Food Labeling of Soft Beverage
Increasing Customer Awareness

Highlights

Human Resource Management
Assessing Learning Organizations

Discovering Thoughts, Inventing Future

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Supply Chain Management, Optimization and Forecasting Techniques

By Atyeh Mohammed Alzhrani
Taif University

Abstract- Supply chain management is one of the biggest challenges of today when it is crucial to remain active in the market and competitive without compromising the processes within the company itself. The costs of production and living in general are increasing day by day and it is up to the management of the company to reduce costs to the lowest possible level in order to maintain profitability in the market. In this paper we address the issue of the supply chain and forecasting method. The impact of supply chain management extends beyond reducing costs (Farris II & Hutchison, 2002). Forecasting methods are very important for company plan, production plan, sales and similar segments of a company. The study introduce and find prediction method brings better planning for the production or sale of other parts of the supply chain within the company. Each optimization brings a new loss reduction and increase in profit, so firms need to choose the right method to predict the needs of the company. The Q model introduced by the study is one of the most used methods within supply chain optimization.

Keywords: supply chain, forecasting, production, supply chain management.

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Supply Chain Management, Optimization and Forecasting Techniques

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I. Introduction

Managing supply chain managing is the process of planning, implementing and controlling all activities in the supply chain in the most efficient way possible. According to Bahree (2006) the supply chain includes all transfers of physical suppliers and services required to produce and value the goods and bring them to final consumer. Given the transfer of market’s power to customers, meeting customer’s demands not only involves producers but also the whole supply chain (SC) (Gunasekaran and Ngai, 2004). Agility in supply chain management (SCM), namely, quick, high-quality and low-cost responding to demands, reducing the product life cycle, increasing products variety, etc. is essential to the survival and development of SC members (Hanafizadeh and Sherkat, 2009).

Excellence in managing supply chains is directly linked to superior organizational performance (Christopher M., 2005). There exists a contradiction among experts on differences in supply chain management and logistics. Few experts say both are synonymous terms, while others claim that these are two different terms. The objective of supply chains can be broken down into: end-user satisfaction, chain efficiency and supplier chain flexibility. Successful supply chain management must result in improvements in business areas. Supply chain management is focused on: increasing profits, better exploiting resources and reducing costs. Primarily the focus of supply chain is end-user satisfaction (Sharp et al., 2006). The end customer is the only one who injects "existing" money that drives the activity chain across all partners. The money is divided into chain members in proportion to its added value (Bartling, B., 2003). Supply chains are related associations of individual businesses. The concept of the network indicates the introduction of coordination in processes and relationships. An uplink means that it goes "in the opposite direction" and refers to the link between the company and its suppliers, as well as sub-suppliers with suppliers. Downstream links, or "in the direction of movement", refers to the business-to-consumer relationship (Epstein, 2006). Combined upstream and downstream connections may occur, as in the case with businesses that have return containers, pallets or internal exchange products. The flow strategy of materials, information and value streams includes: reducing the level of production breakdown (ideally just one installation step), increasing the flexibility of production assets capacity, increasing the degree of flexibility human resources capacity, greater involvement of suppliers in the production process, designing simple and short flows of information and materials, introduction of efficient information systems. Planning goals for inland transport within a part of the supply chain in production. Figure 1 presents Fixed order-quantity Model, where Optimal use: minimal transport costs, minimal idle times, high functionality and time utilization. High level of service: short waiting time, short transportation time. High flexibility: wide range of cargo for transportation, easy adaptability to the work environment. High transparency: information on the current situation, calculation of costs, establishment of indicators. Under such circumstances, in order to ensure growth, the retail supply chain must be adaptive and responsive (Ramesh, Banwet, & Shankar, 2008). Trends in production structure: production according to market needs, very limited number of products, customization to customer needs and requirements, acceptance of how fast development in new products and to quickly adapt the product range. Organizing cost-effective production also includes outsourcing capabilities, simpler means of production can be combined more easily Close (2006). In addition to the

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customers’ orders which, generally speaking, draw a final product out of the supply chain network (pull factors), supply chain networks are often subject to push factors which are caused by the feeding of raw material into the supply chain by suppliers (push factors) (Hinkelman, 2005).

II. Review of Literature

Supply chain optimization aims to successfully control the various elements within the chain. By elements we mean participants, their external contacts, but also the way of organizing some internal activities. The essence of the optimization process is the elimination of those elements that do not create or support value, but which still exist as participants or activities within the chain. Optimization is the management of complicated supply chains in their entirety by synchronizing all value-added elements within production or distribution, while eliminating all other elements Rabinob et al. (2004). In van der Vorst et al. (2000), a DES facilitates the evaluation of supply chain scenarios of a food supplier. The results obtained from the simulations suggest ways to improve the supply chain by changing inventory strategies.

Based on the above definition, it can be said that there are a number of goals that firms want to achieve by optimizing the supply chain: synchronization of all elements (participants and activities) that add value in production or distribution and elimination of elements do not create or support value. In addition to the above two basic, there are some other secondary goals of supply chain optimization: providing the highest quality customer service and retaining them. Top performers have a clear supply chain strategy aligned with overall business objectives and customer requirements (Geary and Zonnenberg, 2000). The overall productivity of the supply chain can be expressed through a simple relationship between total outputs and total inputs. Globalization, market instability, reducing product life-cycles and ever increasing competition are few of the major convincing factors which are compelling companies to focus on their core competencies and outsource an increasing amount of their other non-value-adding activities (Prahalad & Krishnan, 2008).

As mentioned earlier that performance measures in a supply chain are required “to streamline the flow of material, information, and cash, simplify the decision-making procedures, and eliminate non-value adding activities” (Gunasekaran, Patel, & Tirtiroglu, 2001). According to Bozon (2006), most of the activities in the chain are about 95% represented by non-value elements. According to them all time-related non-value activities can be classified into the following categories: queues (time until material is processed), production overhauls (bug fixes), managerial incompetence (failure to make decisions on time) and inventory costs in the supply chain.

a) Supply Chain Optimization Factors

New information technologies, increasing pressure from customers on responsiveness and reliability and the globalization of operations and markets, supply chain management has become a challenge and an opportunity (Bowersox and Closs, 1996). Optimization as a process does not happen by itself. Reviewing the literature in this field, the following factors have been identified as the most important. Bento (2003) highlights three major sources of supply-chain uncertainty: suppliers’ failure to deliver on promises, manufacturing plant failures and computer errors, uncertainty about order quantities and the appearance of a whiplash effect. All the factors mentioned increase the volume of inventories (Miller, 2004). The very purpose of stock existence is precisely to insure against supply uncertainty. Lai, Ngai, & Cheng, (2002) distinguish three dimensions of supply chain performance in transport logistics: first, service effectiveness for shippers; second, Operational efficiency; and third, service effectiveness for consignees.

Collaboration and integration of participants in the chain. Optimization is most likely to be achieved through a collaborative exchange of information between cross-functional teams within and outside the organization (Gold, 2006). Comparison with best practice, Boyles and Melvin (2005) points out that this is a thorough analysis of the success and dissemination of learning across an organization. The desire to optimize the supply chain and achieve world-class MLS must be conceptualized or have the support of top management of the company. This requires the existence of two-way communication between the management and senior managers in charge of integrating the supply chain, as well as the functions and processes within it (Frank, R. H, 2006).

III. Methodology

A set of variables that signify the impact of real working of the supply chains based on the profitability of the entire system are used to measure supply chain performance (Ramdas & Spekman, 2000). Time series methods are based on a series of data that are equally spaced in time daily, weekly, monthly, etc. data. Predicting a time series of data assumes that future values are predicted solely on historical data (Shahid & Sattar, 2017) and that other variables, no matter how potentially important data may be overlooked. By decomposing historical data, four major components of the time series can be identified Chu (2004):

- Trend
- Seasonal oscillations
- Cycles
- A random factor
The figure 1 presents Fixed order-quantity Model, the decision rule, in a system of continuous inventory control with predetermined and fixed quantities of Q, is: Continuously monitor inventories (available and ordered). When supplies fall to the reorder point R, a fixed quantity of Q is ordered. If Q is fixed and demand is variable, the time between two orders will also be variable. The fixed order quantity model is also called the Q model. The fixed ordering model, in a continuous inventory control system, is fully determined by two parameters: R and Q. The order quantity Q can be approximated by the EOQ model with acceptable accuracy provided that demand variability is within acceptable limits (Demand Variability Coefficient is less than 0.2). Average demand is used to calculate Q over the EOQ formula. The reorder point (R) can be determined either on the basis of inventory cost (if known) or on the level of service. According to the basic assumptions of the EOQ model, demand and delivery times are known and constant and inventory is not exhausted.

If the demand or delivery time is stochastic, then stocks may be depleted:
- In cases where demand is higher than expected.
- In cases where the delivery time is longer than expected.

Determining the optimal point R, or optimal preventive (safety) stocks is possible if the unit cost of holding the stock and the unit cost of stock shortage are known. The preventative amount of inventories depends on the costs incurred in the event of inventory depletion and the cost of holding excess inventories (Hoffman, 2004). The procedure to calculate the cost is:
- The amount of security stock that results in the minimum total cost is the optimal amount.
- The cost of holding additional inventories can be calculated as follows:
  Supplemental Inventory Cost = Security Inventory x Unit Annual Inventory Cost
- The cost of inventory depletion can be calculated as follows:
  Cost of non-availability of product in stock (Quantity of product whose demand cannot be met) x (probability of demand) x (unit cost of product shortage) x (number of orders per year)

IV. Findings

Brown & Dant (2008) supply chain management is in fact vital for retail success. The eyewear retailer has decided that the order point of a particular type of frame should be 50 pieces. The annual cost of holding the stock apiece is $5, and the lost profit in the event of inventory depletion is $40 per box. The store manager has experience on the likelihood of demand for frames at the time of delivery. The optimum number of orders in a year is 6.

How much preventative amount should be kept in stock?
The goal is to find a preventative amount that will minimize the sum of the cost of keeping an extra amount of product in stock and the cost of product shortage. The annual cost of inventory preventive supplies is equal to the cost of storing the product unit times the product number. If the preventative quantity is 20 frames and the order point is 50 frames, taking the preventative amount into account the new order point is \( 50 + 20 = 70 \) frames and this results in an increase in storage costs by \( 20 \times 5 = 100 \). Depletion losses on inventories can be calculated for each preventive amount (based on a formula already known). For example, if the preventative quantity equals zero and the demand for frames during the waiting period of delivery equals 60 pieces, then the sale of 10 frames is lost since \( ROP = 50 \). In case of demand of 70, the lost sales will be 20 frames. Thus, the costs due to zero amount of preventative supplies are:

Cost of non-existent product on stock = \( (10 \times 0.2 \times 40) + (20 \times 0.1 \times 40) \) = $960

V. Conclusion

Each prediction method brings better planning for the production or sale of other parts of the supply chain within the company. No part of the SCM can be ideally optimized if the previous one is not in this state, so every part of the supply chain, from the initial part to the end customer needs to be optimized. Each optimization brings a new loss reduction and profit increase, so you need to choose the right method to predict the needs of the company. The Q model is one of the most used methods within supply chain optimization that is why we introduced it in the study.

a) Research Implications

This study has the following practical implication

- The findings of the study can be used to improve the service levels to customers while reducing overall supply chain costs. Put another way, supply chain management (SCM) involves the production, shipment and distribution of products.

- The findings of the study has the power to boost customer service, reduce operating costs and improve the financial standing of a company. Organizations increasingly find that they must rely on effective supply chains, or networks, to compete in the global market and networked economy.

- Supply-chain optimization addresses the general supply-chain problem of delivering products to customers at the lowest total cost and highest profit, trading off the costs of inventory, transportation, distributing and manufacturing.

- The finding of this study contributes to the existing body of knowledge about Supply-chain optimization, it effects on operational performance and measures to improve the lead-times.

- The study finding will help the top management of firms to formulate efficient Supply-chain strategy that can enhance the organizational operational efficiency as well as industry outcomes.

- The industry can get a competitive advantage over its competitors by lowering down the overall industry lead-time.

- The findings of the study also help in efficient inventory management system, smooth information flow, and timely availability of required raw materials and optimization of the whole supply chain, which can increase operational performance.

b) Research Limitation

This study has the following Limitations

- The study is limited to the supplier's lead time and product characteristics

- The study has not explained behavioral factors related to employees and manager's personality, attitudes, and experience levels.
• Organizational composition, size, and business nature of the firm is also excluded from this research study.
• There is also limited amount of field research due to time constraints.
• Marketing, sales and other stakeholders which plays an important role in speed-to-market of a product or service are not considered in this study.

c) Future Recommendation
This study has the following Recommendations for Future Research
• The further study should focus on the suppliers’ lead time and product characteristics.
• The further investigation should take into account the behavioral factors related to employees and manager's personality, attitudes and experience levels.
• The future study should investigate Organizational composition, size, and business nature of the firm.
• The future research should be discussed on limited amount of field research due to time constraints.
• The additional study must be focused on the Marketing, sales and other stakeholders which plays an important role in speed-to-market of a product or service which are eliminated from this study.

References Références Referencias
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Artificial Intelligence based Strategic Human Resource Management (AISHRM) for Industry 4.0

By K R Samarasinghe & Dr. Ajith Medis
University of Kelaniya

Abstract: Industry 4.0, known as industry revolution 4.0, is going to be a business environment in which the labor market will get replaced by machines that can think like humans. Value chains of companies will get interconnected with data. Robots with artificial intelligence will be performing operations that were previously done by humans. Further, those will achieve more accuracy and efficiency in such activities. With this revolution, companies require to focus more on strategic human resource management, as human capital is going to be a much more valuable asset in industry 4.0 where organizations will be able to create sustainable competitive advantage through human capital. Artificial intelligence (AI) is going to be the fuel in industry 4.0. AI based machines will represent the majority of the labor force. This paper is to introduce AISHRM conceptual model which stands for the use of “Artificial Intelligence based Strategic Human Resource Management for industry 4.0”. This conceptual model developed based on the strategic human resource management theory of “resource-based view of a firm” or “resource advantage theory”.

Keywords: artificial intelligence, industry 4.0, strategic human resource management, the resource-based view.

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I. INTRODUCTION

Globalization has generated significant level of challenges to business organizations. Global level interconnected processes and dynamically changing customer expectations has created a highly competitive market place. Innovations and technology adoption have become requirements for creating competitive advantage among the industry rivals (Hecklau, Galeitzke, Flachs & Kohl, 2016). Wright, Dunford, and Snell (2001) have identified the requirement of human capital for an organization to have a sustainable competitive advantage among rivals rather than conducting human resource management (HRM) as a mere organizational process (Sajeevane, 2015). Research findings of the last two decades have converted traditional HRM into strategic management which gave birth to Strategic HRM (Yang & Lin, 2014).

According to the definitions given by (Beer, 1997; Dyer and Holder, 1988), strategic HRM is aligning HRM policies and activities with the organizational strategy (Yang & Lin, 2014). HRM reflects organizational policy on the recruitment process, career development and performance management, compensations, employee relationship, safety, and health management, and employee mobility management (Jia, Guo, Li, Li & Chen, 2018). Therefore, aligning above mentioned activities with organizational strategy is the path for an organization to achieve a competitive advantage with human capital. Artificial intelligence has become the trend and component of improving the efficiency of HRM activities with technology involvement (Jia, Guo, Li, Li & Chen, 2018).

We are at the transition age of industry 4.0, which is being defined as the era of interconnecting people and machines with big-data. Data Exchange will be done through continuous digitization and digital transformation of the value chain with artificial intelligence. In this environment of an organization, machines, and objects which involve with the organizational process will be able to learn and change behaviors independently (Hecklau, Galeitzke, Flachs & Kohl, 2016). The value chain of organizations in industry 4.0 will get profoundly based on artificial intelligence, and it will bring up sectors like data science. Significant changes in business models are required to change how strategic HRM is functioning currently, not only to manage the human work but also to decide where people should work and where machines should work (Liboni, Cezarino, Jabour, Oliveira & Stefanelli, 2019).

a) Concept of the study

Jay Barney (1991) states from the resource-based view (RBV) theory or resource advantage theory which has built a sustainable background to strategic human resource management (SHRM).

RBV shows ability of an organization to build unique, sustainable competitive advantage by strategically aligning the talent acquisition and development of resources with organizational strategy (Colbert, 2004).

Industry 4.0 is an industrial age where organizations optimize their production through smart value chains that get service from intelligence machines. The environment will be having continuous optimizations...
through machine learning from algorithms that are being connected with artificial intelligence (Shamim, Cang, Yu & Li, 2016). Accordingly, human capital development will be a factor that organizations in industry 4.0 should focus on as a corporate strategy with appropriate HRM with management approaches that are compatible with industry 4.0. HR practices like training, staffing, compensation, performance appraisal, job design should strategically drive organizations into learning and innovation. These are the factors that will ensure sustainability in industry 4.0. These activities should have continuous development cycles that use the learnings from past cases (Shamim et al., 2016).

According to the model (Figure 1), HRM activities that aligned with the corporate strategy should improve with learning and knowledge management and improve not only peoples’ capabilities but also management approaches as a continuous cycle (Shamim et al., 2016).

Artificial intelligence (AI) defined as algorithmic components that learn through environment and cases and improve its ability in decision making and labor processing with the support of analytics and a knowledge base. AI can bring cost-effective methods for management that will improve according to the latest experience. AI can bring benefits to an organization from an economic perspective by continuous improvement of efficiency in all aspects of HRM and as it will become the new trend for HRM in the future (Jia et al., 2018). The concept of this paper is improving SHRM for industry 4.0 with the usage of artificial intelligence based on SHRM theory of resource-based view.

b) Purpose of the study

Even though artificial intelligence has developed and digitized a significant level of manual work from the HRM industry, systems, and tools that are focusing on strategic HRM are significantly low. The main problem is the lack of research conducted to define a framework for AI and SHRM based on SHRM theories (Jia et al., 2018). According to the resource-based view of SHRM, organizations should be able to ensure alignment of resources for the organizational strategic direction and how the organization increase human capital to have a sustainable competitive advantage (Colbert, 2004). In this paper the author is focusing on the above problems to define AI framework targeting industry 4.0.

c) Problem Significant

While human capital is going to be the highly valued capital of an organization in industry 4.0, it is going to get a significant challenge from following social problems, lack of young labor force, that is not sufficient to replace the retirement age workers, young knowledge workers placing more importance on factors such as work-life balance, influence in virtual work patterns, the requirement of learning and development throughout their job life cycle, the increment of skilled based jobs and reduction in the labor job market and minimization of continuous work requirements (Hecklau et al., 2016).

According to the Price Waterhouse Coopers’ 11th Annual Global Survey, 89% of CEOs admit the acceptance of the “People agenda” into their considerations for the strategy. Hewitt’s survey (2008) shows the need of the majority of companies to focus on top talent as the proposition of economic decline (Beechler & Woodward, 2009). The above factors show the requirement of an AI framework for aligning HRM activities from industry 4.0.

d) Methodology

This paper focuses on discussing and reviewing the literature of case studies, and journal articles about artificial intelligence, industry 4.0 and strategic human resource management. Web-based articles and information of latest evolving startups if human resource based AI software products also taken in to review.
Therefore, the literature review is the research tool used for this concept paper. Finally, the author is introducing the conceptual model for artificial intelligence for strategic management aiming at industry 4.0. For this conceptual model, author get the support of resource based-view of a firm theory of strategic management and competitive advantage. From this concept paper, author is tiring to conceptually fill the literature gap of using artificial intelligence for strategic human resources management.

II. Literature Review

a) Artificial intelligence

AI is a software engineering domain that is developed based on cognitive science, which is emerging with research in areas of machine learning, natural language processing, Robotics, and image processing (Lee et al., 2018). During the past few years, due to the development of machine learning ability of AI, a significant level of algorithmic developments has contributed to getting AI for more industrial aspects (Jia, Q et al., 2018). Due to the drastic development of AI, a new era of labor has exposed to the globe, which are machines with human thinking patterns. Success of this algorithmic innovation can being measured through the enormous victory that “Google Alpha GO” AI chess player took against South Korean chess player Lee Sedol (Silver et al., 2016).

b) Strategic HRM

Organizations have been practicing HRM as a separate management practice, and it was not a factor that considered in developing the corporate or business strategy of an organization. Jim Walker (1980) was the first to suggest to have a human resource plans for the business strategy of the organization and this was the eye-opener for SHRM (Wright, Snell & Dyer, 2005). The literature of Schuler (1992) Dyer and Holder (1988) establish that strategic HRM needs alignment to the company’s corporate and business strategy with HRM.

According to Rich, E. (1983), artificial intelligence is constructing a pathway to make machines do things that humans do more wisely. However, according to the information availability and computational power and algorithmic advancement, AI has developed into a way that machines can do things accurately and efficiently than humans (Jia, Q et al., 2018).

The core of AI is big data analysis, which is the major contributor for the development of AI. Other than big data, cloud technology, domain knowledge, and cases are the key elements of AI that use with industry level. According to the current AI frameworks, the productivity growth that organization gets from AI-based automation is still at a significantly low level. This is not only based on the productivity paradox but also due to the growing market demand and competition. More than the productivity growth, industry 4.0 needs revolutionary changes because of emerging changes in technologies such as big data analytics. Industrial internet of things will convert operational flexibility and efficiency into significantly high level in an eco friendly way (Lee et al., 2018). Figure 2 shows a comparison of the industrial AI system with other learning systems, and it indicates the requirement of this industrial AI framework for operations of industry 4.0.

![Figure 2: Comparison of industrial AI with other learning platforms (Lee et al., 2018)](image-url)
resources as a strategy for a competitive advantage over the global competition (Sheehan, 2005). The main difference between HRM and SHRM, HRM also called as technical HRM that covers conventional functions which are recruitments, training, career developments, performance evaluations and appraisals where SHRM is focusing on empowerment and career management of employees and align them to a corporate strategy, while converting workplace into high performance workplace which directly focuses on achieving company goals (Yang & Lin, 2014).

Considering the theoretical background of the SHRM, which needs to implement SHRM in an organization, resource-based view or resource advantage theory has received a significant amount of attention in the literature. An organization should inspect from resource side from it (resource-based view of a firm) rather than product side of it and they suggested using resource position barrier metric, and resource product metrics as a tool to measures the strategic position of an organization (Wernerfelt, 1995). According to Majoor & Witteboostuijn (1996), the resource-based view of a firm is a strategic management theory that provides a way to recognize the resources of the organization that can build sustainable competitive advantage.

Resources of an organization are not limited to people; it is about skilled people, brand names, machinery, etc, (Sajeevanie, 2015). RBV shows that organization can add value to its competitive advantage by acquiring, growing and merging not only human capital but also physical and organizational resources and converting to the sustainable competitive advantage that will be difficult to copy for competitors (Colbert, 2004).

c) Industry 4.0

Term industry 4.0 represents industry revolution 4.0 occurring as a result of the current speedy development of the high-tech industry. Industry 4.0 describes the business world that people and machines are interconnected with real-time data and get fed through digitized value chain. According to the based background provided with artificial intelligence, machines will be able to increase efficiency by learning human patterns (Hecklau et al., 2016). Predictive maintenance (PdM) of a factory is being considered as a key feature of industry 4.0.

It analyzes, predicts, and indicates the maintenance of machines. Industry 4.0 will enable flexible environment for data communications for cyber-physical systems and generate AI-based algorithms that can-do predictions on the factory process (Chiu, Cheng & Huang, 2017).

According to Shamim et al., (2016), industry 4.0 is a development of a cyber-physical system for production, connecting machines via sensors, and smart manufacturing to the value chain. Here, the author shows value of the human resources in industry 4.0 as all the above-mentioned tasks need continuous innovations done by skilled human resources. When considered the human resources perspective of an organization, industry 4.0 will face a number of socio-economic problems such as lack of skilled staff for maintaining the business, aging society with later retirement, cost reduction pressure, and short product life cycle (that requires different skills and also effect change) will become the main problems. Out of which most critical challenge would be the aging society. Because of not having attractive strategies to attract the young generation to the labor market, there will be very short of young people in the labor market to replace the retirement-age people. Young people who are entering the market also critically consider work-life balance and flexibility of work with virtual environments. Further, lifelong learnings will be attractive values to keep skilled young staff in an organization (Hecklau et al., 2016). Industry 4.0 implies changes in the way human relations (human to human), changes in the way that people involved with organizations and also changes in the way people get involved with innovations and technology (Liboni, Cezarino, Jabbour, Oliveira & Stefanelli, 2019).

d) Using artificial intelligence to strategic HRM in industry 4.0

According to the above literature, industry 4.0 is going to be a business world where machines are connected with data and work efficiently than people in the production process. The labor market will get replaced by robots that can work independently. Every job is going be a different job as jobs will require a different set of skills. But there will be important skills with increased demand, and salient and those should get developed by the human resource management function (Hecklau et al., 2016). Even though industry 4.0 represents the era of advance and intelligent production, the base of this era would be HRM (Liboni et al., 2019). Sivathanu and Pillai (2018) states that HRM innovations done by skilled human resources. When considering the human resources perspective of an organization, industry 4.0 will face a number of socio-economic problems such as lack of skilled staff for maintaining the business, aging society with later retirement, cost reduction pressure, and short product life cycle (that requires different skills and also effect change) will become the main problems. Out of which most critical challenge would be the aging society. Because of not having attractive strategies to attract the young generation to the labor market, there will be very short of young people in the labor market to replace the retirement-age people. Young people who are entering the market also critically consider work-life balance and flexibility of work with virtual environments. Further, lifelong learnings will be attractive values to keep skilled young staff in an organization (Hecklau et al., 2016).

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Summarizing the above, the author is going to find solutions from artificial intelligence for solving human resource issues in industry 4.0 to enable companies can create a competitive advantage according to the resource-based view. Recruitment and knowledge management - as a solution for lack of skilled staff and aging problems in industry 4.0. Robotic process automation- as a solution for cost reduction.
The target of industry 4.0 is to work with robots and other devices that have human thinking while efficient than humans and that are connected to each other with big data to increase the efficiency and productivity of the industry with less cost (Rusydan, Ibrahim & Hassan, 2019). In the business environment of industry 4.0, selecting the best-skilled staff for the organization should be the strategy for HRM to ensure that the company will drive towards sustainable competitive advantage (Colbert, 2004). Submitting paper-based curriculum-vita has got replaced by online job portals, and into electronic formats and these has absorbed by millennials. Electronic profile activities and data such as Facebook, LinkedIn has become the base of candidate selection process and HR managers currently using social media and professional networks such as LinkedIn to do the headhunting. According to Reilly (2018), AI has simplified the process of selecting suitable talents to the company by providing efficient and more accurate platforms that lead to a better relationship between the applicant and the employer (Rusydan, Ibrahim & Hassan, 2019). The screening process and decision making about the talent and skills that align with company strategy will be the strategic HRM task that any company would expect in industry 4.0. The ideal corporation who are into artificial intelligence-based software development shows how it can reduce the biases of candidate selection process with data screening and decision-making support with AI while reducing the recruitment cost by 70% (Jia, Q et al., 2018).

However, Dennis M (2018) shows the danger in using AI in ethical decision making by giving an example from college recruitment. “Even though AI is reliable in pattern recognition and computation, it cannot replace human” (Dennis, 2018). However, we can directly argue with the article as AI has the power of pattern recognition and learn from cases and identify new patterns better than humans. The best part of AI is that it is filed with big data and analytics and machine learning system (Colbert, 2004), which can develop by past recruitments and success and fail cases. AI that uses for strategic HRM should focus and also get learning from HR analytics emerging in the HRM industry. Mc Kenney describes their development of feeding HR analytics into machine learning algorithm to identify behaviors, patterns and identify and predict employees at risk of resignations. Based on big data gathered at of series of the exit interview and ongoing HR data tracking, one of their customers has cut down $20 millions of retention bonus and also has reduced unwanted attrition (Lippens, Schaninger & Tanner, 2019). Above factors illustrates the need for HR analytics as a longing process with AI-based strategic HRM for industry 4.0.

From the Sri Lankan context, companies who are into AI-based strategic HRM software development (“C-SUITE HR,” 2019) show evolvement of their career guiding bot “SIA” in to HR analytics based AI solution for strategic HRM. It analyses the data from the graduate level, and as a career guidance bot, it shows a career path according to the skills of the candidate. Analysis and prediction will get done not only based on their preference but also by analyzing social media context and series of interview inputs from the candidate and also from interview words. It shows how it captures HR analytics of a particular user throughout their career and provide a prediction for the organization (“Sia,” 2019).

Another main challenge for HRM in industry 4.0 is cost reduction pressure and aging staff that will not get replaced by the younger generations. Cost reduction will be a high considerate factor in industry 4.0 and it will be a pressure to provide product level completion (Hecklau at el., 2016). Therefore, HRM should align with absorbing knowledge and skills from existing labor and conduct operative trainings. More than that HRM, should consider costs solutions without large scale recurring cost. Robotic process automation is not an application or process. It is a way to replace a human from a particular task by automating the process through technology. RPA is a combination of IT and HRM, and it has become a part of people’s life such, as SIRI and Alexa as personal assistance. Artificial intelligence here is going to become a critical layer in RPA in developing the future workforce (Rai, Siddiqui, Pawar & Goyal, 2019). RPA is a technology that enables companies to configure bot or robot that can perform tasks or processes in a higher efficiency (compared to human) without humans’ involvement (Rai et al., 2019).

Leslie Willock, Mary Lacity, Andrew Craig (2017) from their paper on “Robotic process automation: strategic transformation lever for global business services” shows “Xchanging,” an insurance company based step by step process automation with RPA. Looking with a resource-based view of a firm, organizations should consider to develop and train their resource as same as an accusation, to build a competitive advantage. Therefore, an organization should get the service of cyber-physical agents to capture data from the workforce (Chiu, Cheng & Huang, 2017). SHRM should consider developing training programs and handover and take over process automation and identify where a machine can work better than humans and make the cost reductions. In the paper “Robotic process automation -Automating the automation” done by Blitz technologies mentioned that RPA is the next technology that needs human judgment (Rai et al., 2019). But, as we can see from above literature RPA will be able to run with high-level of HR analytics that can gain through cyber-physical agents.
and align it with company strategy with resource-based view and stretching the algorithm through AI that is capable of handling aging staff and ease off the cost reduction pressure for a company.

In the past decade we saw onshore workforce changing into offshore while reducing cost by four times. But with RPA same tasks can be done less than half the price of offshore cost, but still, all work will get done onshore. Data production, according to the performed tasks, will get passed to the analysis process for the efficiency improvements and then feed again to the production floors with increased efficiency (Rai et al., 2019). There can be efficiency limiting factors by product types and according to environment variables. Therefore, this analysis done through the AI algorithm in RPA process accuracy will be high as it does not take human involvement. Therefore, this RPA should provide feedback for the resource plan which should always need to align with the corporate and business strategy of the organization (Rai et al., 2019).

III. Conclusions

To implement Artificial intelligence-based SHRM for industry 4.0, it is a must to implement an industrial AI framework that can learn with a systematic learning approach. According to current AI and machine learning system, it will need a process to identify the expert level and provide updates. Therefore, AISHRM system that is proposing in this paper should base on industrial AI framework. To be in competitive business by building sustainable competitive advantage, an organization should focus on AI algorithms that will not only update people skills but also whole management strategy by learning from past cases.

HR analytics should be a key player in this AISHRM framework throughout the life cycle of employee and organization child needs to consider about machine learning algorithms and skills people that have skills in high end AI algorithm development as a competitive advantage. HR analytics consider as the nerve system of the whole AI SHRM system of the organization. It should be able to identify patterns that cause for resignations and low performance and feed those particular data to AI algorithms to gain more accurate predictions.

When it comes to resources in industry 4.0 similar to human resources, machines also need to be considered as resources that require learning and training; handover takes over process, and analytics. AISHRM process should be a framework that covers all aspects of HRM, and beyond otherwise, organizations will not be able to get the expected return on investments. It should start with on or before the recruitment process to screen and make decisions about talent selection. This output and learnings should store in a central knowledge base. The output from appraisals and other HR analytics should also save in a central knowledge base to compare with recruitments and learn and update the AI algorithms for the next phases of selections. SHRM should always analyze to identify what to convert from RPA and what is not. These decisions should always align with the corporate strategy of the company.

Main Tasks for AISHRM process in industry 4.0 should start with automated talent recommendation. This function includes reading electronic curriculum vitae and scraping social media and professional network data, analyzing the cyber-space behavior of particular candidate, connecting to other HRM systems via Application Interfaces (API), conducting the initial selection of interviewees through an automated gaming and psychological tests. Automated hand over take over process (HOTO) by learning from cyber agents and past cases this automated agent will be conducting HOTO programs and provide recommendations with percentage of particular process knowledge of the user and areas of high skills and low skills as the next task of the process. Working condition tracking, conditions that motivate and increase productivity and decrease motivation and productivity. This module also has does self-learning with cyber-space articles and also results from a work-place should consider as an ongoing task.

Automated tracking on performance, efficiency, patterns of work, both humans, and machines and update knowledge base. Cyber-physical agents will be a part of this tracking process. This module is a supportive module for other processes of the organization. Strategic training and developments - which focus on the work tracking and analyzing available resources inside and outside of the organization will provide recommendations on what kind of process that can automate with RPA aligning with the organization strategy and conduct training for humans and also for machines for particular operations. Analyzing patterns of people - this module will show details about people that are at risk of resignation and demotivated and percentages of risk of losing and replacement level and cost whether it is aligning with the business strategy of the company.

The strategic alignment module should include analysis about overall human resource strategy and strategic fit for the corporate and business strategy and deviations. There data should also transfer to the knowledge base for learnings. Information from this module will be able to use to decide whether the company should select a new strategic choice or build a sustainable competitive advantage among the industry rivals.

References Références Referencias


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A Bayesian Network for Assessing Learning Organizations: Case Study of Mexico

By David Joaquín Delgado-Hernández, Heriberto Archundia-Méndez, Efraín Ríos-Plata & Carlos Enrique Rodríguez-López

Abstract- Organizations endeavoring to promote learning practices on their daily businesses need guidance, information, examples, frameworks, qualitative and quantitative models from existing practitioners to help them set out for the road. Worldwide, research in the Learning Organization (LO) domain has increased mainly in developed countries. In contrast, literature is still scarce in developing nations, where companies sometimes struggle to survive. Moreover, most of the research reported in the area of organizational learning focuses on qualitative analysis and lacks a framework for assessing existing performance. This paper presents the results of an empirical study investigating how a sample of Mexican firms have embraced the concept of LO, and proposes a Bayesian Network (BN) to evaluate their advances.

Keywords: organizational learning; knowledge management; bayesian methods; analytical modeling; network analysis.

GJMBR-G Classification: JEL Code: D83
A Bayesian Network for Assessing Learning Organizations: Case Study of Mexico

David Joaquín Delgado-Hernández⁹, Heriberto Archundia-Méndez⁹, Efraín Ríos-Plata⁹ & Carlos Enrique Rodríguez-López⁹

Abstract- Organizations endeavoring to promote learning practices on their daily businesses need guidance, information, examples, frameworks, qualitative and quantitative models from existing practitioners to help them set out for the road. Worldwide, research in the Learning Organization (LO) domain has increased mainly in developed countries. In contrast, literature is still scarce in developing nations, where companies sometimes struggle to survive. Moreover, most of the research reported in the area of organizational learning focuses on qualitative analysis and lacks a framework for assessing existing performance. This paper presents the results of an empirical study investigating how a sample of Mexican firms have embraced the concept of LO, and proposes a Bayesian Network (BN) to evaluate their advances. To determine whether the target enterprises had adopted any of Peter Senge’s recommendations made in the “Fifth Discipline”, a survey was conducted considering the current level of use of 16 factors. The data collection tool was, with minor modifications, analogous to the one used in an earlier study conducted in Estonia. Based on the results of the survey, a BN comprising thirteen nodes was built. By combining the variables under study, it is feasible to determine their interaction and dependencies. The results are useful for managers willing to know their potential advances in the learning organization domain.

Keywords: organizational learning; knowledge management; bayesian methods; analytical modeling; network analysis.

I. Introduction

Marketplaces globally have become very competitive in many sectors. Companies in developed countries (e.g. US, Germany and Australia), have realized that a key aspect to ensure continuous growth is organizational learning and several practices to help in this regard have emerged under the Knowledge Management (KM) umbrella. However, to date, associated research in developing regions such as Mexico, has received little attention by comparison.

During the early 1990s, Canada, the US and Mexico started to prepare themselves for the North American Free Trade Agreement (NAFTA), which was finally signed in 1994. The main thrust of the arrangement was to create a combined market with more than 400 million people, where technology, goods, and services could be transferred from the northern countries to one in the south and vice versa, by means of trade and foreign direct investment (Tadashi, 2010). In 2018 such an agreement is being renegotiated, and presumably companies with good learning organization (LO) practices will be able to take advantage of the new terms of the arrangement.

In this context, Mexican businesses should have in place learning methodologies to capitalize experiences from the past in order to become more efficient and competitive in the future. Additionally, they should know, quantitatively, their advances in their efforts to become LO’s. In the following sections, a brief literature review related to the LO philosophy will be presented. Then, the results of a survey carried out in Mexico will be discussed. Next, a BN is proposed to quantify companies’ progress to become LO’s. Finally, some recommendations and conclusions will be drawn for academics and practitioners.

II. Five Disciplines

Peter Senge published, in 1990, the seminal book “The Fifth Disciplines: The Art and Practice of the Learning Organization”. Since then, the LO concept has been widely studied and analyzed. While different authors have considered the idea in various contexts (Örtenblad, 2013), in this piece of research the traditional Senge’s approach will be adopted. Basically, the paper is aimed at developing a mathematical model able to carry out diagnoses and prognoses about LO practices in the Mexican environment; a model that could be transferred to other countries.

A LO is one “…where people continually expand their capacity to create the results they truly desire, where new and expansive patterns of thinking are nurtured, where collective aspiration is set free, and where people are continually learning to see the whole together” (Senge, 1990). Essentially, LO’s are able to respond successfully to changes in their environments (Mets & Torokoff, 2007).

In terms of the five disciplines, they are: shared vision, personal mastery, mental models, team learning and systems thinking. It is not the objective of this section to present the details of each, but a brief
A shared vision paves the way in a company to create a common purpose. This nourishes a sense of identity in a firm by generating mutual images of the future. Personal mastery refers to the individual’s development of professional and particular skills throughout a career path. Mental models are related to the paradigms, expectations and assumptions that people have about their surrounding world. Team learning promotes the communication within the enterprise, inspiring persons to neglect, if necessary, their own archetypes to achieve the mutual vision. Finally, systems thinking help to integrate the previous four disciplines, allowing companies to truly become LO’s (Senge, Cambron-McCabe, Lucas, Smith, & Dutton, 2012).

Having presented the disciplines, in the next section a survey carried out in Mexico will be discussed. Its main purpose was to establish the level of penetration of the five disciplines in the country. Then, the use of BN’s in the organizational learning context will be analyzed prior to the development of the mathematical model to quantify LO practices.

III. Survey in Mexico

In order to determine the level of agreement with some LO practices in different Mexican industries, it was decided to conduct a survey, following the methodology reported by Delgado-Hernandez & Aspinwall (2005). The first step then was to choose its type (one-to-one interviews, telephone interviews or questionnaires). While personal and telephone interviews give a better response rate, they tend to be both more expensive and time consuming than the questionnaires. The latter can provide an acceptable coverage even with a limited budget (Burns & Bush, 2001). Moreover, recent similar LO studies that have been reported in both developed and developing countries, such as those carried out in the US health sector (Estrada, 2009), in the banking industry in Lebanon (Jamali, Sidani, & Zouein, 2009) and in the public educational sector of Pakistan (Abbas Zamin et al., 2011), have employed them.

It was therefore convenient to use this strategy as a means of data collection, because potential respondents were distributed throughout the whole country and a questionnaire provided a relatively cheap and effective way to reach them. The second decision was related to selecting the type of document to send. Electronic questionnaires are cheaper and faster than their postal counterparts, so the use of e-mail to distribute the instrument was felt to be convenient. Nevertheless, it should be noted that there are certain disadvantages associated with using either electronic or postal questionnaires. These are low response rate, lack of opportunity to clarify respondent doubts, no control over the speed with which participants return the completed questionnaires (Burns & Bush, 2001) and outdated or incorrect either electronic or postal addresses.

To overcome these obstacles, the questionnaire was carefully designed and reviewed several times by the authors to avoid misunderstandings related to the wording of the questions. Since the original version was written in English, all the items were translated into Spanish so that managers within Mexican companies who were not English speakers could participate in the study. The actual content of the questionnaire and its layout were finalized after a pilot run conducted in four organizations. To distribute it electronically, it was then uploaded into surveymonkey.com. In addition, a period was set for the return of the completed questionnaires (2nd to 16th Aug 2010), after which a reminder email was sent to companies in order to increase the response rate.

The questionnaire was divided into three sections. The first was designed to determine the profile of the respondents on the basis of their age, gender and experience with their organizations. Then, companies were categorized according to age, size, sector and location. Consequently, respondents were firstly asked to specify the age of their firms. In terms of size, micro (up to 10 people), small (less than 50 employees), medium (less than 250 employees) and large companies (250 employees or more according to the Mexican Secretary of Economy (MSE, 2009) were considered. It is worth noting that this classification of size was based only on the number of employees, although there are other factors such as turnover that affect this categorization. With regard to sector, both manufacturing and service industries were taken into account. Three types of ownership were included: public, private and partially public/partially private. Participants were also asked to indicate the state of the country in which their headquarters were located.

The second section, and the most important, was devoted to the LO practices currently being undertaken within the respondent companies. Here, they were required to indicate their degree of agreement with the LO activities presented in the questionnaire. A 10 point Likert scale (1 = strongly disagree, 3 = disagree, 5 = somewhat disagree, 6 = somewhat agree, 8 = agree and 10 = strongly agree) was used to complete the exercise. The final section of the data collection instrument was designed to include some personal opinions about the environment within the organizations, and to establish whether participants knew both their company’s mission and vision. The survey was addressed to the Managing Directors, who have a complete view of the companies, and would pass the questionnaire to an appropriate member of staff if necessary.

With regard to the number of questionnaires to be distributed, the approach proposed by Burns & Bush
(2001) for calculating the sample size \( n \) was utilized. Using the formula \( n = \frac{z^2s^2}{e^2} \), a value of \( z = 1.96 \) was chosen as the Standard Normal Value for a conventional 95% confidence level; the standard deviation, \( s \), was calculated to be 1.00 (based on their method) and an expected error, \( e \), of \( \pm 25\% \) was used (based on both the author’s judgement and on budget restrictions). This resulted in a value of 62 (i.e. 62 responses should be sufficient for analytical purposes). Since the expected response rate for such surveys is thought to be between 25% and 70% (Sheenan, 2001), at least 248 questionnaires should be distributed.

As a result, 250 companies within Mexico were chosen from the Government database of enterprises (SIEM, 2010). The criteria for selection were as follows: i) companies were distributed throughout the country based on the 2010 Mexican States’ GDP (INEGI, 2010), in order to ensure that the number of companies to be invited would be proportional to each State’s wealth; ii) the split between manufacturing and service companies was approximately 50:50; and iii) within each of these two groups approximately half were small or medium size and the remainder large. Following the selection process, the questionnaires were distributed by institutional e-mail along with a message explaining the purpose of the survey.

IV. SURVEY RESULTS

Of the 250 questionnaires sent, 122 replies were received after sending the reminding e-mails, of which only 91 could be used in the analysis. This response rate of 36% was within the expected range, and in fact, might be regarded as especially good since the survey was conducted during the summer holiday period and the authors believe that companies currently receive so many electronic questionnaires that a large proportion do not respond. After testing the questionnaire for possible bias (Armstrong & Overton, 1977), it was concluded that there was little or no non-response bias in the survey. Therefore, it would provide useful information about the current LO practices in Mexico.

V. RESPONDENTS’ PROFILE

80.2% of the participants were under 34 years old, and the reminder older. In terms of gender 63% were male and 37% female. Almost three fourths of them had worked for their companies less than 15 years. Leaving aside the participants’ characteristics, the profile of the respondent firms somehow reflected the selection criteria used for choosing them. 42% of the organizations were up to 20 years old, and a similar proportion exceeded the age of 30. With regard to size, 17.8 % could be categorized as micro, 26.4% as small, 20.8% as medium and 35.0% as large. In terms of their type, 36.3% were involved in construction works, 15.4% in the education sector, 12.1% in the automotive industry, while the remainder participated in other activities.

It was no surprise to find that most of the companies (73.6%) were Mexican, 24.2% international, and 2.2% were joint ventures. The percentages of companies located in both the southern and the northern parts of the country were lower than those of the central region, representing 4%, 23.5% and 72.5% respectively, in some way resembling the wealth distribution of the country.

VI. VALIDATION OF THE SECOND SECTION OF THE SURVEY INSTRUMENT: RELIABILITY AND VALIDITY TEST

Before discussing the survey results in terms of the specific LO practices studied, this part will present the questionnaire validation process. Reliability and validity tests were performed, making use of the approach adopted by Saraph, Benson & Schroeder (1989). Cronbach’s alpha (\( \alpha \)) model, which is aimed at measuring internal consistency, was utilized in the reliability analysis. The values of alpha reflect the degree to which elements in a group are homogeneous (Nunnally, 1978) and the extent to which these elements are related to each other. The final purpose is to help in the recognition of problem elements that should be removed from the group in order to increase its reliability.

The questionnaire was also subjected to validity testing, which encompasses both content and construct validity. The first is qualitatively determined - based on judgment (Nunnally, 1978), while the latter can be established by means of the quantitative method known as factor analysis in which each group (or factor) is checked to verify unifactoriality.

VII. INTERNAL CONSISTENCY ANALYSIS

The SPSS Statistical Package for Windows, Version 20.0 (SPSS, 2011), was employed to carry out the reliability analysis. Based on previous research developed in Western Europe (Torokoff, 2010), 16 elements were extracted from the questionnaire and grouped in the five Senge’s disciplines for further analysis (see Table 1). It was hoped that, by adopting this approach, comparisons between the observations already made in Estonian companies (Torokoff, 2010) and in their Mexican counterparts could be made in the future.
Table 1: LO activities studied (Source: Torokof, 2010)

<table>
<thead>
<tr>
<th>I. Shared Vision</th>
<th>II. Personal Mastery</th>
<th>III. Mental Models</th>
<th>IV. Team Learning</th>
<th>V. Systems Thinking</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. We have discussed and come to a common vision on the organization’s future in 5 years.</td>
<td>4. The management consistently introduces the planned changes.</td>
<td>7. Our staff are innovative.</td>
<td>11. Our staff are not criticized for negative consequences arising from taking reasonable new initiatives.</td>
<td>14. Any work-related problems are promptly discussed.</td>
</tr>
<tr>
<td>2. The company manager is interested in employees’ ideas.</td>
<td>5. All employees share a common understanding of work quality.</td>
<td>8. I can discuss introducing initiatives with my fellow workers and implement them when appropriate.</td>
<td>12. I share the new experience gained from improvements.</td>
<td>15. Managers disseminate positive experiences.</td>
</tr>
<tr>
<td>3. Our staff makes proposals for the introduction of changes to ensure that our common objective is achieved.</td>
<td>6. Our staff takes initiative when fulfilling the organization’s objectives.</td>
<td>9. Employees’ initiative and dedication are considered in pay levels.</td>
<td>13. The management have a positive attitude towards employees’ initiative.</td>
<td>16. The management employs novel ideas in management.</td>
</tr>
</tbody>
</table>

The first results of the reliability test are shown in Table 2. An internal consistency analysis was conducted independently for the elements of each group of activities. Alpha values greater than 0.6 are sufficient for testing the reliability of factors in exploratory research (Black & Porter, 1996). All but one of the alphas exceeded this, and then more analysis was required for such a discipline before concluding that the instrument had internal consistency and was reliable. The next stage was to carry out the content and construct validity tests, which helped, as will be seen, to finalize the internal consistency exercise.

Table 2: First internal consistency results (n=91)

<table>
<thead>
<tr>
<th>Group</th>
<th>Disciplines</th>
<th>Elements</th>
<th>Alpha Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>Shared Vision</td>
<td>[1, 2, 3]</td>
<td>0.76</td>
</tr>
<tr>
<td>II</td>
<td>Personal Mastery</td>
<td>[4, 5, 6]</td>
<td>0.63</td>
</tr>
<tr>
<td>III</td>
<td>Mental Models</td>
<td>[7, 8, 9, 10]</td>
<td>0.66</td>
</tr>
<tr>
<td>IV</td>
<td>Team Learning</td>
<td>[11, 12, 13]</td>
<td>0.58</td>
</tr>
<tr>
<td>V</td>
<td>Systems Thinking</td>
<td>[14, 15, 16]</td>
<td>0.75</td>
</tr>
</tbody>
</table>

VIII. Content and Construct Validity

As stated earlier, content validity is qualitatively determined. It is the analyst who subjectively evaluates the content validity of the instrument (Nunnally, 1978). Since in the case of this research, a comprehensive literature review was made regarding LO disciplines and activities, the questionnaire was carefully designed, reviewed and improved on several occasions, sensible methods of test construction were employed, and it was piloted before distribution, it is strongly believed that the instrument developed has content validity.

In order to test whether the questionnaire had construct validity or not, factor analysis was employed. Each group of LO activities was assessed by considering its constituent elements. The main purpose of the analysis was to test whether specific activities belonged to the group allocated, belonged to another group, or should be eliminated. Again, SPSS 20.0 (SPSS, 2011) was employed in the analysis, which was carried out using the steps followed by Delgado-Hernandez & Aspinwall (2005).

The Kaiser-Meyer-Olkin (KMO) indicator was firstly considered to assess sample size adequacy. Since all the groups exceeded its minimum acceptable level of 0.5 (Brah, Tee, & Madhu Rao, 2002), no elements were initially removed and the factor analysis could progress. However, the first run showed that “9. Employees’ initiative and dedication are considered in pay levels”, the third element of the Mental Models group, should be removed. As a result, it was eliminated from the group leading to its unifactoriality (see Table 3).
Table 3: Final results of factor analysis (n=91)

<table>
<thead>
<tr>
<th>Group</th>
<th>Disciplines</th>
<th>KMO</th>
<th>Element loading range</th>
<th>Variance explained by group (%)</th>
<th>Obtaining by deleting</th>
<th>Obtaining by adding</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>Shared Vision</td>
<td>0.67</td>
<td>0.77-0.86</td>
<td>68.58</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>II</td>
<td>Personal Mastery</td>
<td>0.64</td>
<td>0.73-0.78</td>
<td>57.97</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>III</td>
<td>Mental Models</td>
<td>0.66</td>
<td>0.77-0.81</td>
<td>62.39</td>
<td>9</td>
<td>-</td>
</tr>
<tr>
<td>IV</td>
<td>Team Learning</td>
<td>0.66</td>
<td>0.74-0.82</td>
<td>55.24</td>
<td>12</td>
<td>17</td>
</tr>
<tr>
<td>V</td>
<td>Systems Thinking</td>
<td>0.67</td>
<td>0.77-0.84</td>
<td>65.65</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

Another element removed during the first run was “12. I share the new experience gained from improvements” i.e. the second activity of the Team Learning group. The original data collection instrument had a 17th element. Consequently, 12 was replaced by “17. We have problem-centered management, as a manager I expect all the staff to go into the problem and suggest solutions and make proposals following this principle: the most important is to identify the best solution to a problem, not the guilty person who caused it”, which was felt suitable for the group and improved its element loading range from 0.69-0.84 to 0.73-0.83. After two runs all the groups were considered unifactorial (see Table 3).

Now with the new information, the reliability test was completed. Table 4 summarizes the final results obtained. As can be seen both the Mental Models’ alpha and the Team Learning’s alpha increased from 0.66 to 0.69 and from 0.58 to 0.72 respectively. As a result of the two analyses it was concluded that the survey instrument was reliable and valid with respect to its construct and content, hence well founded conclusions about the level of practice of the five LO disciplines could be drawn.

Table 4: Final internal consistency results (n=91)

<table>
<thead>
<tr>
<th>Group</th>
<th>Disciplines</th>
<th>Elements</th>
<th>Alpha Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>Shared Vision</td>
<td>[1, 2, 3]</td>
<td>0.76</td>
</tr>
<tr>
<td>II</td>
<td>Personal Mastery</td>
<td>[4, 5, 6]</td>
<td>0.63</td>
</tr>
<tr>
<td>III</td>
<td>Mental Models</td>
<td>[7, 8, 10]</td>
<td>0.69</td>
</tr>
<tr>
<td>IV</td>
<td>Team Learning</td>
<td>[11, 13, 17]</td>
<td>0.72</td>
</tr>
<tr>
<td>V</td>
<td>Systems Thinking</td>
<td>[14, 15, 16]</td>
<td>0.73</td>
</tr>
</tbody>
</table>

IX. LO Practices in Mexico

As stated earlier, the main objective of the survey was to determine the breadth of practice of the LO disciplines in the Mexican context. Based on the five groups previously analyzed some statistics were measured. It is important to note that the precision of the results can be re-estimated based on the actual data gathered. Using again the formula n=\(z^2s^2/e^2\), and knowing that \(z=1.96\), \(n=91\) and \(s=2.19\) (calculated as the average of the standard deviations reported below in Table 5), the expected error is 44%. This means that information from more companies will be necessary in future research to reduce such a percentage. Over and above this, however, it was felt appropriate to conduct a further investigation to assess the progress of Mexican corporations in the LO arena.

Once the precision of the results was assessed, various means for the agreement level were calculated and the rank for each discipline was determined. The results are presented in Table 5. In all cases, the opinion of the 91 participants was taken into consideration to calculate the average ratings.

Table 5: LO Disciplines’ mean level of agreement (n=91)

<table>
<thead>
<tr>
<th>Group</th>
<th>Disciplines</th>
<th>Mean</th>
<th>Standard Deviation</th>
<th>Rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>Shared Vision</td>
<td>6.86</td>
<td>2.13</td>
<td>1</td>
</tr>
<tr>
<td>II</td>
<td>Personal Mastery</td>
<td>6.75</td>
<td>1.76</td>
<td>2</td>
</tr>
<tr>
<td>III</td>
<td>Mental Models</td>
<td>6.55</td>
<td>2.33</td>
<td>5</td>
</tr>
<tr>
<td>IV</td>
<td>Team Learning</td>
<td>6.67</td>
<td>2.36</td>
<td>3</td>
</tr>
<tr>
<td>V</td>
<td>Systems Thinking</td>
<td>6.62</td>
<td>2.40</td>
<td>4</td>
</tr>
</tbody>
</table>

As can be seen, the mean scores range from 6.55 to 6.86, which is a very narrow interval meaning that the respondent companies tend to agree with the five disciplines. When they were ordered, shared vision,
personal mastery and team learning activities were the three most practiced while systems thinking and mental models were the two least used. It came as no surprise to see shared vision first since the strategic planning approach is now widely used throughout industries; personal mastery is highly related with shared vision, obtaining a similar level of agreement.

Among these two groups, the statement “5. All employees share a common understanding of work quality” registered the highest mean value (6.95), possibly indicating that quality ideas have impacted throughout the organizations. In contrast, “6. Our staff takes initiative when fulfilling the organization’s objectives” received the lowest mean score (6.59), probably meaning that not everybody within the companies is committed to achieving their strategic goals.

With regard to team learning a higher usage was expected for obvious reasons. The relatively low level of use of Systems Thinking, and more particularly Mental Models possibly means that in Mexico more attention needs to be paid to the disciplines that help to disseminate positive experiences, to use novel ideas in management, to encourage innovation among employees, and to acknowledge successful cases in public.

One important aspect to highlight is that the statement “10. Managers acknowledge our success in public”, included in the Mental Models group, obtained the lowest mean score (5.91) not only in its category but also in all five disciplines analyzed. This could indicate that some companies do not recognize their worker’s efforts systematically, and do not let their communities know about positive results.

Additionally, the statement “14. Any work-related problems are promptly discussed”, one of the elements of the Systems Thinking group, obtained the highest mean score (7.00) both in its category and in all five disciplines. Perhaps rather than implementing long term initiatives, organizations are fighting on a day-to-day basis for solving short term problems, and consequently they must discuss them immediately.

Having presented these ideas, in the next section a brief review of the concepts behind BN’s, and their application in the LO domain will be presented. Following on from this, the outcomes of the survey will be used to build a mathematical framework to measure the level of use of the LO five disciplines. The use of the proposed framework will then be illustrated numerically.

X. BAYESIAN NETWORKS IN THE LO CONTEXT

There are available a number of procedures and tools to assess the use of managerial approaches, such as: tree events, quantitative observations, probability analysis, expert judgement and BN’s. Regarding the latter, a comprehensive analysis of the usefulness of BN’s was presented by Weber, Medina-Oliva, Simon & Lung (2012). They highlighted their potential to: model complex issues, carry out both diagnostics and predictions, evaluate an event’s exact occurrence probability, incorporate original information to update the model, characterize multi-modal variables, offer a visual, user-friendly and simple approach. Having considered these benefits, it was concluded that BN’s were appropriate to build the framework for measuring LO practices, from a probabilistic perspective.

A BN is a directed acyclic graph (DAG). In general, it is a probabilistic graphical model that contains: (i) nodes representing random variables, and (ii) arcs, which help not only to connect nodes but they also imply relationships. The direct predecessors of a node are known as parents, and the direct successors are known as children (Hanea, Naples & Ababei, 2015). Moreover, BN’s represent the information about the joint probability of the nodes, expressed as local distributions for every variable conditional to its parents. Mathematically, the following expression summarizes the conditional probabilities within a BN:

\[ P(x) = P(x_1, \ldots , x_n) = \prod [P(x_i | pa_i)] \] (1)

Where \( pa_i \) is the numerical representation for the parents of \( x_i \). BN’s update the marginal distributions based on new information. A number of algorithms in BN’s can be found to perform updating processes (Hanea et al., 2015). In this way, prognostic and diagnostic predictions may be achieved.

With reference to the applications of BN’s in the LO context, Elish, Rine & Foreman (2002) carried out a research to select collaborative tools to operationalize organizational learning concepts in practice. First, they presented a set of criteria to assess the feasibility of using collaborative software within the enterprise. Then, they explored the use of BN’s as an evaluation model, to rank the tools of interest, concluding that such networks had multiple advantages to fulfill the purpose.

Hadjikusumo, Jitwasinkul & Memon (2017), in the construction industry, developed a BN to enhance safety performance. They identified the following seven factors as important: communication, culture, management commitment, leadership, organizational learning, empowerment and reward systems. Their BN was useful for handling the complex relationships among such variables and, eventually, improving work safety.

In the management area, Lee & Choi (2011) were able to measure individual creativity by means of a BN. It was built with the following nodes: creativity, knowledge characteristic, intrinsic motivation, knowledge heterogeneity among team members, and organizational learning. After implementing their network in practice, based on a sample of 222 people, they found that the most important nodes in the creativity
process were intrinsic motivation and individual knowledge characteristic.

Having described some previous works related to BN’s in learning backgrounds, the one proposed in this work is now presented. As will be seen, the results of the Mexican survey are employed to build a BN for measuring LO advances. While the BN uses the collected data, the methodology used for its construction could be applied not only in other countries but also in other management areas.

XI. The Proposed BN

The developed network comprises 13 nodes in total, divided into three categories: seven company features, five disciplines and one functional node called LO average. The former encompasses the characteristics included in the first part of the Mexican survey i.e., age of respondent, gender of participant, company age, time working in the company, number of employees, type of industry and the state of the country in which the organization had its headquarters. The incorporation of these variables allowed to ascertain whether size, industrial sector, age and geographical location had an influence in the LO practices of the sample analyzed.

The second group involves the five Senge’s disciplines. Additionally, the LO average node was included to calculate the mean of the five values, based on the 10-point Likert scale previously described. The idea was to evaluate LO performance numerically between 1 and 10 points. The higher the average, the better the LO implementation. Figure 1 shows the resultant BN, its nodes and their relationships.

![Bayesian Network for Assessing Learning Organizations: Case Study of Mexico](source: UNINET®)

Figure 1: The proposed BN to measure LO performance

Making use of UNINET®, the network was utilized to carry out different analysis. It should be emphasized that the BN can predict, or diagnose, the performance in any of the Mexican companies included in the sample. Since this is a discrete network, each variable can assume various states. Figure 2 shows them. For instance, the node gender has two alternatives, male and female. The variable number of employees has four: [1] 1-10 people, [2] 11-50, [3] 51-250, [4] >250. The remainder of the variables can be interpreted in the same fashion. Observe that the nodes associated with the five disciplines have 10 states each, related to the respective Likert scale.
Note that all variables present both the mean value and the standard deviation of their corresponding distributions. For instance, shared vision has \(6.86 \pm 2.13\) and personal mastery \(6.75 \pm 1.76\) respectively, as was reported earlier in Table 5. Once more, the variable LO average is a functional node, calculated with a formula. Consequently, it does not have any states at the moment. Now that the mathematical framework has been described, its use will be illustrated in the following paragraphs.

### XII. BN Results

To determine whether the network has made academic advances, some hypothetical scenarios will be explored. To do so, the approach introduced by Moilanen (2005) for diagnosing and measuring LO’s, based on the construction of both tables and radar plots, will be adopted. In first place, the age of respondent will be investigated. While the states for this variable are five: [1] <18 years old, [2] 18-24, [3] 25-34, [4] 35-54 and [5] ≥55, in the Mexican sample only three were used i.e. [2], [3] and [4]. The other two did not have any applicable content. Now assume that the analyst wants to know the effect of the second group in the node LO average. Then, the node age of respondent is updated with the state [2] as shown in Figure 3(b). It is worth mentioning that the means and standard deviations in Figure 3(a) slightly vary from those previously reported in Figure 2. This is because the UNINET® software used in the calculations, samples the network prior to the execution of the iteration.

![Figure 3](image_url)

**Figure 3:** (a) Original model and (b) Updated model with evidence in the node age of respondent

In this case, the node of interest is reduced from 6.64 to 6.39 meaning that the second group i.e. people between 18 and 24 years old, has a LO average lower than the default value. The same analysis is carried out for the remainder of the groups, leading to the results summarized in Table 6. Essentially, all but one of the five disciplines grow for the fourth group namely systems thinking. In contrast, the second group presents the opposite behavior. With regard to the third group, it basically remains similar to the default condition. To sum up, the higher the age of the respondent, the greater the LO average.
Table 6: LO Disciplines’ mean level of agreement based on the age of the respondents

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Shared Vision</td>
<td>6.80</td>
<td>6.46</td>
<td>6.79</td>
<td>7.10</td>
</tr>
<tr>
<td>Personal Mastery</td>
<td>6.73</td>
<td>6.48</td>
<td>6.73</td>
<td>6.97</td>
</tr>
<tr>
<td>Mental Models</td>
<td>6.50</td>
<td>6.31</td>
<td>6.50</td>
<td>6.69</td>
</tr>
<tr>
<td>Team Learning</td>
<td>6.63</td>
<td>6.12</td>
<td>6.63</td>
<td>7.10</td>
</tr>
<tr>
<td>Systems Thinking</td>
<td>6.55</td>
<td>6.56</td>
<td>6.55</td>
<td>6.54</td>
</tr>
<tr>
<td>LO average</td>
<td>6.64</td>
<td>6.39</td>
<td>6.64</td>
<td>6.88</td>
</tr>
</tbody>
</table>

To complete the analysis, the radar plots for three states can be observed in Figure 4. The default state is compared simultaneously with both the second and the fourth group. The portrayals are in line with the results so far obtained. Once more, the state [4] is bigger than the state [2]. Similar examinations were conducted with all the model input variables, finding the major differences between the following combinations: company age (<5 vs >31 years old), company size (micro vs large), industry (retailer vs public administration) and state (Sonora vs Baja California). Figures 5-8 show the corresponding plots followed by their discussion.

Figure 4: Radar plot for the variable age of respondent

Figure 5: Radar plot for the variable company age

Figure 6: Radar plot for the variable company size

Figure 7: Radar plot for the variable industry

Figure 8: Radar plot for the variable state

Company age turned out to be important for the LO average. In general, older enterprises (>31 years old) scored better averages than their younger counterparts (<5 years old). Particularly, the discipline mental models received mean values of 6.83 and 5.82 respectively. This possibly means that well established businesses recognize their importance to survive in the long term, while relatively new organizations do not perceive them as relevant. Another variable with interesting differences was company size. Now the average scores were 6.93 (micro) and 6.43 (large). Both team learning and systems thinking were the two...
disciplines with greater dissimilarities. Micro-firms had better team learning practices than large companies, presumably because the interaction among employees is effective. Also, their flexibility allows them to solve work related problems and spread positive experiences in a quick manner.

Industry was the next variable under study. Here, the retailer sector reported a mean value of 7.09, whereas the public administration had only 6.18. Specifically, the discipline personal mastery was widely practiced in the first, while in the latter there is still room for improvement. This result is in line with anecdotal evidence. Public organizations in Mexico are perceived as less efficient than similar private groups simply because they are public.

The last variable studied was state, finding differences between Sonora (6.84) and Baja California (6.24). Interestingly, the two federal entities are located in the north of the country. In the reminder of the states the mean scores did not vary significantly across geographical regions. The results obtained so far, on the one hand, reveal that the more influential variables in the LO average were: age of respondent, company age, company size and industry. On the other hand, the less influential were: gender, time working in the company and state.

Based on the previous observations, more analyses were performed. At this point, the proposed BN was used to estimate the LO average when two input variables were combined. Table 7 summarizes the scores obtained. Two interesting mean values were the result of the combinations between: age of respondent & number of employees (7.16) and industry & state (7.27).

Table 7: LO Average resulting from the combination of input variables

<table>
<thead>
<tr>
<th>Variables</th>
<th>AR</th>
<th>G</th>
<th>CA</th>
<th>TWC</th>
<th>NE</th>
<th>I</th>
<th>S</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age of Respondent (AR)</td>
<td>-</td>
<td>6.90</td>
<td>6.92</td>
<td>6.89</td>
<td>7.16</td>
<td>7.31</td>
<td>7.25</td>
</tr>
<tr>
<td>Gender (G)</td>
<td>-</td>
<td>-</td>
<td>6.70</td>
<td>6.68</td>
<td>6.95</td>
<td>7.05</td>
<td>7.04</td>
</tr>
<tr>
<td>Company Age (CA)</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>6.70</td>
<td>6.97</td>
<td>7.13</td>
<td>7.06</td>
</tr>
<tr>
<td>Time Working in the Company (TWC)</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>6.95</td>
<td>7.10</td>
<td>7.04</td>
</tr>
<tr>
<td>Number of Employees (NE)</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>7.36</td>
<td>7.30</td>
</tr>
<tr>
<td>Industry (I)</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>7.27</td>
</tr>
<tr>
<td>State (S)</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

Figures 9 and 10 show the plots for the identified two conditions. In first place, the simultaneous use in the BN of respondents between 35-54 years old working in Micro organizations resulted in a LO average of 7.16. This means that experienced people employed in companies with less than 10 colleagues reported a relatively good experience in terms of practicing the five disciplines under investigation. The result was not surprising since such corporations foster teamwork and an environment that allows for knowledge sharing on multiple levels.

In second place, not only the variable industry had an impact on the LO Average but also the Mexican state in which participant businesses were located. Essentially, the retailer sector in the northern federal entity of Sonora presented a mean value of 7.27, the highest in the analysis. Being one of the border states connected to the US, it represents a major route for the retailer’s trade. Then, there is little doubt that the use of the five disciplines should be common practice among them. Another hypothetical exercise was run assigning 10 points to all five disciplines within the BN. Figure 11 shows the effect. In this case, the best LO Average that could be reached was 8.4.
This maximum value would be the result of having the combined presence of male experienced employees, in well-established micro businesses, with less than 10 years working for their construction companies in the state of Mexico. Again, a hypothetical case, but good enough for showing the applicability of the proposed BN in the LO arena.

Finally, it is strongly believed that the BN proposed in this study can help to better understand the LO disciplines in the Mexican and international context. Even more, it may be used to smooth their adoption and to assess their levels of practice in various industries and regions of the country. The academic community could use the results to create and enhance models that would further develop the LO domain from the quantitative point of view. For managers, the model can be used as a benchmark for comparison i.e. as an aid for comparative assessments with their neighbor corporations engaged in selling similar products and services. With these ideas in mind, in the following section the main conclusions of the study are drawn.

XIII. Conclusions

LOs are able to have internal collaboration, to quickly respond to changes in their settings and to reach the goals that they propose to pursue. Accepting their advantages, companies in developed countries have formally implemented the Senge’s five disciplines to become LOs. Nevertheless, very little formerly reported research has either empirically investigated LO practices in Mexico or developed a BN model for assessing LOs in the national context. Consequently, this paper has discussed the results of a survey to determine the level of adoption of the five disciplines, and the development of a quantitative model suitable for assessing LOs in the Mexican environment.

The survey, analogous to one used in an earlier study conducted in Estonia, included 16 elements which were shown to be both reliable and valid. The information collected from 91 Mexican participants was utilized to rank the five disciplines in the country. It was found that shared vision, personal mastery and team learning activities were the three most practiced while systems thinking and mental models were the two least used. An important contribution of this part of the research is a prioritized set of activities to implement the five disciplines in practice.

Furthermore, the findings of the survey were used to support the construction of a new BN in the LO domain. It has 13 nodes in total, distributed into three groups: seven company features, five disciplines and one functional node called LO average. After applying the model, the influence of the variables age of respondent, company age, company size, industry and state on the LO average became evident. In addition, the simultaneous consideration of the variables age of respondent & number of employees and industry & state revealed its highest scores.

From a practical perspective, the results of the survey and the proposed BN can be useful for...
academics and practitioners. Researchers may use them as a foundation to build more mathematical models. In terms of executives, since their businesses could not implement the five disciplines in parallel, the model provides a tool to prioritize them and to establish the way to follow in the LO journey.

The items analyzed in the survey represent genuine activities to assess LO improvements within companies across different sectors and locations. They also may be useful for assessing the advances and challenges to the adoption of the five disciplines in practice. While the results of the investigation are interesting, there are opportunities for future research work. First, the number of respondents should be enlarged in further studies. Second, specific industries should be analyzed in detail to enhance the accuracy of the results. Last but not least, updated data will be required to conduct a longitudinal study in the country and determine its performance.

Acknowledgments

The authors would like to thank all the companies that took part in this study. Thanks also go to the Inter institutional Program to Strengthen the Research and Post grade of the Mexican Pacific Coast.

References

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Status of Food Labeling of Soft Beverage According to BFSA Guidelines & Laws: Matter of Increasing Customer Awareness

By Md. Touhidul Islam, Tasnima Haque & Mohammad Mahmudur Rahman

Abstract- Why should people know about the Labeling of Soft Beverages in Bangladesh? To find the answer to this question, this article has focused on the Food Safety Act, 2013 of Bangladesh, the status of Labeling of Soft Beverage, and customer awareness. The core intent of the study is to examine and analysis the present scenarios of soft beverage labeling according to the “Regulations of product labeling,” the Food Safety Act, 2013 (Act No. 43 of 2013) and “Regulations on the use of additives products,” (Act No. 43 of 2013), section-87 and section-27. To attain the goal of the research, most important considerable variables and attributes are taken for survey from BFS Act and regulations. The study, descriptive in nature, has been conducted based on primary data. Total 39 criteria (Variable) have been taken related to the Regulations of product labeling and Regulations on the use of additives products. The sample size of the study is 29, where the sample is the labels of soft beverage. The convenience sampling method has been used here where the sample collected from Dhaka, Manikganj, Gazipur district of Bangladesh.

Keywords: food labeling, customer awareness, soft beverage, BFSA, healthy & safe food.

GJMBR-G Classification: JEL Code: M31
Status of Food Labeling of Soft Beverage
According to BFSA Guidelines & Laws: Matter of Increasing Customer Awareness

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Abstract: Why should people know about the Labeling of Soft Beverages in Bangladesh? To find the answer to this question, this article has focused on the Food Safety Act, 2013 of Bangladesh, the status of Labeling of Soft Beverage, and customer awareness. The core intent of the study is to examine and analyse the present scenarios of soft beverage labeling according to the "Regulations of product labeling," the Food Safety Act, 2013 (Act No. 43 of 2013) and "Regulations on the use of additives products," (Act No. 43 of 2013), section-87 and section-27. To attain the goal of the research, most important considerable variables and attributes are taken for survey from BFS Act and regulations. The study, descriptive in nature, has been conducted based on primary data. Total 39 criteria (Variable) have been taken related to the Regulations of product labeling and Regulations on the use of additives products. The sample size of the study is 29, where the sample is the labels of soft beverage. The convenience sampling method has been used here where the sample collected from Dhaka, Manikganj, Gazipur district of Bangladesh. The collected data are analyzed by various statistical tools and techniques, including frequency distribution, descriptive statistics, and correlation through the data processing software SPSS (Statistical Package for the Social Science) 25.0 version. The outcomes of the study express that within 39 criteria, Fanta, Speed & Soul up maintain 62.5%, 7up- 66.7%, Sprite- 75.0%, Royal Tiger, Frutica, Oscar & Mejanda- 66.7%, Tropicana frutz, Dinko & Current- 79.2%, Fruto & Sprite- 83.3%, Pepsi- 66.7%, Cocacola- 58.3%, Speed- 62.5%, Diet_Coke- 54.8%, Clemon, Cocacola, Clear Up, Mountain dew, Apple_Fizz & Mojo- 70.8%, Power, Brever, & Fizz Up- 75.0%, Jerra_masa1 50.0% and Click- 37.5% of the total regulations (selected criteria). Outcomes of the study may be help to the consumer of soft beverages to choose healthy soft beverage. On the other hand, the study outcomes will be beneficial to increase the awareness of customers towards the information of food labeling and possible to minimize the health risk. It can contribute to increasing the social and moral responsibility of marketers and, it could also indirectly contribute to achieving SDGs of Bangladesh expected by 2030. This study has evaluated the present Status of Food Labeling of Soft Beverage, and future recommendations are proposed.

Keywords: food labeling, customer awareness, soft beverage, BFS, healthy & safe food.

1. Introduction

According to the statistics of WHO, around 600 million people (almost 1 in 10 people) in the world are falling ill after contaminated food. It also estimated that unsafe food resulting in the loss of 33 million healthy life and 420 000 die every year (WHO, 4 June 2019). So it is time to make people aware of safe and healthy food eating especially soft beverages. It also matters whether the soft drink companies are properly using the labeling of their product or not according to the BFSA act. So the core intent of the study is to examine and analyse the present scenarios of soft beverage labeling according to the “Regulations of product labeling,” the Food Safety Act, 2013 (Act No. 43 of 2013) and “Regulations on the use of additives products,” (Act No. 43 of 2013), section-87 and section-27. The salient objective of this study is to represent the overall scenarios/status of labeling of soft beverages according to the Food Safety Act- 2013, rules and policies of Bangladesh. In chapter two, the general conditions of food labeling have been written in this Gazette. There has a clear direction about product labeling. We have taken the 29 general directions (criteria) for our research and finally we select 24 criteria for this study named International Brand, Pet Bottle, Manufacturer name, Manufacturer address, Brand name in Bengali, Batch No., Net weight/amount, Price in Bengali, Manufacturing Date, Expire Date, BSTI Logo, Ingredients name in Bengali, Nutritional Value Table, Specific Preservatives name, Specific Acedulants/AR name, Specific Stabilizers name, Specific Clouding Agents name, Specific Color name, Specific Flavors name, Allergen on Label, GM Food on Label, Consumer Help Line number on Label, Barcode Use, Vegetarian Symbol. It is time to increase customer awareness about the information of food labeling. Through this study, reader can get an idea about the status of food labeling of soft beverages. If customers are aware of the information and status of food labeling, then they will choose the right, healthy and safe food for them, and in this way, it’s possible to reduce the rate of mortality and
illness. The findings of this study will provide an in-depth understanding of the status of food labeling that means whether they (soft beverage producing company) following and using the directions of BFSA’s “Regulations of product labeling” or not. By analyzing this study, the concerned authority can take legal action towards the company, and the consumers may be aware of those company’s food. This research study considers only 39 criteria (variables) and choose the 24 variables to conduct this study, and sample size is only 29, so here the future research scope to study more.

II. Objectives of the Study

The salient objective of this study is to represent the overall scenarios/ status of labeling of soft beverages according to the Food Safety Act-2013, rules and policies of Bangladesh. The other purposes are:-

- Help to increase the customers’ awareness towards the information of soft drink labeling through comparative study.
- To find out the Comparative position of various branded soft beverage labeling.
- To provide information that will help the customers to choose a healthy soft drink.
- To make some recommendations to the National and International soft beverage industry/ company according to the findings of this study.

III. Research Methodology

The study, descriptive in nature, has been conducted based on a survey of primary data. The sample size of the study is 29, where the sample is the labels of soft beverage. Data has been collected and analyzed based on the Total 39 criteria (Variables). Quantitative primary data have been collected by using a self-administered structured “Dichotomous Questions” method.

Nonprobability Convenience sampling method has been used for collecting primary data here where the sample collected from Dhaka, Manikganj, Gazipur district of Bangladesh in the month of December 2019.

The collected data are analyzed by various statistical tools and techniques, including frequency distribution, descriptive statistics, and correlation through the data processing software SPSS (Statistical Package for the Social Science) 25.0 version.

IV. Data Analysis & Findings

Here, the Table-1.1 showing the variable names and percentages of criteria usages on the product label (soft beverage). Here 29 samples (soft beverages) are using “Manufacturer Name” and “Manufacturer address” 100% on their product labeling but in conversely “Specific Clouding Agents name,” “Allergen on Label,” and “GM Food on Label” are not used in their labeling 100%.

<table>
<thead>
<tr>
<th>Variables Names</th>
<th>NO (%)</th>
<th>YES (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>International Brand</td>
<td>58.6</td>
<td>41.4</td>
</tr>
<tr>
<td>Pet Bottle</td>
<td>13.8</td>
<td>86.2</td>
</tr>
<tr>
<td>Manufacturer name</td>
<td>0</td>
<td>100</td>
</tr>
<tr>
<td>Manufacturer address</td>
<td>0</td>
<td>100</td>
</tr>
<tr>
<td>Brand name in Bengali</td>
<td>6.9</td>
<td>93.1</td>
</tr>
<tr>
<td>Batch No</td>
<td>3.4</td>
<td>96.6</td>
</tr>
<tr>
<td>Net weight/amount</td>
<td>3.4</td>
<td>96.6</td>
</tr>
<tr>
<td>Price in Bengali</td>
<td>27.6</td>
<td>72.4</td>
</tr>
<tr>
<td>Manufacturing Date</td>
<td>3.4</td>
<td>96.6</td>
</tr>
<tr>
<td>Expire Date</td>
<td>3.4</td>
<td>96.6</td>
</tr>
<tr>
<td>BSTI Logo</td>
<td>6.9</td>
<td>93.1</td>
</tr>
<tr>
<td>Ingredients name in Bengali</td>
<td>3.4</td>
<td>96.6</td>
</tr>
<tr>
<td>Nutritional Value Table</td>
<td>13.8</td>
<td>86.2</td>
</tr>
<tr>
<td>Specific Preservatives name</td>
<td>34.5</td>
<td>65.5</td>
</tr>
<tr>
<td>Specific Acedulants/AR name</td>
<td>17.2</td>
<td>82.8</td>
</tr>
<tr>
<td>Specific Stabilizers name</td>
<td>82.8</td>
<td>17.2</td>
</tr>
<tr>
<td>Specific Clouding Agents name</td>
<td>100</td>
<td>0</td>
</tr>
<tr>
<td>Specific Color name</td>
<td>48.3</td>
<td>51.7</td>
</tr>
<tr>
<td>Specific Flavors name</td>
<td>72.4</td>
<td>27.6</td>
</tr>
</tbody>
</table>
"Status of Food Labeling of Soft Beverage According to BFSA Guidelines & Laws: Matter of Increasing Customer Awareness"

Following Table -1.2 are showing the descriptive statistics with mean, Std. Deviation and variance that represent the comparative usage of criteria in 29 products (Soft beverages/ Samples).

**Table 1.2:** Descriptive analysis of 24 criteria for 29 samples. (N=24)

<table>
<thead>
<tr>
<th>Variables Name ( Yes=1, No= 0)</th>
<th>Mean</th>
<th>Std. Deviation</th>
<th>Variance</th>
</tr>
</thead>
<tbody>
<tr>
<td>International Brand</td>
<td>.41</td>
<td>.501</td>
<td>.251</td>
</tr>
<tr>
<td>Pet Bottle</td>
<td>.86</td>
<td>.351</td>
<td>.123</td>
</tr>
<tr>
<td>Manufacturer name</td>
<td>1.00</td>
<td>.000</td>
<td>.000</td>
</tr>
<tr>
<td>Manufacturer address</td>
<td>1.00</td>
<td>.000</td>
<td>.000</td>
</tr>
<tr>
<td>Brand name in Bengali</td>
<td>.93</td>
<td>.258</td>
<td>.067</td>
</tr>
<tr>
<td>Batch No.</td>
<td>.97</td>
<td>.186</td>
<td>.034</td>
</tr>
<tr>
<td>Net weight/amount</td>
<td>.97</td>
<td>.186</td>
<td>.034</td>
</tr>
<tr>
<td>Price in Bengali</td>
<td>.72</td>
<td>.455</td>
<td>.207</td>
</tr>
<tr>
<td>Manufacturing Date</td>
<td>.97</td>
<td>.186</td>
<td>.034</td>
</tr>
<tr>
<td>Expire Date</td>
<td>.97</td>
<td>.186</td>
<td>.034</td>
</tr>
<tr>
<td>BSTI Logo</td>
<td>.93</td>
<td>.258</td>
<td>.067</td>
</tr>
<tr>
<td>Ingredients name in Bengali</td>
<td>.97</td>
<td>.186</td>
<td>.034</td>
</tr>
<tr>
<td>Nutritional Value Table</td>
<td>.86</td>
<td>.351</td>
<td>.123</td>
</tr>
<tr>
<td>Specific Preservatives name</td>
<td>.66</td>
<td>.484</td>
<td>.234</td>
</tr>
<tr>
<td>Specific Acedulants/AR name</td>
<td>.83</td>
<td>.384</td>
<td>.148</td>
</tr>
<tr>
<td>Specific Stabilizers name</td>
<td>.17</td>
<td>.384</td>
<td>.148</td>
</tr>
<tr>
<td>Specific Clouding Agents name</td>
<td>.00</td>
<td>.000</td>
<td>.000</td>
</tr>
<tr>
<td>Specific Color name</td>
<td>.52</td>
<td>.509</td>
<td>.259</td>
</tr>
<tr>
<td>Specific Flavors name</td>
<td>.28</td>
<td>.455</td>
<td>.207</td>
</tr>
<tr>
<td>Allergen on Label</td>
<td>.00</td>
<td>.000</td>
<td>.000</td>
</tr>
<tr>
<td>GM Food on Label</td>
<td>.00</td>
<td>.000</td>
<td>.000</td>
</tr>
<tr>
<td>Consumer Help Line number on Label</td>
<td>.66</td>
<td>.484</td>
<td>.234</td>
</tr>
<tr>
<td>Barcode Use</td>
<td>.97</td>
<td>.186</td>
<td>.034</td>
</tr>
<tr>
<td>Vegetarian Symbol</td>
<td>.59</td>
<td>.501</td>
<td>.251</td>
</tr>
<tr>
<td>Valid N (list wise)</td>
<td>24</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Comparative position of using "Regulations of product labeling," the Food Safety Act, 2013:

![Graph](image-url)

**Fig 1.1:** Comparative status analysis of the Criteria usages within the “Regulations of product labeling.”

Figure -1.1 express the outcomes of the study that National brand is 58.6% and international brand is 41.4%, Pet Bottle is 86.2%, and cane is 13.8%, brand name in Bengali is written in 93.1% label where 6.9% of total label does not contain the Bengali brand name, both percentage of use of batch no. and net weight amount is 96.6%, where 3.4% do not use the batch no. In 72.4% sample show that it write Price in Bengali in the food label and remain 27.6% do not, 96.6% use the manufacturing date, expire date, Ingredients name in Bengali and barcode in their label and remain 3.4% are not, 93.1% have used the BSTI logo and 6.9% do not use, Nutritional Value Table has been used in 86.2%, and 13.8% do not, Specific Preservatives name has been used in 65.5% and remaining (34.5%) do not, Specific Acedulants AR name is 82.8% not in use 17.2%, Specific Stabilizers name used by 17.2% and not in use is 82.8%, both Specific Clouding Agents name, GM Food on Label and Allergen on Label are not mentioned by 100%, Specific Color name has been mentioned by 51.7%, and remain (48.3%) do not specific Flavors name used by 27.6% and do not by 72.4%. Consumer Help Line number on Label is 65.5%, and 34.5% do not use, use Vegetarian Symbol by 58.6% and remain 41.4% do not. Results also indicated that the observed sample do not fulfill the regulations of Safety Act, 2013 properly (100%).

**Table 1.3:** Frequency distribution (percentage) of 29 Soft beverages within 24 Criteria

<table>
<thead>
<tr>
<th>Product Name</th>
<th>NO (%)</th>
<th>Yes (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fanta</td>
<td>37.5</td>
<td>62.5</td>
</tr>
<tr>
<td>Cocacola</td>
<td>29.2</td>
<td>70.8</td>
</tr>
<tr>
<td>7up</td>
<td>33.3</td>
<td>66.7</td>
</tr>
<tr>
<td>Sprite</td>
<td>25</td>
<td>75</td>
</tr>
<tr>
<td>Current</td>
<td>20.8</td>
<td>79.2</td>
</tr>
<tr>
<td>Speed</td>
<td>37.5</td>
<td>62.5</td>
</tr>
<tr>
<td>Royal Ti</td>
<td>33.3</td>
<td>66.7</td>
</tr>
<tr>
<td>Mejanda</td>
<td>33.3</td>
<td>66.7</td>
</tr>
<tr>
<td>Tropician</td>
<td>20.8</td>
<td>79.2</td>
</tr>
</tbody>
</table>
Table 1.3 express that within 39 criteria, Fanta, Speed & Soul up maintain 62.5%, 7up- 66.7%, Sprite-75.0%, Royal Tiger, Frutica, Oscar & Mejanda- 66.7%, Tropicana frutz, Dinko & Current- 79.2%, Fruto & Sprite-83.3%, Pepsi- 66.7%, Cocacola- 58.3%, Speed- 62.5%, Diet_Coke- 58.4%, Clemon, Cocacola, Clear Up, Mountain dew, Apple_Fizz & Mojo- 70.8%, Power, Brever, & Fizz Up- 75.0%, Jerra_masal- 50.0% and Click- 37.5% of the total regulations (selected criteria).

Analysis through Pie diagram: Fig 1.2 showing the competitive status of using the regulations of product labeling where we see the position of CLICK is in the highest for not using the product labeling regulations 62.5% and conversely FRUTO is the lowest position for not using the product labeling regulations that is 16.7%. Here not one product does use the 100% BFSA’s “Regulations of product labeling” guidelines. So it is an alarming issue to be considered by the concerned authority, company, and consumers also.

Fig 1.2: Pie diagram of comparative analysis of NOT using the “Regulations of product labeling”.

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**Table 1.3**

<table>
<thead>
<tr>
<th>Product</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oscar</td>
<td>33.3</td>
</tr>
<tr>
<td>Fruto</td>
<td>16.7</td>
</tr>
<tr>
<td>Dinko</td>
<td>20.8</td>
</tr>
<tr>
<td>Soul up</td>
<td>37.5</td>
</tr>
<tr>
<td>Mountain</td>
<td>29.2</td>
</tr>
<tr>
<td>Frutica</td>
<td>33.3</td>
</tr>
<tr>
<td>Apple Fi</td>
<td>29.2</td>
</tr>
<tr>
<td>Pepsi</td>
<td>33.3</td>
</tr>
<tr>
<td>Brever</td>
<td>25</td>
</tr>
<tr>
<td>mojo</td>
<td>29.2</td>
</tr>
<tr>
<td>Cocacola_C</td>
<td>41.7</td>
</tr>
<tr>
<td>speed</td>
<td>37.5</td>
</tr>
<tr>
<td>Diet Cok</td>
<td>41.7</td>
</tr>
<tr>
<td>Sprite-C</td>
<td>41.7</td>
</tr>
<tr>
<td>clemon</td>
<td>29.2</td>
</tr>
<tr>
<td>Power</td>
<td>25</td>
</tr>
<tr>
<td>Fizz Up</td>
<td>25</td>
</tr>
<tr>
<td>Clear Up</td>
<td>29.2</td>
</tr>
<tr>
<td>Jerra Masal</td>
<td>50</td>
</tr>
<tr>
<td>Click</td>
<td>62.5</td>
</tr>
<tr>
<td>Total</td>
<td>100%</td>
</tr>
</tbody>
</table>
Figure 1.3 represents the percentage of usages the food labeling guidelines by the selected samples, where FRUTO (83.3%) is in the highest position, and CLICK (37.5%) is in the lowest position.

Fig 1.3: Pie diagram of comparative analysis of using the “Regulations of product labeling.”
**Correlation among the Twenty four Samples (Soft beverages):**

*Table 1.4:* shows the comparative Correlations among the 29 samples.

<table>
<thead>
<tr>
<th>Sample Names</th>
<th>Fanta</th>
<th>CocaCola</th>
<th>7up</th>
<th>Sprite</th>
<th>Current</th>
<th>Speed</th>
<th>Royal_Tiger</th>
<th>Mejanda</th>
<th>Tropicana_F</th>
<th>Oscar</th>
<th>Dinko</th>
<th>Soul_up</th>
<th>Mountain_d</th>
<th>Frutica</th>
<th>Apple_Fizz</th>
<th>Pepsi</th>
<th>Brever</th>
<th>mojo</th>
<th>CocaCola_C</th>
<th>speed_C</th>
<th>Diet_Coke</th>
<th>Sprite_C</th>
<th>Clemmon</th>
<th>Power</th>
<th>Fizz_Up</th>
<th>Clear_Up</th>
<th>Jerra_mea</th>
<th>Click</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fanta</td>
<td>1</td>
<td>828.730</td>
<td>745.662</td>
<td>467.365</td>
<td>548.500</td>
<td>183.346</td>
<td>238.467</td>
<td>639.548</td>
<td>450.730</td>
<td>348.639</td>
<td>917.467</td>
<td>362.917</td>
<td>450.547</td>
<td>547.450</td>
<td>258.600</td>
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<td></td>
</tr>
<tr>
<td>CocaCola</td>
<td>1</td>
<td>713.900</td>
<td>799.450</td>
<td>519.713</td>
<td>647.324</td>
<td>451.348</td>
<td>639.597</td>
<td>519.597</td>
<td>713.476</td>
<td>798.759</td>
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</tr>
<tr>
<td>7up</td>
<td>1</td>
<td>816.725</td>
<td>730.625</td>
<td>625.722</td>
<td>250.395</td>
<td>290.548</td>
<td>907.437</td>
<td>519.812</td>
<td>408.519</td>
<td>657.730</td>
<td>289.657</td>
<td>713.408</td>
<td>612.519</td>
<td>530.548</td>
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<tr>
<td>Sprite</td>
<td>1</td>
<td>889.547</td>
<td>612.816</td>
<td>647.408</td>
<td>516.415</td>
<td>745.688</td>
<td>408.688</td>
<td>612.556</td>
<td>688.683</td>
<td>547.547</td>
<td>270.685</td>
<td>688.556</td>
<td>776.688</td>
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<tr>
<td>Current</td>
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<td>744.290</td>
<td>596.495</td>
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<td>508.799</td>
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<td>799.607</td>
<td>662.240</td>
<td>607.574</td>
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<tr>
<td>Speed</td>
<td>1</td>
<td>913.730</td>
<td>657.365</td>
<td>367.577</td>
<td>662.644</td>
<td>828.730</td>
<td>639.730</td>
<td>547.639</td>
<td>393.622</td>
<td>161.393</td>
<td>639.547</td>
<td>547.547</td>
<td>450.602</td>
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<tr>
<td>Royal Tiger</td>
<td>1</td>
<td>813.722</td>
<td>437.632</td>
<td>725.730</td>
<td>713.625</td>
<td>713.625</td>
<td>612.713</td>
<td>299.730</td>
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Pearson Correlation, **Correlation is significant at the 0.01 level (two-tailed), *Correlation is significant at the 0.05 level (two-tailed)**
V. DISCUSSIONS

The supreme aim of this paper is to know the present scenarios of soft beverage labeling according to the “Regulations of product labeling,” the Food Safety Act, 2013 (Act No. 43 of 2013) of Bangladesh Food Safety Authority (BFSA).

As the findings show that the within 29 variables (ingredients) “Specific Clouding Agents name,” “Allergen on Label,” “GM Food on Label” are not indicated/ specified in the label of soft beverage on the other hand “Specific Stabilizers name” is used by 17.2%, “Specific Flavors name” is used by 27.6%, “Vegetarian Symbol” is used by 58.6% within the 39 criteria.

Within the 29 samples (products), “CLICK soft beverage” is the lowest BFSA labeling regulation follower (only 37.5%) contrary, “FRUTICA” follows the highest -83.3%, CURRENT and DINKO simultaneously follow 79.2% of total regulations.

VI. RECOMMENDATIONS

1. BFSA should use the legal steps towards the company who are not following the “Regulations of product labeling” properly.
2. The Consumer should be aware of the Sample (soft beverage) to drink.
3. Companies should give more emphasis on their food labeling.
4. Company must write/usage the full information on the product label according to the BFSA guidelines.
5. As none of the product does use the Specific Clouding Agents name, Allergen on Label, GM Food on Label in their beverage label so all the companies of these products should use this types of information.
6. Concerned authority of food safety and government should monitor the market to know whether the companies are using BFSA’s guideline of product labeling or not as this study has shown that no one’s product (soft beverage) labeling had followed the 100% of food labeling guidelines.
7. Food safety authority should take programs (advertising, promotion) to make consumers’ aware of the information on food labeling.
8. Consumers should be aware and concern about the information of food labeling that will help people to choose safe food and leads to lead a healthy life.

CONCLUSION

To achieve SDGs of Bangladesh expected by 2030, it’s high time to give more concern to food safety and make people more aware of choosing and eating food. As it is mandatory to follow the directions of BFSA to the labeling of food, but the study shows that soft beverage producing company do not fully follow that. The result of this study helps to the rules creating and imposing authority, government, and soft beverages company to take the immediately necessary steps to confirm the food labeling regulations. Mostly this study will help the general people to understand and to be conscious about the food labeling that will lead them to live with a healthy and happy life. Outcomes of the study may helpful to the consumer of soft beverages to choose the healthy soft beverage. On the other hand, the study outcomes are expected to be beneficial to increase the awareness of customers towards the information of food labeling and possible to minimize the health risk. The results of the study may generate new thoughts for the researchers and find improvement areas for soft beverage seller to serve better and achieve progress in the long term and it can contribute to increasing the social and moral responsibility of marketers and it could also indirectly contribute to achieve SDGs of Bangladesh expected by 2030. This study has evaluated the present Status of Food Labeling of Soft Beverage and future recommendations are proposed.

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We accept the manuscript submissions in any standard (generic) format.

We typeset manuscripts using advanced typesetting tools like Adobe In Design, CorelDraw, TeXnicCenter, and TeXStudio. We usually recommend authors submit their research using any standard format they are comfortable with, and let Global Journals do the rest.

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5. Authors should submit paper in a ZIP archive if any supplementary files are required along with the paper.
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2. Drafting the paper and revising it critically regarding important academic content.
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Acknowledgments

Contributors to the research other than authors credited should be mentioned in Acknowledgments. The source of funding for the research can be included. Suppliers of resources may be mentioned along with their addresses.

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Authors can submit papers and articles in an acceptable file format: MS Word (doc, docx), LaTeX (.tex, .zip or .rar including all of your files), Adobe PDF (.pdf), rich text format (.rtf), simple text document (.txt), Open Document Text (.odt), and Apple Pages (.pages). Our professional layout editors will format the entire paper according to our official guidelines. This is one of the highlights of publishing with Global Journals—authors should not be concerned about the formatting of their paper. Global Journals accepts articles and manuscripts in every major language, be it Spanish, Chinese, Japanese, Portuguese, Russian, French, German, Dutch, Italian, Greek, or any other national language, but the title, subtitle, and abstract should be in English. This will facilitate indexing and the pre-peer review process.

The following is the official style and template developed for publication of a research paper. Authors are not required to follow this style during the submission of the paper. It is just for reference purposes.
Manuscript Style Instruction (Optional)

- Microsoft Word Document Setting Instructions.
- Font type of all text should be Swis721 Lt BT.
- Page size: 8.27” x 11”", left margin: 0.65, right margin: 0.65, bottom margin: 0.75.
- Paper title should be in one column of font size 24.
- Author name in font size of 11 in one column.
- Abstract: font size 9 with the word “Abstract” in bold italics.
- Main text: font size 10 with two justified columns.
- Two columns with equal column width of 3.38 and spacing of 0.2.
- First character must be three lines drop-capped.
- The paragraph before spacing of 1 pt and after of 0 pt.
- Line spacing of 1 pt.
- Large images must be in one column.
- The names of first main headings (Heading 1) must be in Roman font, capital letters, and font size of 10.
- The names of second main headings (Heading 2) must not include numbers and must be in italics with a font size of 10.

Structure and Format of Manuscript

The recommended size of an original research paper is under 15,000 words and review papers under 7,000 words. Research articles should be less than 10,000 words. Research papers are usually longer than review papers. Review papers are reports of significant research (typically less than 7,000 words, including tables, figures, and references)

A research paper must include:

a) A title which should be relevant to the theme of the paper.
b) A summary, known as an abstract (less than 150 words), containing the major results and conclusions.
c) Up to 10 keywords that precisely identify the paper’s subject, purpose, and focus.
d) An introduction, giving fundamental background objectives.
e) Resources and techniques with sufficient complete experimental details (wherever possible by reference) to permit repetition, sources of information must be given, and numerical methods must be specified by reference.
f) Results which should be presented concisely by well-designed tables and figures.
g) Suitable statistical data should also be given.
h) All data must have been gathered with attention to numerical detail in the planning stage.

Design has been recognized to be essential to experiments for a considerable time, and the editor has decided that any paper that appears not to have adequate numerical treatments of the data will be returned un refereed.

i) Discussion should cover implications and consequences and not just recapitulate the results; conclusions should also be summarized.
j) There should be brief acknowledgments.
k) There ought to be references in the conventional format. Global Journals recommends APA format.

Authors should carefully consider the preparation of papers to ensure that they communicate effectively. Papers are much more likely to be accepted if they are carefully designed and laid out, contain few or no errors, are summarizing, and follow instructions. They will also be published with much fewer delays than those that require much technical and editorial correction.

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All manuscripts submitted to Global Journals should include:

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The title page must carry an informative title that reflects the content, a running title (less than 45 characters together with spaces), names of the authors and co-authors, and the place(s) where the work was carried out.

**Author details**
The full postal address of any related author(s) must be specified.

**Abstract**
The abstract is the foundation of the research paper. It should be clear and concise and must contain the objective of the paper and inferences drawn. It is advised to not include big mathematical equations or complicated jargon.

Many researchers searching for information online will use search engines such as Google, Yahoo or others. By optimizing your paper for search engines, you will amplify the chance of someone finding it. In turn, this will make it more likely to be viewed and cited in further works. Global Journals has compiled these guidelines to facilitate you to maximize the web-friendliness of the most public part of your paper.

**Keywords**
A major lynchpin of research work for the writing of research papers is the keyword search, which one will employ to find both library and internet resources. Up to eleven keywords or very brief phrases have to be given to help data retrieval, mining, and indexing.

One must be persistent and creative in using keywords. An effective keyword search requires a strategy: planning of a list of possible keywords and phrases to try.

Choice of the main keywords is the first tool of writing a research paper. Research paper writing is an art. Keyword search should be as strategic as possible.

One should start brainstorming lists of potential keywords before even beginning searching. Think about the most important concepts related to research work. Ask, “What words would a source have to include to be truly valuable in a research paper?” Then consider synonyms for the important words.

It may take the discovery of only one important paper to steer in the right keyword direction because, in most databases, the keywords under which a research paper is abstracted are listed with the paper.

**Numerical Methods**
Numerical methods used should be transparent and, where appropriate, supported by references.

**Abbreviations**
Authors must list all the abbreviations used in the paper at the end of the paper or in a separate table before using them.

**Formulas and equations**
Authors are advised to submit any mathematical equation using either MathJax, KaTeX, or LaTeX, or in a very high-quality image.

**Tables, Figures, and Figure Legends**
Tables: Tables should be cautiously designed, uncrowned, and include only essential data. Each must have an Arabic number, e.g., Table 4, a self-explanatory caption, and be on a separate sheet. Authors must submit tables in an editable format and not as images. References to these tables (if any) must be mentioned accurately.
Figures

Figures are supposed to be submitted as separate files. Always include a citation in the text for each figure using Arabic numbers, e.g., Fig. 4. Artwork must be submitted online in vector electronic form or by emailing it.

Preparation of Electronic Figures for Publication

Although low-quality images are sufficient for review purposes, print publication requires high-quality images to prevent the final product being blurred or fuzzy. Submit (possibly by e-mail) EPS (line art) or TIFF (halftone/photographs) files only. MS PowerPoint and Word Graphics are unsuitable for printed pictures. Avoid using pixel-oriented software. Scans (TIFF only) should have a resolution of at least 350 dpi (halftone) or 700 to 1100 dpi (line drawings). Please give the data for figures in black and white or submit a Color Work Agreement form. EPS files must be saved with fonts embedded (and with a TIFF preview, if possible).

For scanned images, the scanning resolution at final image size ought to be as follows to ensure good reproduction: line art: >650 dpi; halftones (including gel photographs): >350 dpi; figures containing both halftone and line images: >650 dpi.

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Tips for Writing a Good Quality Management Research Paper

Techniques for writing a good quality management and business research paper:

1. Choosing the topic: In most cases, the topic is selected by the interests of the author, but it can also be suggested by the guides. You can have several topics, and then judge which you are most comfortable with. This may be done by asking several questions of yourself, like “Will I be able to carry out a search in this area? Will I find all necessary resources to accomplish the search? Will I be able to find all information in this field area?” If the answer to this type of question is “yes,” then you ought to choose that topic. In most cases, you may have to conduct surveys and visit several places. Also, you might have to do a lot of work to find all the rises and falls of the various data on that subject. Sometimes, detailed information plays a vital role, instead of short information. Evaluators are human: The first thing to remember is that evaluators are also human beings. They are not only meant for rejecting a paper. They are here to evaluate your paper. So present your best aspect.

2. Think like evaluators: If you are in confusion or getting demotivated because your paper may not be accepted by the evaluators, then think, and try to evaluate your paper like an evaluator. Try to understand what an evaluator wants in your research paper, and you will automatically have your answer. Make blueprints of paper: The outline is the plan or framework that will help you to arrange your thoughts. It will make your paper logical. But remember that all points of your outline must be related to the topic you have chosen.

3. Ask your guides: If you are having any difficulty with your research, then do not hesitate to share your difficulty with your guide (if you have one). They will surely help you out and resolve your doubts. If you can’t clarify what exactly you require for your work, then ask your supervisor to help you with an alternative. He or she might also provide you with a list of essential readings.

4. Use of computer is recommended: As you are doing research in the field of management and business then this point is quite obvious. Use right software: Always use good quality software packages. If you are not capable of judging good software, then you can lose the quality of your paper unknowingly. There are various programs available to help you which you can get through the internet.

5. Use the internet for help: An excellent start for your paper is using Google. It is a wondrous search engine, where you can have your doubts resolved. You may also read some answers for the frequent question of how to write your research paper or find a model research paper. You can download books from the internet. If you have all the required books, place importance on reading, selecting, and analyzing the specified information. Then sketch out your research paper. Use big pictures: You may use encyclopedias like Wikipedia to get pictures with the best resolution. At Global Journals, you should strictly follow here.
6. Bookmarks are useful: When you read any book or magazine, you generally use bookmarks, right? It is a good habit which helps to not lose your continuity. You should always use bookmarks while searching on the internet also, which will make your search easier.

7. Revise what you wrote: When you write anything, always read it, summarize it, and then finalize it.

8. Make every effort: Make every effort to mention what you are going to write in your paper. That means always have a good start. Try to mention everything in the introduction—what is the need for a particular research paper. Polish your work with good writing skills and always give an evaluator what he wants. Make backups: When you are going to do any important thing like making a research paper, you should always have backup copies of it either on your computer or on paper. This protects you from losing any portion of your important data.

9. Produce good diagrams of your own: Always try to include good charts or diagrams in your paper to improve quality. Using several unnecessary diagrams will degrade the quality of your paper by creating a hodgepodge. So always try to include diagrams which were made by you to improve the readability of your paper. Use of direct quotes: When you do research relevant to literature, history, or current affairs, then use of quotes becomes essential, but if the study is relevant to science, use of quotes is not preferable.

10. Use proper verb tense: Use proper verb tenses in your paper. Use past tense to present those events that have happened. Use present tense to indicate events that are going on. Use future tense to indicate events that will happen in the future. Use of wrong tenses will confuse the evaluator. Avoid sentences that are incomplete.

11. Pick a good study spot: Always try to pick a spot for your research which is quiet. Not every spot is good for studying.

12. Know what you know: Always try to know what you know by making objectives, otherwise you will be confused and unable to achieve your target.

13. Use good grammar: Always use good grammar and words that will have a positive impact on the evaluator; use of good vocabulary does not mean using tough words which the evaluator has to find in a dictionary. Do not fragment sentences. Eliminate one-word sentences. Do not ever use a big word when a smaller one would suffice. Verbs have to be in agreement with their subjects. In a research paper, do not start sentences with conjunctions or finish them with prepositions. When writing formally, it is advisable to never split an infinitive because someone will (wrongly) complain. Avoid clichés like a disease. Always shun irritating alliteration. Use language which is simple and straightforward. Put together a neat summary.

14. Arrangement of information: Each section of the main body should start with an opening sentence, and there should be a changeover at the end of the section. Give only valid and powerful arguments for your topic. You may also maintain your arguments with records.

15. Never start at the last minute: Always allow enough time for research work. Leaving everything to the last minute will degrade your paper and spoil your work.

16. Multitasking in research is not good: Doing several things at the same time is a bad habit in the case of research activity. Research is an area where everything has a particular time slot. Divide your research work into parts, and do a particular part in a particular time slot.

17. Never copy others' work: Never copy others' work and give it your name because if the evaluator has seen it anywhere, you will be in trouble. Take proper rest and food: No matter how many hours you spend on your research activity, if you are not taking care of your health, then all your efforts will have been in vain. For quality research, take proper rest and food.

18. Go to seminars: Attend seminars if the topic is relevant to your research area. Utilize all your resources.

19. Refresh your mind after intervals: Try to give your mind a rest by listening to soft music or sleeping in intervals. This will also improve your memory. Acquire colleagues: Always try to acquire colleagues. No matter how sharp you are, if you acquire colleagues, they can give you ideas which will be helpful to your research.

20. Think technically: Always think technically. If anything happens, search for its reasons, benefits, and demerits. Think and then print: When you go to print your paper, check that tables are not split, headings are not detached from their descriptions, and page sequence is maintained.
21. **Adding unnecessary information:** Do not add unnecessary information like "I have used MS Excel to draw graphs." Irrelevant and inappropriate material is superfluous. Foreign terminology and phrases are not apropos. One should never take a broad view. Analogy is like feathers on a snake. Use words properly, regardless of how others use them. Remove quotations. Puns are for kids, not grunt readers. Never oversimplify: When adding material to your research paper, never go for oversimplification; this will definitely irritate the evaluator. Be specific. Never use rhythmic redundancies. Contractions shouldn’t be used in a research paper. Comparisons are as terrible as clichés. Give up ampersands, abbreviations, and so on. Remove commas that are not necessary. Parenthetical words should be between brackets or commas. Understatement is always the best way to put forward earth-shaking thoughts. Give a detailed literary review.

22. **Report concluded results:** Use concluded results. From raw data, filter the results, and then conclude your studies based on measurements and observations taken. An appropriate number of decimal places should be used. Parenthetical remarks are prohibited here. Proofread carefully at the final stage. At the end, give an outline to your arguments. Spot perspectives of further study of the subject. Justify your conclusion at the bottom sufficiently, which will probably include examples.

23. **Upon conclusion:** Once you have concluded your research, the next most important step is to present your findings. Presentation is extremely important as it is the definite medium through which your research is going to be in print for the rest of the crowd. Care should be taken to categorize your thoughts well and present them in a logical and neat manner. A good quality research paper format is essential because it serves to highlight your research paper and bring to light all necessary aspects of your research.

**Informal Guidelines of Research Paper Writing**

**Key points to remember:**
- Submit all work in its final form.
- Write your paper in the form which is presented in the guidelines using the template.
- Please note the criteria peer reviewers will use for grading the final paper.

**Final points:**

One purpose of organizing a research paper is to let people interpret your efforts selectively. The journal requires the following sections, submitted in the order listed, with each section starting on a new page:

*The introduction:* This will be compiled from reference matter and reflect the design processes or outline of basis that directed you to make a study. As you carry out the process of study, the method and process section will be constructed like that. The results segment will show related statistics in nearly sequential order and direct reviewers to similar intellectual paths throughout the data that you gathered to carry out your study.

*The discussion section:* This will provide understanding of the data and projections as to the implications of the results. The use of good quality references throughout the paper will give the effort trustworthiness by representing an alertness to prior workings.

Writing a research paper is not an easy job, no matter how trouble-free the actual research or concept. Practice, excellent preparation, and controlled record-keeping are the only means to make straightforward progression.

**General style:**
Specific editorial column necessities for compliance of a manuscript will always take over from directions in these general guidelines.

*To make a paper clear:* Adhere to recommended page limits.

*Mistakes to avoid:*
- Insertion of a title at the foot of a page with subsequent text on the next page.
- Separating a table, chart, or figure—confine each to a single page.
- Submitting a manuscript with pages out of sequence.
- In every section of your document, use standard writing style, including articles ("a" and "the").
- Keep paying attention to the topic of the paper.
• Use paragraphs to split each significant point (excluding the abstract).
• Align the primary line of each section.
• Present your points in sound order.
• Use present tense to report well-accepted matters.
• Use past tense to describe specific results.
• Do not use familiar wording; don't address the reviewer directly. Don't use slang or superlatives.
• Avoid use of extra pictures—include only those figures essential to presenting results.

Title page:
Choose a revealing title. It should be short and include the name(s) and address(es) of all authors. It should not have acronyms or abbreviations or exceed two printed lines.

Abstract: This summary should be two hundred words or less. It should clearly and briefly explain the key findings reported in the manuscript and must have precise statistics. It should not have acronyms or abbreviations. It should be logical in itself. Do not cite references at this point.

An abstract is a brief, distinct paragraph summary of finished work or work in development. In a minute or less, a reviewer can be taught the foundation behind the study, common approaches to the problem, relevant results, and significant conclusions or new questions.

Write your summary when your paper is completed because how can you write the summary of anything which is not yet written? Wealth of terminology is very essential in abstract. Use comprehensive sentences, and do not sacrifice readability for brevity; you can maintain it succinctly by phrasing sentences so that they provide more than a lone rationale. The author can at this moment go straight to shortening the outcome. Sum up the study with the subsequent elements in any summary. Try to limit the initial two items to no more than one line each.

Reason for writing the article—theory, overall issue, purpose.
• Fundamental goal.
• To-the-point depiction of the research.
• Consequences, including definite statistics—if the consequences are quantitative in nature, account for this; results of any numerical analysis should be reported. Significant conclusions or questions that emerge from the research.

Approach:
• Single section and succinct.
• An outline of the job done is always written in past tense.
• Concentrate on shortening results—limit background information to a verdict or two.
• Exact spelling, clarity of sentences and phrases, and appropriate reporting of quantities (proper units, important statistics) are just as significant in an abstract as they are anywhere else.

Introduction:
The introduction should "introduce" the manuscript. The reviewer should be presented with sufficient background information to be capable of comprehending and calculating the purpose of your study without having to refer to other works. The basis for the study should be offered. Give the most important references, but avoid making a comprehensive appraisal of the topic. Describe the problem visibly. If the problem is not acknowledged in a logical, reasonable way, the reviewer will give no attention to your results. Speak in common terms about techniques used to explain the problem, if needed, but do not present any particulars about the protocols here.

The following approach can create a valuable beginning:

• Explain the value (significance) of the study.
• Defend the model—why did you employ this particular system or method? What is its compensation? Remark upon its appropriateness from an abstract point of view as well as pointing out sensible reasons for using it.
• Present a justification. State your particular theory(-ies) or aim(s), and describe the logic that led you to choose them.
• Briefly explain the study's tentative purpose and how it meets the declared objectives.
Approach:
Use past tense except for when referring to recognized facts. After all, the manuscript will be submitted after the entire job is done. Sort out your thoughts; manufacture one key point for every section. If you make the four points listed above, you will need at least four paragraphs. Present surrounding information only when it is necessary to support a situation. The reviewer does not desire to read everything you know about a topic. Shape the theory specifically—do not take a broad view.

As always, give awareness to spelling, simplicity, and correctness of sentences and phrases.

Procedures (methods and materials):
This part is supposed to be the easiest to carve if you have good skills. A soundly written procedures segment allows a capable scientist to replicate your results. Present precise information about your supplies. The suppliers and clarity of reagents can be helpful bits of information. Present methods in sequential order, but linked methodologies can be grouped as a segment. Be concise when relating the protocols. Attempt to give the least amount of information that would permit another capable scientist to replicate your outcome, but be cautious that vital information is integrated. The use of subheadings is suggested and ought to be synchronized with the results section.

When a technique is used that has been well-described in another section, mention the specific item describing the way, but draw the basic principle while stating the situation. The purpose is to show all particular resources and broad procedures so that another person may use some or all of the methods in one more study or referee the scientific value of your work. It is not to be a step-by-step report of the whole thing you did, nor is a methods section a set of orders.

Materials:

Materials may be reported in part of a section or else they may be recognized along with your measures.

Methods:

- Report the method and not the particulars of each process that engaged the same methodology.
- Describe the method entirely.
- To be succinct, present methods under headings dedicated to specific dealings or groups of measures.
- Simplify—detail how procedures were completed, not how they were performed on a particular day.
- If well-known procedures were used, account for the procedure by name, possibly with a reference, and that's all.

Approach:
It is embarrassing to use vigorous voice when documenting methods without using first person, which would focus the reviewer’s interest on the researcher rather than the job. As a result, when writing up the methods, most authors use third person passive voice.

Use standard style in this and every other part of the paper—avoid familiar lists, and use full sentences.

What to keep away from:

- Resources and methods are not a set of information.
- Skip all descriptive information and surroundings—save it for the argument.
- Leave out information that is immaterial to a third party.

Results:
The principle of a results segment is to present and demonstrate your conclusion. Create this part as entirely objective details of the outcome, and save all understanding for the discussion.

The page length of this segment is set by the sum and types of data to be reported. Use statistics and tables, if suitable, to present consequences most efficiently.

You must clearly differentiate material which would usually be incorporated in a study editorial from any unprocessed data or additional appendix matter that would not be available. In fact, such matters should not be submitted at all except if requested by the instructor.

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Content:

- Sum up your conclusions in text and demonstrate them, if suitable, with figures and tables.
- In the manuscript, explain each of your consequences, and point the reader to remarks that are most appropriate.
- Present a background, such as by describing the question that was addressed by creation of an exacting study.
- Explain results of control experiments and give remarks that are not accessible in a prescribed figure or table, if appropriate.
- Examine your data, then prepare the analyzed (transformed) data in the form of a figure (graph), table, or manuscript.

What to stay away from:

- Do not discuss or infer your outcome, report surrounding information, or try to explain anything.
- Do not include raw data or intermediate calculations in a research manuscript.
- Do not present similar data more than once.
- A manuscript should complement any figures or tables, not duplicate information.
- Never confuse figures with tables—there is a difference.

Approach:

As always, use past tense when you submit your results, and put the whole thing in a reasonable order.

Put figures and tables, appropriately numbered, in order at the end of the report.

If you desire, you may place your figures and tables properly within the text of your results section.

Figures and tables:

If you put figures and tables at the end of some details, make certain that they are visibly distinguished from any attached appendix materials, such as raw facts. Whatever the position, each table must be titled, numbered one after the other, and include a heading. All figures and tables must be divided from the text.

Discussion:

The discussion is expected to be the trickiest segment to write. A lot of papers submitted to the journal are discarded based on problems with the discussion. There is no rule for how long an argument should be.

Position your understanding of the outcome visibly to lead the reviewer through your conclusions, and then finish the paper with a summing up of the implications of the study. The purpose here is to offer an understanding of your results and support all of your conclusions, using facts from your research and generally accepted information, if suitable. The implication of results should be fully described.

Infer your data in the conversation in suitable depth. This means that when you clarify an observable fact, you must explain mechanisms that may account for the observation. If your results vary from your prospect, make clear why that may have happened. If your results agree, then explain the theory that the proof supported. It is never suitable to just state that the data approved the prospect, and let it drop at that. Make a decision as to whether each premise is supported or discarded or if you cannot make a conclusion with assurance. Do not just dismiss a study or part of a study as "uncertain."

Research papers are not acknowledged if the work is imperfect. Draw what conclusions you can based upon the results that you have, and take care of the study as a finished work.

- You may propose future guidelines, such as how an experiment might be personalized to accomplish a new idea.
- Give details of all of your remarks as much as possible, focusing on mechanisms.
- Make a decision as to whether the tentative design sufficiently addressed the theory and whether or not it was correctly restricted. Try to present substitute explanations if they are sensible alternatives.
- One piece of research will not counter an overall question, so maintain the large picture in mind. Where do you go next? The best studies unlock new avenues of study. What questions remain?
- Recommendations for detailed papers will offer supplementary suggestions.
Approach:
When you refer to information, differentiate data generated by your own studies from other available information. Present work done by specific persons (including you) in past tense.
Describe generally acknowledged facts and main beliefs in present tense.

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