

ADFJ ISSN 2522 - 3186.

African Development Finance Journal

VOLUME 5 (4)

*Predictive Data Analysis and Competitive Advantage of
Jade Collections Clothing Retail Store, Kenya*

Angima Caren (PhD)

Kiboma Linda G.

Date Received: February, 06, 2023

Date Published: June, 25, 2023

Predictive Data Analysis and Competitive Advantage of Jade Collections Clothing Retail Stores, Kenya

By: Angima Caren (PhD) ¹& Kiboma Linda G. ²

Abstract

The objective of this study was to determine the extent to which the Jade Collections retail store uses predictive data analysis to gain competitive advantage. A case study research design was used and qualitative data collected from the ICT manager and head of marketing through in-depth interviews. Among the study findings was that predictive data analysis is conducted on a large scale, and this analysis is done at the head office and results cascaded downwards to the branches through the branch managers. The key predictive data at Jade Collections is from sales data and to a smaller extent, social media data. A team of analysts review the data collected in conjunction with the operations departments and the findings are used to inform business decisions in the company, for instance, the introduction of new items, getting rid of dead stock as well as improving customer experience by arranging products systematically at the stores and creating differentiation by introducing varieties of products. As a result, Jade Collections has gained advantage over its competitors. The findings show that predictive data analysis has had a relative advantage on cost leadership as the management makes decisions based on the data collected and analysed, leading to improved clothing apparels, understanding of customer trends and customer behaviour. The information also helps them decide on when and how to introduce a new product and make decisions on slow-moving items. The study concludes that competitiveness at Jade Collections and in the clothing retail business at large can be examined from the dimension of cost reduction using technology, high efficiency of the business in terms of service delivery, quality products, superior customer service and client management. The study recommends that there is need to channel more resources towards the utilization of technology and that the clothing apparel stores should continue utilizing creative online marketing strategies to engage consumers directly and more personally with the clothing brands. Jade Collections should also keep abreast of new developments on the technological front to maintain a competitive advantage in the sector.

Keywords: *Predictive Data Analysis, Technology, Competitive advantage, Clothing Apparel Stores*

Introduction

The 21st-century business environment has been characterized by increasing competitive pressure, volatility, and a fast pace of changing demand. Businesses need to sustain a competitive advantage and come up with ways in which personalized goods and services can be offered through new and emerging

¹ Senior Lecturer, Faculty of Business and Management Sciences, University of Nairobi, Kenya, E-Mail: kangima@uonbi.ac.ke

² University of Nairobi, Kenya, E-Mail: lindakiboma@gmail.com

technologies. Most of these technologies have been based on the exploitation of data to improve performance. Predictive data analysis has been one of the most salient factors for most organizations to not only gain competitive advantage but also increase organizational efficiency (Hasan, 2021).

Competitive advantage and profitability can be determined through Porter's (1985) five forces, the threat of new entrants to the industry, rivalry among existing competitors, the threat of substitutes, the bargaining power of buyers and the bargaining power of suppliers. In addition, industries like insurance, manufacturing, and banking have for long been known to tap into using predictive analytics and related technologies in making decisions and thereby gaining immense value in improving customer satisfaction, doing focused marketing, reducing fraud as well as the effectiveness of activities at the internal level (Manyika et al., 2011). Technology helps retail clothing stores to compete globally which results in stiffer competition for local companies (Ngugi, 2016). For businesses to have an understanding as well as extract business value accrued from predictive data analysis, technology becomes vital in the configuration of competitive advantage and related strategies based on the sequences and trends in a competitive market.

Research Problem

In the recent past, there has been a rise in the use of predictive data analytics by firms, which has, in turn, resulted in these organizations concentrating on ways to gather information so that they can put themselves in a strategic position to compete effectively (Ochieng, 2015). Despite the emphasis on the possible gains of adoption of predictive data analysis, implementation is still a challenge since there is the ever pressing need to train the required personnel, the skyrocketing cost of the tools of data analysis as well as fees accrued through service subscriptions (Ndambo, 2016). With the onset of the Novel Corona Virus (COVID-19) pandemic, most customers prefer online markets and virtual services to minimize contact with others and save on time and expenses (Macharia, Joseph & Okiro, 2020). This has necessitated the adoption of technologies including big data management and predictive data analytics by several SMEs. It is in line with this that this study sought to determine if the use of predictive data analysis is used and if it contributes to competitive advantage at Jade Collections retail stores in Kenya

Some related empirical work in the area of data analytics, big data and competitive advantage in different contexts and examining various variables include - Mikalef, Pappas, Krogstie & Pavlou (2019) Kauffman (2012); Lee, Kweon, Kim & Chai (2017); Liu (2014); Ramsbothan & Kiron (2017); Arora & Rahman (2018), and Nderi (2014). However, these studies have not been specific in use of data analytics in retail settings thus necessitating a study of this nature. The study posits that the use of predictive data analytics

enhances competitive advantage of clothing retail stores, and specifically, the Jades clothing retail outlets in Kenya.

Theoretical Foundation

This study is anchored on the theories of Technology Acceptance Model (TAM), Technology Organization Environment (TOE), and Investment Theory, that deals with forecasting and modelling investment. The three theories are vital in explaining factors that promote the ability to use and accept technology, as well as the use of predictive analysis by companies. The TAM by Davis (1989), relates to how users of technology make decisions on acceptance or rejection of a certain technological innovation, influenced by its perceived usefulness in improving their daily output (figure 1).

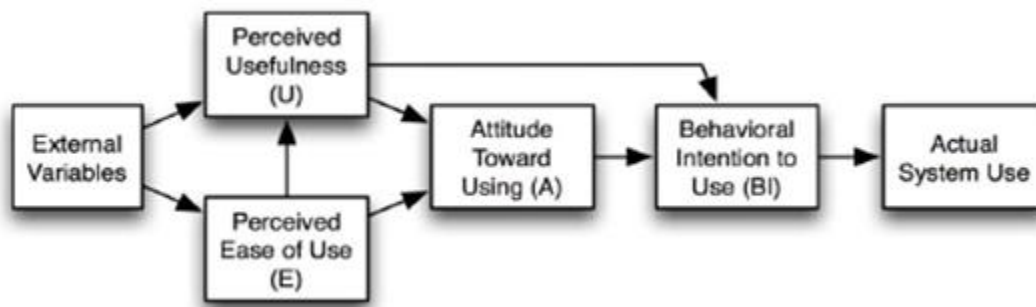


Figure 1: TAM Model; Source (Davis 1989)

The perceived ease of use on the other hand is the level of confidence of the user on how easy it is to implement and make use of technology either as a mediator or as an actual system. According to Abidaje (2018) the technology acceptance model may fail to apply or adopt new technologies. He opines that it may only be accepted for use by individuals but not institutions as some institutional-based factors highly influence the adoption of new technologies.

The Technology organization and environment framework (TOE) predicts an organization's intention to adopt communication systems, with its constructs being technology, organization and environment (Jere & Ngidi, 2020; Olivera & Martins, 2011). Organizational factors include formal and informal structures, structures that link and integrate functions, communication structures and processes as well as the size of the organization all of which influence the decision to adopt innovative technologies. For the environment, the concern is on how the organization conducts itself in a highly competitive environment as well as

governance, regulation, and the larger industry in general. Environment factors, in this case, include the market structure, the characteristics of the industry, technological support systems, requisite infrastructure and the regulations by various government entities. The technological aspect entails a description of both the external and internal forces that influence the organization's ability to adopt new technologies (Tonatzsky & Fleischer, 1990). Technology Organization Environment (TOE) and Technology Acceptance Model (TAM) help to predict user and customer behaviour by considering three main components: the first being human attitude, the second social influence and the third the perceived behavioural control (Huda et al., 2012).

The Investment Theory by Butler & Kazakov (2012), is used to develop business strategies by collecting past data and analyzing it to identify patterns that help make informed business decisions. It proposes two main forms of analysis; technical analysis (that deals with the patterns within the market that can be observed and modelled) and fundamental analysis (concerned with an organization's statements of accounts) and looks at organizational stability, and the company's competitive advantage.

Empirical Review

Predictive Data Analytics and Competitive Advantage

According to Zhang (2003), there exist several methods of prediction based on the performance of firms. These prediction models include the traditional models of forecasting such as the time series and Markovian models and the modern-day techniques such as the expert system and the neural networks. Diverse methods will naturally produce diverse accuracy levels in both the long and short-term depending on how regular and available data is. Zhang's study also shows that these prediction models are ranked in such a way that the best models are adopted by managers to create an organization's competitive edge. Predictive data analytics is vital to competitive advantage in that it not only uses data to improve the quality of decisions but also makes it more affordable and easier. The industry notwithstanding, the organization can utilize predictive data analytics to not only improve their functions but also their competitiveness (Lambrecht & Tucker, 2017).

Zhao (2009) in his study identifies artificial neural networks. These are mathematical-based models that were inspired by biological network structures. According to Stergiou & Siganos (2012), artificial networks are modelled just as the biological central nervous system processes information. Such systems are made

up of a large number of processing elements that are also highly interconnected. These elements work in unison to solve particular problems. According to Park (2011), the most common type of neural network is made up of at least three layers. These layers will function as an input unit to a layer of hidden units which are in turn connected to output unit layers (Figure 2).

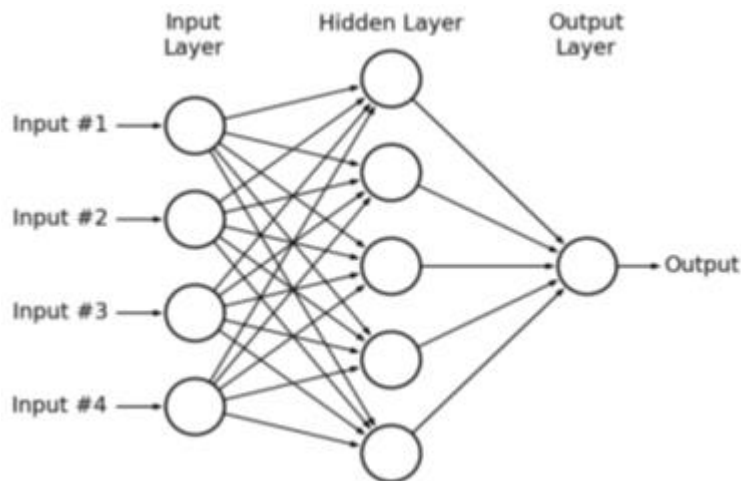


Figure 2: Neural Network Diagram; Source (Park, 2011)

Time series forecasting methods by use of stochastic models as explained by Kumar (2016) observe data that is well structured. The most basic forms of time series are random walk and mean models, usually based on the assumption that a good prediction of what will happen next, will have to ignore the past and focus on what is happening currently. Mean models normally assume that current happenings on average is what has been happening until the current time. These two models are suggestive of the fact that there is a major change from one period to the next and therefore it is easy to determine what happens next when we know what has been happening.

Kumar (2016) points out that the two most popular models are the Autoregressive (AR) and the Moving Average (MA) and advises that more accurate results can be obtained when these two models are combined. In the current study, they are better suited to predict and forecast sales in the fashion industry to attain an ordered sequence of values attached to competitiveness and understand the factors that influence the current data leading to better marketing decisions.

Ndambo's (2016) study on big data analysis and competitive advantage posits that predictive data analytics is the answer for firms seeking to have a competitive edge over their competitor. The study identifies the use of cost leadership, differentiation (taking deliberate and calculated measures to ensure that a firm's products are different from those of others) and focus (focusing on a particular niche of clientele) strategies. These strategies need to be evaluated constantly especially when firms need to stay afloat in a crowded industry. Predictive data analysis is vital in examining the already collected data not just to understand it but also to use it to gain a competitive advantage.

Several challenges come with predictive data analysis implementation and these impact negatively on the organization's ability to compete (Jere & Ngidi 2020), the biggest being the adoption of any technology, and ease and ability to use it. According to Rigby & Bilodeau (2013) predictive data analysis may not necessarily appeal to everyone in the business enterprises. It therefore takes the support and effort of the organizational management to influence their work teams and align them with the business goals (Sharma, Mithas & Kankanhalli, 2014). Another impediment in implementing predictive data analysis as an organization-wide strategy may be lack of large storage space coupled with the power to process, mine, and report on data and the insights that emanate from big data. This therefore requires enterprises to invest heavily in technologies, equipment as well as highly skilled human resources (He, 2014).

Research Methodology

A case study design was adopted in this research with primary data collected using in depth semi structured interviews with the ICT manager, as predictive analysis falls within his docket, and the head of marketing as this department utilizes predictive data analysis to make data driven marketing decisions. Data analysis was done using content analysis and documented and interpreted in terms of concepts, themes, interactions, categories and processes.

Results and Discussions

Adoption of Predictive Data Analysis at Jade Collections

The study set out to establish the adoption and acquisition of predictive data analysis practices at Jade Collections. The firm is one of the leading brands in the fashion industry in Kenya with a total of six stores spread over the major towns of Nairobi, Thika, Kisumu and Eldoret as at the end of year 2022. The main competitor brand names include L C Waikiki, Vivo, Levis and Mr Price (MRP) shops among others.

The findings were that the adoption of PDA has been a journey with rapidly changing technology, trial, and error, which has seen the firm change from one software to another. This suggests that the firm does not have one-inbuilt software for predictive data analysis but rather makes use of a series of synchronized applications for better results. It was established that that predictive data analysis has evolved through four decision phases, namely little or no data with just ideas and decisions to perform sporadic market research; the collection and review of data from multiple systems and sporadic analysis; the investment in data architecture, where data from disparate systems was combined for later use, and data utilization insights into risks, and opportunities and use in artificial intelligence and machine learning. These developments imply that the firm is ready to plunge into the wider realm of artificial intelligence for business solutions.

The Benefits from the use of PDA.

Jade Collections uses predictive data analysis on a large scale, with the analysis being done at the head office and results cascaded downwards, to its various branches countrywide. The firm has experienced benefits accruing from PDA in terms of supply chain processes as well as improvement in operational efficiency which has great effects on the organization's sustainability. This has enhanced a greater understanding of customer preferences and observation of market trends and helped in the creation of agile and responsive supply chains. The use of PDA has saved on costs by saving time on contract negotiations thus increasing profitability.

Jade Collections exploits PDA to make better marketing decisions by use of both qualitative and quantitative data to analyze, rather than use observation and intuition alone. They also exploit PDA to discontinue or discard some of the existing products and try as much as possible to develop partnerships with other industry players to leverage data sources. PDA is utilized by the top management in the setting of targets, strategic planning, and general administration of the apparel shops. PDA is also used to anticipate the most appropriate times undertake store renovations and maintenance, staffing, division of labour and various deployments.

The study established that PDA has been viewed as a tool to help in information sharing within the larger supply chain more efficiently leading to attainment of cost reduction and improvement of product availability. This is because PDA stems from the great capacity to process huge amounts of data, reduce

information asymmetry, save time, and reduce cost enabling access to what one needs without having to interrupt someone else.

The retail clothing apparel store widely uses predictive data analysis as one of the ways of getting consumer views and insights using customer data. The customer data collected includes demographic, personal and contact information using customer profile forms filled out at the branches, or online customer details forms for online shoppers. Other information collected includes purchasing patterns, preferred clothing style and fashion trend. This data is usually utilized for marketing and segmentation of their niche markets and clients. This is done in conformity with all data protection laws. However, for some data sets, the only available information may be the purchases and the customer links. It was noted that this information covers at least five years, the latest being for years 2017-2022.

The clothing apparel firm uses customer churn modelling - a predictive model that predicts whether customers remain loyal or are likely to churn (i.e. that they are not likely to make a purchase the following year). In the model, Churners are assumed to represent nearly half the number of clients. The store has conducted predictive experiments making use of the most active clients who have remained loyal in the last three years from 2019 to 2021. This provided churn predictors for the year 2022. The study established that 30% of all the new customers were likely to churn each year (this is a relatively low level of client loyalty), while 50% of the current loyal customers were not likely to churn in the coming years. The gap left by the churn is, however, filled by an impressive number of new customers. The respondents described their predictive models as not only precise but also sufficiently accurate although with a considerable tradeoff between recall and precision.

One other motivation for the need to implement PDA at the clothing apparels shops is the maintenance of assets, improvement of the ability to track clients, safety standards improvement, and value addition for clients. They find it important to keep up with the advancing and upcoming technology to maintain a good reputation. They are therefore able to update all their clients at once when need be. This has had a very positive influence on the profitability of the company. Customer feedback is used for evaluation and continuous improvement of their systems. Customers are thus able to easily access products at the stores thus improving the customer experience, which in turn gives Jade Collections an upper edge in differentiation from their competitors.

The use of PDA for online marketing and advertisement, purchasing and supply chain management, enhancing clothing store security and surveillance, online payment, research and development of clothing products has opened new revenue opportunities for the firm as they have managed to reach a market section inaccessible to them before, This has in turn resulted in acquisition of new customers and greater customer retention. Predictive data analytics technology has also facilitated the acceleration of e-payments, supported e-commerce, and brought significant benefits. Predictive data analysis has also been vital in the identification of pitfalls and triggered risk management initiatives.

The study further established that Jade Collections can easily conduct customer surveys and research. As a result, the firm can compute and analyze large volumes of data for better decision making about consumers' choices, purchasing trends and spending habits. Other than customer survey benefits, PDA has created a smoother browsing experience for customers leading to improved customer retention through personalization, which can be further advanced by artificial intelligence.

Another key area where PDA has impacted Jade Collections and the larger clothing retail is the management of inventory and stores. The benefits include improved accuracy in managing inventory, reduced logistical costs, improved customer service, improved communication, and the capacity to hold more information. Furthermore, electronic data interchange enhances information flow between or among the stores in the chain, radio frequency identification which aids in real-time inventory tracking and management and electronic point-of-sale (POS) data and big data analysis. These help the retailer to improve on its supply chain accuracy and efficiency.

The use of Predictive data analysis has spurred competitive advantage within the sector in terms of building a cost leadership edge of the organization over others. Cost leadership is built over time, and it involves using the most efficient, cost-effective models to ensure that the firm enjoys healthy product margins over its competitors. Jade Collections management has embraced the use PDA by having the right infrastructure, technical skills and IT platforms to implement it. This has helped the firm have a competitive edge over others by utilizing its results.

The retail store uses social networking and social media and in particular the use of Twitter data over a specified period to improve the forecasting of sales. An example given was that after further analysis of

twitter data, a correlation was established between consumer tweets and sales, an indication that Twitter and other social media platforms influence sales. Social media helps in the forecasting of clothing sales and that the model they used can easily be integrated with all-time series techniques of forecasting. This helps the marketing department to make complex market decisions in the clothing and fashion industry through the use of data extracted from social media. The decision-makers thus have a better and more data-based perspective that can help in market strategy optimization.

Challenges in the use of PDA

The study identified general challenges in the implementation of PDA. These include - considerable resistance from the staff to implementing new technologies, mainly attributable to the fear of unknown. Some of the fears stem from ignorance of the technology by the staff. The cost of the technology also becomes prohibitive, there is low infrastructure for technological innovations and the fact that technology for clothing apparel has been considered too complex and viewed as being irrelevant for this segment of business. Demand planning has also held back some of their operations, especially in logistics and transport, especially for extremely large projects. At times, there are challenges in their processes, and the selection of suppliers mainly based on flexibility and price.

Conclusions and Recommendations

The study established that Jade Collections has the capacity and resources and willingness to adopt and implement predictive data analysis and related technologies to make data driven decisions- from placing orders, managing inventory, making selections, and receiving payments. This has enabled them to have a clear edge amongst its competitors. They can anticipate the customers' needs and address them in time before the customer finds the need to switch to competitor shops thus helping them retain their customer base as well as acquire new ones. They are also able to drive satisfaction amongst their customers by giving them personalized shopping experiences and thus gaining a competitive edge. It was also established that PDA has led to increased sales though economies of scale and better margins in comparison to its competitors. This competitiveness is viewed from the dimension of cost reduction due to technology, high efficiency of the business in terms of service delivery, quality products, and superior customer service and client management.

It is concluded that predictive data analysis and related solutions is an emerging technology that helps grow and support business enterprises to have a competitive edge, hence when allocating resources, organizations need to deliberately invest more in this area. However, challenges like lack of trust by staff, lack of financial capability to invest in ICT solutions, and the absence of legal infrastructure make it difficult to conduct meaningful business online.

Some study limitations noted include the following: Methods of exploitation of data collected to make decisions for competitive advantage was not very specific, probably attributable to the fact that PDA and other related technologies are relatively young at the firm and other similar retail stores. Due to the limitation in scope and methodology, the findings may not be generalized to other small and medium size enterprises within the clothing and fashion industry. An ideal quantitative study with a wider scope within this industry is therefore desirable for more conclusive results.

References

- Abidaje, P. (2018). Technology acceptance model limitations and criticisms: Exploring the practical applications and use in technology-related studies, mixed-method and qualitative research. University of Nebraska – Lincoln.
- Arora, B., & Rahman, Z. (2018). Information technology investment strategies: A review and synthesis of the literature. *Technology Analysis & Strategic Management*, 28(9), 1073-1094
- Butler M., & Kazakov, D. (2012). Financial forecasting. At the 2012 IEEE Conference on Computational Intelligence for Financial Engineering and Economics.
- Davis, F. D. (1989). Perceived Usefulness, Perceived Ease of Use, and User Acceptance of Information Technology. *MIS Quarterly*, 13 (3), 74-87.
- Guo, Z. X., Wong, W. K., Leung, S. Y. S., & Li, M. (2011). Applications of artificial intelligence in the apparel industry: a review. *Textile Research Journal*, 81(18), 1871-1892.
- Hasan, R. (2021). Investigating the impact of big data analytics on supply chain operations: case studies from the UK private sector. Unpublished Doctoral Thesis, Brunel Business School, Brunel University London.
- He, X. J. (2014). Business intelligence and big data analytics: An overview. *Communications of the IIMA*, 14(3), 1-9.

- Huda, T., Etikan, I., Musa, S. A., & Alkassim, R. S. (2012). Particle swarm optimization of Bollinger bands. *American Journal of Theoretical and Applied Statistics*, 3: 667-669.
- Jade Collections (2021). Jade Collections; About Us. www.jade.co.ke accessed on 13th November, 2021.
- Jere, J. N. & Ngidi, N. (2020). 'A technology, organization and environment framework analysis of information and communication technology adoption by small and medium enterprises in Pietermaritzburg', *South African Journal of Information Management* 22 (1), 1-9
- Kauffman, R. J., Srivastava, J., & Vaughan, J. (2012). Business and data analytics: innovations for the management of e-commerce. *Electronic Commerce Research and Applications*, 11(2), 85–88.
- Kumar, V. (2016,). Time series modelling using stochastic models: A review. *International Journal of Engineering Sciences & Research Technology* 5(12), 585-589.
- Lambrecht, A., & Tucker, C. E. (2017). Can big data protect a firm from the competition? Retrieved from <https://www.kaggle.com/henrykasereka/customer-data> SSRN 2705530
- Lee, H., Kweon, E., Kim, M., & Chai, S. (2017). Does implementation of big data analytics improve firms' market value? Investors' reaction to stock market. *Sustainability*, 9(6),978-979.
- Liu, Y. (2014). Big data and predictive business analytics. *Journal of Business Forecasting*, 33(4), 33-40.
- Macharia, P. M., Joseph, N. K., & Okiro, E. A. (2020). A vulnerability index for COVID-19, Spatial analysis at the subnational level in Kenya. *BMJ Global Health*, 2020;5:e003014. doi:10.1136/bmjgh-2020-003014
- Manyika, J., Chui, M., Brown, B., Bughin, J., Dobbs, R., Roxburgh, C., & Byers, A. (2011). Big data: The next frontier for innovation, competition, and productivity. Unpublished Masters Thesis University of Nairobi
- Mikalef, P., Krogstie, J., Pappas, I. O., & Pavlou, P. (2019). Exploring the relationship between big data analytics capability and competitive performance: The mediating roles of dynamic and operational capabilities. *Information & Management*. (86-104). IGI Global.
- Ndambo, D. (2016). Big data analytics and competitive advantage of commercial banks and insurance companies in Nairobi, Kenya, Unpublished Masters Dissertation, University of Nairobi.
- Nderi, C. (2014). Business analytics and performance of commercial banks in Kenya. Unpublished MBA Project, University of Nairobi
- Ngugi, E. W. (2016). E-Commerce security and performance of SMEs in Nairobi, Kenya. Unpublished MBA Project, University of Nairobi

- Ochieng, G. (2015). The adoption of big data analytics by supermarkets in Kisumu, Unpublished MBA Project, University of Nairobi
- Olivera, V. & Martins, D. (2011). Innovative Technologies and the competitive edge: Artificial Intelligence in Kenya. Business Daily. Retrieved from: www.bdafrica.com
- Park, H. (2011). Study for Application of Artificial Neural Networks in Geotechnical Problems. Korea Republic, Samsung C&TI
- Porter, M. E. (1985). The competitive advantage: creating and sustaining superior performance. NY: Free Press. (Republished with a new introduction-1998)
- Ramsbotham S. and Kiron D. (2017) Analytics as a Source of Business Innovation. MIT Sloan Management Review. Retrieved February 28, 2017, from www.sloanreview.mit.edu.
- Rigby, D. & Bilodeau B. (2013). Management tools & trends. Bain & Robert H. Smith School Research Paper No. RHS, 106-138.
- Sharma, R., Mithas, S., & Kankanhalli, A. (2014). Transforming decision-making processes: a research agenda for understanding the impact of business analytics on organizations. *European Journal of Information Systems*, 23: 433–441.
- Shmueli, G., & Koppius, O. R. (2011). Predictive analytics in information systems research. *MIS Quarterly*, 35(3), 553–572. <https://doi.org/10.2307/23042796>
- Stergiou, C., & Siganos, D. (2012). Neural Networks. Retrieved December 9, 2016, from Imperial College London.
- Tornatzky, L. & Fleischer, M. (Ed). (1990). the processes of technological innovation. Lexington Books, Lexington, 3: 27-50.
- Zhang, G. (2003). Time series forecasting using a hybrid ARIMA and neural network model. *Neurocomputing*, 50: 159-175.
- Zhao, L. (2009). Neural networks in business time series forecasting: benefits and problems. *Review of Business Information Systems*, 13(3), 57-62.