided with the appropriate equipment for infrastructure to improve big data analytics capabilities. To do so, the government needs to develop a framework to facilitate the telecommunication firms with the easy access to the required hardware equipment. In case, import of hardware for the development of clouds with big data analytics capabilities is not possible, government should try getting the international cloud providers to invest in Pakistan and bring their data center in Pakistan. As data secrecy act does not allow firms in Pakistan to store the data on international clouds, the government must look into the revision of policy.

2. Concern

As the procurement of the hardware necessary for the development of cloud services and big data analytics infrastructure is done in US dollars, due to the unstable Pakistani Rupee, procurement process poses a serious issue. Due to this reason, the telecommunication firms, who are already paying for the licenses in US dollars to the government, poses difficulty in buying the required equipment.

Recommendations: As data secrecy act does not allow to store big data on international clouds and government encourages the development of clouds at the national level, the government should facilitate such organizations. The government may in such cases, plan a supportive financing/subsidy so that the firms are provided with the hardware easily. Pakistan also has embargos on the hardware which provides the high processing capacity. Efforts should be made to lift the embargos on such equipment.

3. Concern

The telecommunication firms are facing high turnover ratio with expertise in the big data analytics. According to the telecommunication firms, the human resource having expertise in big data analytics joining the firms leave after a short span of time due to international offers. The reason is better placement and facilities internationally as compared to Pakistan.

Recommendations: A framework is to be developed by the government to retain the intellect within country and reduce the brain drain in Pakistan. The individuals with the expertise in the area of computing/ big data analytics/ computer related knowledge should be facilitated with better quality of living, financial stability, and stable infrastructure. The government should try to create more secure environment in the country with equality and guarantee of better living standards.

4. Concern

The telecommunication firms are concerned that at the time of the purchase of spectrum license, the spectrum base prices are kept excessively high, benchmarked and denominated in USD which makes extremely difficult for the operators to invest into new technologies and infrastructure, which is the backbone for digital enablement in the country. Operators can pay license fee 100% upfront or 50% upfront and the rest of the 50% on 5 years instalments with LIBOR+3%. However, due to the fluctuation of USD, the business model against which they bought the license does not remain feasible, as they earn in Pak Rupee.

Recommendations: The licensing of spectrum for the telecommunication firms should be rationalized and aligned with Pakistani market realities. The steps taken to reduce the spectrum cost for telecommunication firms may allow them to leverage the cost to develop cloud infrastructure. This will further improve their big data analytics capabilities and allow them to adapt to the rapidly changing technology and market dynamics. It is crucial for the telecommunications industry to remain financially sustainable to invest in infrastructure, which serves as the foundational layer for digital ecosystem and enablement.

Concern

The telecommunication firms having an enormous data with them remain concerned about the provision of services to the government. According to the telecommunication firms, the government usually treats the telecommunication firms as vendors and offer unreasonable rates to offer digital/ICT services; and puts pressure on vendor/service providers to reduce the tariff against the legitimate commercial interests.

Recommendations: The government while receiving the services from the telecommunication firms should treat telecommunication firms as partners rather than as vendor. The tariffs offered by the government to the telecommunication firms should keep the commercial interests in view. An agreement should be developed between the government and the telecommunication firms which encompasses these commercial interests of telecommunication firms and benefits to the government.