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VOLUME 20 ISSUE 2 VERSION 1.0



GLOBAL JOURNAL OF MANAGEMENT AND BUSINESS RESEARCH: G
INTERDISCIPLINARY



GLOBAL JOURNAL OF MANAGEMENT AND BUSINESS RESEARCH: G
INTERDISCIPLINARY

VOLUME 20 ISSUE 2 (VER. 1.0)

OPEN ASSOCIATION OF RESEARCH SOCIETY

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GLOBAL JOURNAL OF MANAGEMENT AND BUSINESS RESEARCH: G
INTERDISCIPLINARY

Volume 20 Issue 2 Version 1.0 Year 2020

Type: Double Blind Peer Reviewed International Research Journal

Publisher: Global Journals

Online ISSN: 2249-4588 & Print ISSN: 0975-5853

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.*

GJMBR-G Classification: *JEL Code: Q21, C53*



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Supply Chain Management, Optimization and Forecasting Techniques

Atyeh Mohammed Alzhrani

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.

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 expeters 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", refer 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 Rabbinob 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 (Pralhad & 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

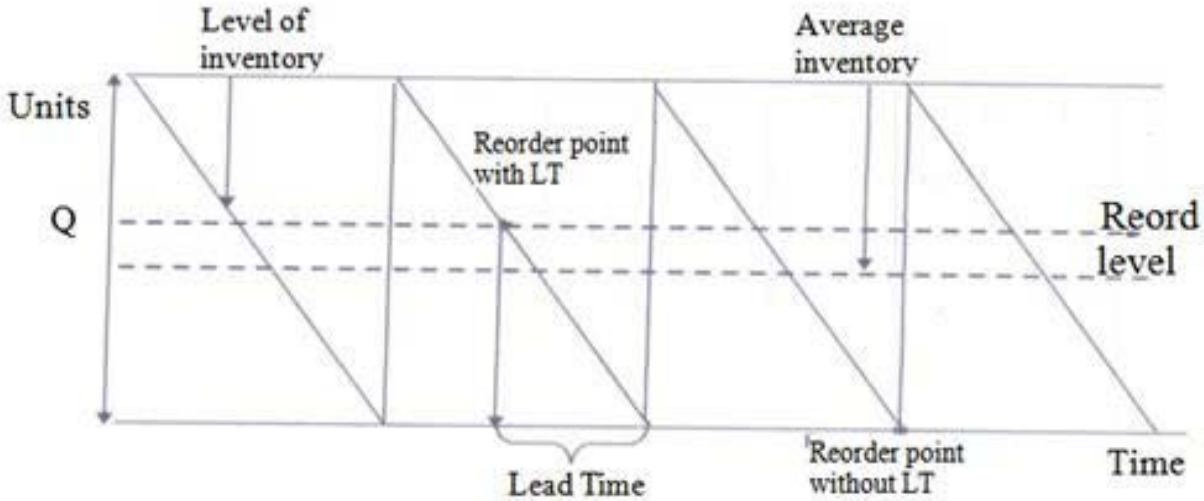


Figure 1: Fixed order-quantity Model

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;

- For different levels of security stocks, the additional cost of holding inventory and the cost of inventory shortage are calculated.

- 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:

$$\text{Supplemental Inventory Cost} = \text{Security Inventory} \times \text{Unit Annual Inventory Cost} \dots \dots \dots \text{equation-1}$$

The cost of inventory depletion can be calculated as follows:

$$\text{Cost of non-availability of product in stock (Quantity of product whose demand cannot be met) } \times \text{(probability of demand te = quantity of product) } \times \text{(unit cost of product shortage) } \times \text{(number of orders per year) } \dots \dots \dots \text{equation-1}$$

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?





| | | NUMBERS | POSIBILITY |
|-----|---|---------|--------------|
| ROP | → | 30 | 0,2 |
| | | 40 | 0,2 |
| | | 50 | 0,3 |
| | | 60 | 0,2 |
| | | 70 | 0,1 |
| | | | $\Sigma = 1$ |

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 preventative 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:

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

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.

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GLOBAL JOURNAL OF MANAGEMENT AND BUSINESS RESEARCH: G
INTERDISCIPLINARY

Volume 20 Issue 2 Version 1.0 Year 2020

Type: Double Blind Peer Reviewed International Research Journal

Publisher: Global Journals

Online ISSN: 2249-4588 & Print ISSN: 0975-5853

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

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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.*

GJMBR-G Classification: *JEL Code: O15*



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

K R Samarasinghe^α & Dr. Ajith Medis^σ

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.

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 adaption 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 (Sajeewanie, 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

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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, Jabbour, 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).

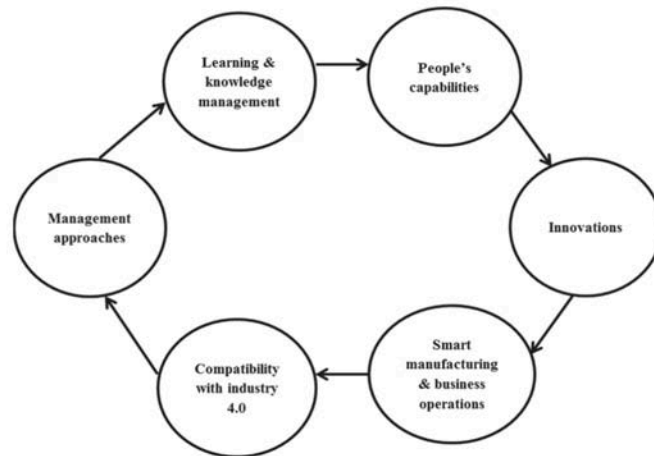


Figure 1: Management practice that compatible with industry 4.0 (Shamim et al., 2016)

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 continues work requirements (Hecklauet 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).

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.

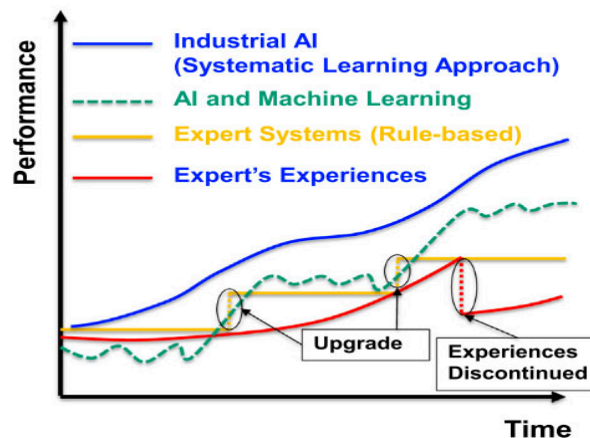


Figure 2: Comparison of industrial AI with other learning platforms (Lee et al., 2018)

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.

From this concept, accountability of HRM decentralize as an organizational activity and not as a part of HRM department (Sajeevanie, 2015).

SHRM is created based on two factors namely how does an organization align resources with current strategies or adapt new strategies which effect to change the strategic direction and how does an organization create or give more strength to competitive advantage by strategically build and renew human resources? (Colbert, 2004) while Beer, M. (1997) stressed the importance of investing in human

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 work-place into high performance work place 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 measure the strategic position of an organization (Wernerfelt, 1995). According to Majoor & Witteloostuijn (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 background provided with artificial intelligence, machines will be able to increase efficiency by learning human patterns (Hecklau, Galeitzke, 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 to 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 process like recruitments, development of skills should align with the business strategy of an organization. It also mentioned about the need for problem-solving skills that will be highly required to manage the internet of things (IoT), Big data, and AI (Liboni et al., 2019).

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

pressure /short production life cycle and aging of workforce.

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 filled 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 et al., 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 Willcocks, Mary Lacity, Andrew Craig (2017) from their paper on "Robotic process automation: strategic transformation lever for global business services" shows "Xchanging," a 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 scrapping 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.

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GLOBAL JOURNAL OF MANAGEMENT AND BUSINESS RESEARCH: G
INTERDISCIPLINARY

Volume 20 Issue 2 Version 1.0 Year 2020

Type: Double Blind Peer Reviewed International Research Journal

Publisher: Global Journals

Online ISSN: 2249-4588 & Print ISSN: 0975-5853

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 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



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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 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. 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- 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). 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, BFSA, healthy & safe food.

I. 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 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. 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

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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 BFSFA'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 1.1: Frequency distribution (percentage) of 24 Criteria of 29 Soft beverages products

| Variables Names | NO (%) | YES (%) |
|-------------------------------|--------|---------|
| International Brand | 58.6 | 41.4 |
| Pet Bottle | 13.80 | 86.2 |
| Manufacturer name | 0 | 100 |
| Manufacturer address | 0 | 100 |
| Brand name in Bengali | 6.9 | 93.1 |
| Batch No | 3.4 | 96.6 |
| Net weight/amount | 3.4 | 96.6 |
| Price in Bengali | 27.6 | 72.4 |
| Manufacturing Date | 3.4 | 96.6 |
| Expire Date | 3.4 | 96.6 |
| BSTI Logo | 6.9 | 93.1 |
| Ingredients name in Bengali | 3.4 | 96.6 |
| Nutritional Value Table | 13.8 | 86.2 |
| Specific Preservatives name | 34.5 | 65.5 |
| Specific Acedulants/AR name | 17.2 | 82.8 |
| Specific Stabilizers name | 82.8 | 17.2 |
| Specific Clouding Agents name | 100 | 0 |
| Specific Color name | 48.3 | 51.7 |
| Specific Flavors name | 72.4 | 27.6 |

| | | |
|------------------------------------|------|------|
| Allergen on Label | 100 | 0 |
| GM Food on Label | 100 | 0 |
| Consumer Help Line number on Label | 34.5 | 65.5 |
| Barcode | 3.4 | 96.6 |
| Vegetarian Symbol | 41.4 | 58.6 |

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).

Table1.2: Descriptive analysis of 24 criteria for 29 samples. (N=24)

| Descriptive Statistics | | | |
|------------------------------------|------|----------------|----------|
| Variables Name (Yes=1, No= 0) | Mean | Std. Deviation | Variance |
| International Brand | .41 | .501 | .251 |
| Pet Bottle | .86 | .351 | .123 |
| Manufacturer name | 1.00 | .000 | .000 |
| Manufacturer address | 1.00 | .000 | .000 |
| Brand name in Bengali | .93 | .258 | .067 |
| Batch No. | .97 | .186 | .034 |
| Net weight/amount | .97 | .186 | .034 |
| Price in Bengali | .72 | .455 | .207 |
| Manufacturing Date | .97 | .186 | .034 |
| Expire Date | .97 | .186 | .034 |
| BSTI Logo | .93 | .258 | .067 |
| Ingredients name in Bengali | .97 | .186 | .034 |
| Nutritional Value Table | .86 | .351 | .123 |
| Specific Preservatives name | .66 | .484 | .234 |
| Specific Acedulants/AR name | .83 | .384 | .148 |
| Specific Stabilizers name | .17 | .384 | .148 |
| Specific Clouding Agents name | .00 | .000 | .000 |
| Specific Color name | .52 | .509 | .259 |
| Specific Flavors name | .28 | .455 | .207 |
| Allergen on Label | .00 | .000 | .000 |
| GM Food on Label | .00 | .000 | .000 |
| Consumer Help Line number on Label | .66 | .484 | .234 |
| Barcode Use | .97 | .186 | .034 |
| Vegetarian Symbol | .59 | .501 | .251 |
| Valid N (list wise) | 24 | | |



Comparative position of using "Regulations of product labeling," the Food Safety Act, 2013":

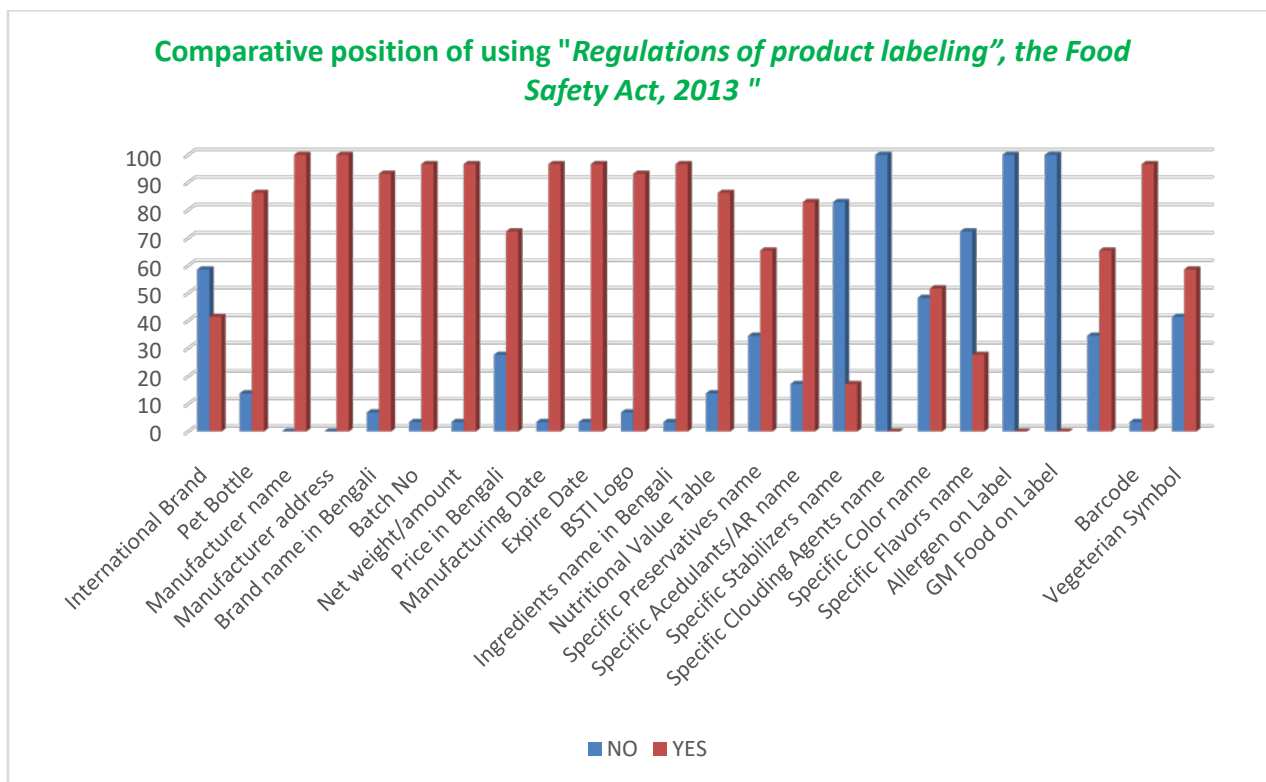


Fig 1.1: Comparative status analysis of the Criteria usages within the "Regulations of product labeling."

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

| Product Name | NO (%) | Yes (%) |
|--------------|--------|---------|
| Fanta | 37.5 | 62.5 |
| Cocacola | 29.2 | 70.8 |
| 7up | 33.3 | 66.7 |
| Sprite | 25 | 75 |
| Current | 20.8 | 79.2 |
| Speed | 37.5 | 62.5 |
| Royal Ti | 33.3 | 66.7 |
| Mejanda | 33.3 | 66.7 |
| Tropicana | 20.8 | 79.2 |

| | | |
|------------|------|------|
| Oscar | 33.3 | 66.7 |
| Fruto | 16.7 | 83.3 |
| Dinko | 20.8 | 79.2 |
| Soul up | 37.5 | 62.5 |
| Mountain | 29.2 | 70.8 |
| Frutica | 33.3 | 66.7 |
| Apple Fi | 29.2 | 70.8 |
| Pepsi | 33.3 | 66.7 |
| Brever | 25 | 75 |
| mojo | 29.2 | 70.8 |
| Cocacola_C | 41.7 | 58.3 |
| speed | 37.5 | 62.5 |
| Diet Cok | 41.7 | 58.3 |
| Sprite-C | 41.7 | 58.3 |
| clemon | 29.2 | 70.8 |
| Power | 25 | 75 |
| Fizz Up | 25 | 75 |
| Clear Up | 29.2 | 70.8 |
| Jerra ma | 50 | 50 |
| Click | 62.5 | 37.5 |

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).

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.

Analysis through Pie diagram: Fig-1.2 showing the competitive status of using the regulations of

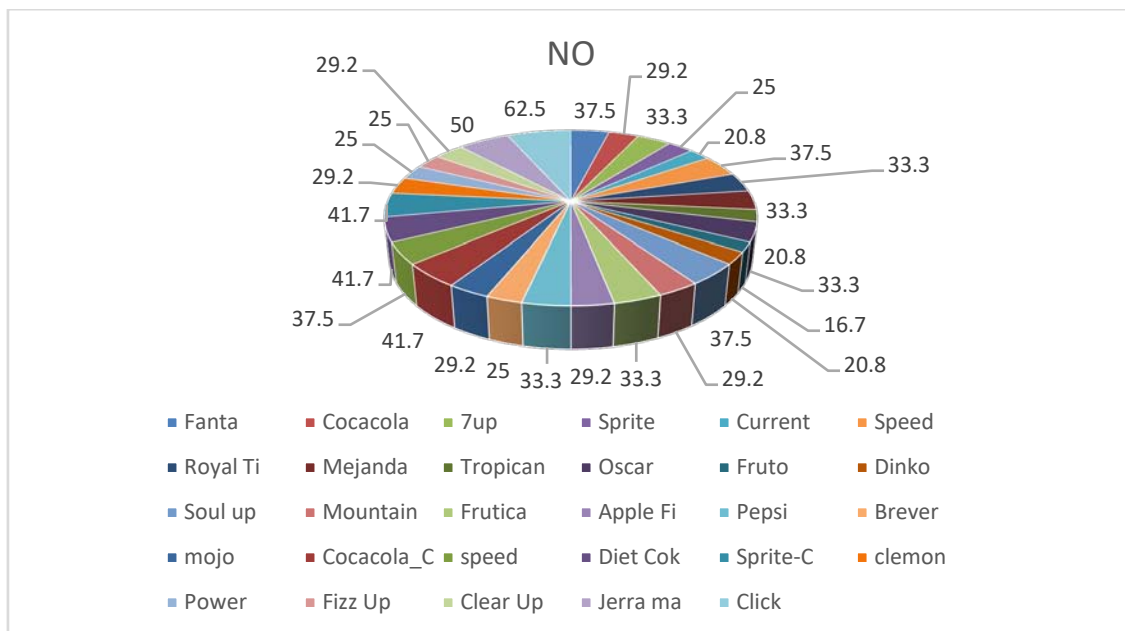


Fig 1.2: Pie diagram of comparative analysis of NOT using the "Regulations of product labeling".

Figure -1.3 represents the percentage of samples, where FRUTO (83.3%) is in the highest usages the food labeling guidelines by the selected position, and CLICK (37.5%) is in the lowest position.

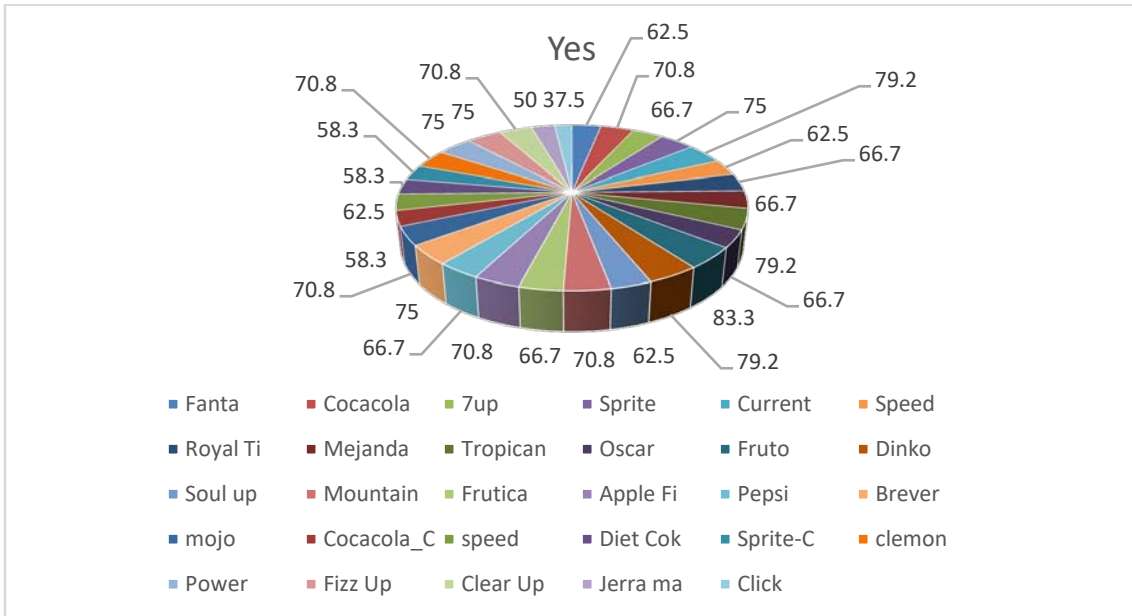


Fig 1.3: Pie diagram of comparative analysis of using the “Regulations of product labeling.”

Correlation among the Twenty four Samples (Soft beverages):

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

| Correlations | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--------------|-------|----------|------|--------|---------|-------|-------------|---------|----------------|-------|-------|-------|---------|--------------|---------|------------|-------|--------|------|------------|---------|-----------|----------|--------|-------|---------|----------|-------------|-------|
| Sample Names | Fanta | Cocacola | 7up | Sprite | Current | Speed | Royal_Tiger | Mejanda | Tropicana_fruz | Oscar | Fruto | Dinko | Soul_up | Mountain_dew | Frutica | Apple_Fizz | Pepsi | Brever | mojo | Cocacola_C | Speed_C | Diet_Coke | Sprite_C | clemon | Power | Fizz_Up | Clear_Up | Jerra_masal | Click |
| Fanta | 1 | .828 | .730 | .745 | .662 | .467 | .365 | .548 | .500 | .183 | .346 | .238 | .467 | .639 | .548 | .450 | .730 | .348 | .639 | .917 | .467 | .362 | .917 | .450 | .547 | .547 | .450 | .258 | .600 |
| Cocacola | | 1 | .713 | .900 | .799 | .450 | .519 | .713 | .647 | .324 | .451 | .348 | .639 | .597 | .519 | .597 | .713 | .476 | .798 | .759 | .450 | .300 | .759 | .597 | .688 | .688 | .597 | .275 | .497 |
| 7 up | | | 1 | .816 | .725 | .730 | .625 | .625 | .722 | .250 | .395 | .290 | .548 | .907 | .437 | .519 | .812 | .408 | .519 | .657 | .730 | .289 | .657 | .713 | .408 | .612 | .519 | .530 | .548 |
| Sprite | | | | 1 | .889 | .547 | .612 | .816 | .647 | .408 | .516 | .415 | .745 | .688 | .408 | .688 | .612 | .556 | .688 | .683 | .547 | .270 | .683 | .688 | .556 | .778 | .688 | .385 | .447 |
| Current | | | | | 1 | .662 | .725 | .725 | .744 | .290 | .596 | .495 | .662 | .799 | .508 | .799 | .725 | .652 | .799 | .607 | .662 | .240 | .607 | .574 | .652 | .652 | .574 | .513 | .397 |
| Speed | | | | | | 1 | .913 | .730 | .657 | .365 | .577 | .662 | .644 | .828 | .730 | .639 | .730 | .547 | .639 | .393 | .822 | -.161 | .393 | .639 | .547 | .547 | .450 | .602 | .422 |
| Royal Tiger | | | | | | | 1 | .813 | .722 | .437 | .632 | .725 | .730 | .713 | .625 | .713 | .625 | .612 | .713 | .299 | .730 | -.206 | .299 | .713 | .612 | .612 | .519 | .530 | .365 |
| Mejanda | | | | | | | | 1 | .500 | .625 | .632 | .725 | .913 | .519 | .625 | .713 | .438 | .612 | .713 | .478 | .548 | -.165 | .478 | .713 | .612 | .816 | .713 | .354 | .365 |
| Tropicana F | | | | | | | | | 1 | .279 | .592 | .489 | .441 | .797 | .568 | .568 | .797 | .407 | .647 | .441 | .657 | .204 | .441 | .568 | .489 | .407 | .339 | .505 | .423 |
| Oscar | | | | | | | | | | 1 | .632 | .725 | .730 | .130 | .437 | .324 | .063 | .612 | .324 | .120 | .183 | -.248 | .120 | .519 | .408 | .612 | .519 | .177 | .000 |
| Dinko | | | | | | | | | | | 1 | .662 | .348 | .725 | .574 | .290 | .652 | .574 | .191 | .450 | -.335 | .191 | .574 | .652 | .652 | .574 | .308 | .185 | |
| Soul_up | | | | | | | | | | | | 1 | .450 | .548 | .639 | .365 | .745 | .639 | .393 | .467 | -.161 | .393 | .639 | .547 | .745 | .639 | .430 | .244 | |
| Mountain_D | | | | | | | | | | | | | 1 | .519 | .597 | .907 | .476 | .597 | .573 | .828 | .257 | .573 | .597 | .476 | .476 | .395 | .642 | .497 | |
| Frutica | | | | | | | | | | | | | | 1 | .519 | .625 | .408 | .713 | .478 | .548 | -.165 | .478 | .324 | .612 | .408 | .324 | .354 | .365 | |
| Apple_Fizz | | | | | | | | | | | | | | | 1 | .519 | .688 | .798 | .387 | .639 | .214 | .387 | .597 | .688 | .688 | .597 | .642 | .118 | |
| Pepsi | | | | | | | | | | | | | | | | 1 | .408 | .713 | .657 | .730 | .289 | .657 | .519 | .612 | .408 | .324 | .530 | .548 | |
| Brever | | | | | | | | | | | | | | | | | 1 | .688 | .293 | .547 | .180 | .293 | .688 | .778 | .778 | .688 | .577 | .050 | |
| mojo | | | | | | | | | | | | | | | | | | 1 | .573 | .639 | .257 | .573 | .597 | .900 | .688 | .597 | .458 | .308 | |
| Cocacola_C | | | | | | | | | | | | | | | | | | | | 1 | .567 | .395 | 1.00 | .387 | .488 | .488 | .387 | .169 | .480 |
| speed_C | | | | | | | | | | | | | | | | | | | | | 1 | .281 | .567 | .639 | .547 | .547 | .450 | .602 | .244 |
| Diet_Coke | | | | | | | | | | | | | | | | | | | | | | 1 | .395 | .214 | .225 | .225 | .214 | .234 | -.040 |
| Sprite_C | | | | | | | | | | | | | | | | | | | | | | | 1 | .387 | .488 | .488 | .387 | .169 | .480 |
| clemon | | | | | | | | | | | | | | | | | | | | | | | | 1 | .688 | .900 | .798 | .458 | .308 |
| Power | | | | | | | | | | | | | | | | | | | | | | | | | 1 | .778 | .688 | .385 | .248 |
| Fizz_Up | | | | | | | | | | | | | | | | | | | | | | | | | | 1 | .900 | .385 | .248 |
| Clear_Up | | | | | | | | | | | | | | | | | | | | | | | | | | | 1 | .275 | .118 |
| Jerra_masla | | | | | | | | | | | | | | | | | | | | | | | | | | | | 1 | .086 |
| Click | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 1 |

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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GLOBAL JOURNAL OF MANAGEMENT AND BUSINESS RESEARCH: G
INTERDISCIPLINARY

Volume 20 Issue 2 Version 1.0 Year 2020

Type: Double Blind Peer Reviewed International Research Journal

Publisher: Global Journals

Online ISSN: 2249-4588 & Print ISSN: 0975-5853

Barriers to Engagement in Apprenticeship Programme Identifying Role of State, Employer and Apprentices through Study of Delhi

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Abstract- This study critically examines apprenticeship system in India with case study of Delhi. Sound apprenticeship system is desirable for transferring people smoothly from world of learning to world of work. For a country with 485 million workforce, a miniscule number of apprentices i.e. around 3 lakhs, get trained every year. Total establishments registered on apprenticeship portal are 67650 all over India. Stipend given to the apprentices is so less that they don't want to enter into industries as apprentices. Even the fixed stipend rules are not followed due to lack of accountability of the firms. Private firms, as found in numerous studies, don't comply with legislative requirements while apprentices view their training period as avenue for future employment rather than as a mode of training and all this affects quality of training. There is a need of a more comprehensive labour market information system which can be of benefit to all 3 key stakeholders- employers, job-seekers and government. Strong apprenticeship paradigm requires cooperation of industrial associations, government and participating companies, it cannot be bought off the market but is in need of nurturing at the shop floor. This study recommends reforms that Delhi can do to improve the apprenticeship conditions.

GJMBR-G Classification: JEL Code: O17



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Barriers to Engagement in Apprenticeship Programme Identifying Role of State, Employer and Apprentices through Study of Delhi

Harshil Sharma

Abstract- This study critically examines apprenticeship system in India with case study of Delhi. Sound apprenticeship system is desirable for transferring people smoothly from world of learning to world of work. For a country with 485 million workforce, a miniscule number of apprentices i.e. around 3 lakhs, get trained every year. Total establishments registered on apprenticeship portal are 67650 all over India. Stipend given to the apprentices is so less that they don't want to enter into industries as apprentices. Even the fixed stipend rules are not followed due to lack of accountability of the firms. Private firms, as found in numerous studies, don't comply with legislative requirements while apprentices view their training period as avenue for future employment rather than as a mode of training and all this affects quality of training. There is a need of a more comprehensive labour market information system which can be of benefit to all 3 key stakeholders-employers, job-seekers and government. Strong apprenticeship paradigm requires cooperation of industrial associations, government and participating companies, it cannot be bought off the market but is in need of nurturing at the shop floor. This study recommends reforms that Delhi can do to improve the apprenticeship conditions. Reforms recommended at national level: 1. long term reforms-Introduction of new TVET Act and formation of Ministry of Employment Generation for release of reliable statistics. 2) Short term reforms need are: in-plant internship compulsory for all vocational courses, mapping of training institutions, stipend paid should be close to minimum wage, government support for MSME financially for apprenticeship, involvement of private sector in certification which should be given in accordance of NSQF levels.

I. INTRODUCTION

Apprenticeship is a system of training practitioners of a skill at their workplace. In India it was conceived as *guru-shishya* (teacher-disciple) relation since the start of civilization in all traditional vocational trades. Sound apprenticeship system is desirable for transferring people smoothly from world of learning to world of work. Apprenticeship Act, 1961 was implemented with aim of- a. Regulating industries to conform with prescribed syllabi, period of training etc. b. Using industrial facilities to fully impart practical training and producing skilled manpower (MOLE, 1961). The Act has been amended six times in the years 1973, 1986,

1997, 2007, 2014 and 2017. Salient features of the Act, along with the Amendments are given in Appendix 1. Issues such as rigid and impractical guidelines of the Act, non-introduction of marketable trade/ skills at industry, absence of control over syllabi make industries resistant of recruiting apprentices. Study by DGET in six states questioned the market relevance of training of apprentices provided in India and found that close to two thirds of total apprentices were employed in a trade in which they were not trained (DGET, 2003). Total establishments registered on apprenticeship portal are 67650 all over India¹ (GOI, 2020).

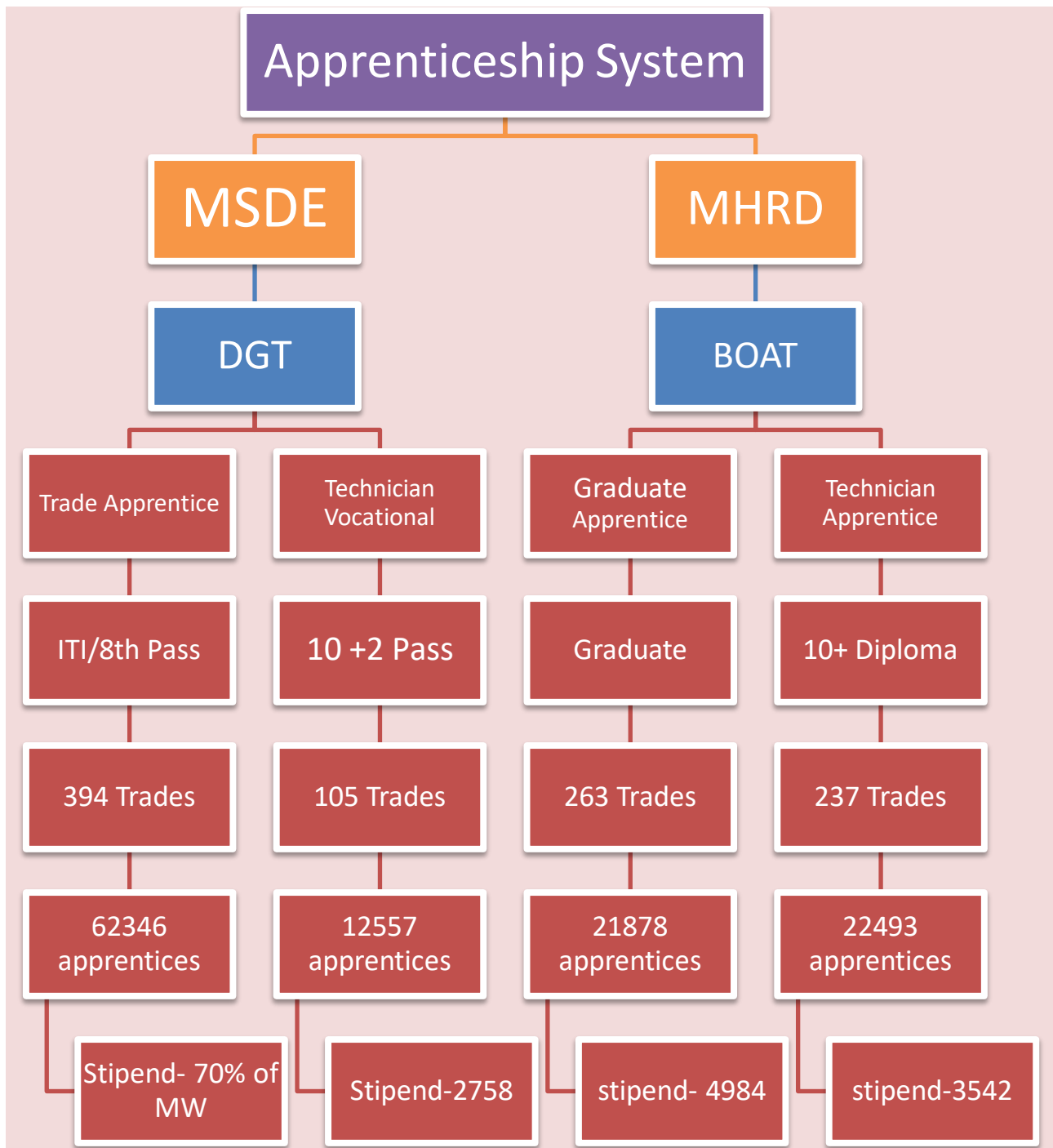
First section of the study will explain operational framework of apprenticeship in India and how the current system of apprenticeship training works. Second section would be a case study of apprenticeship system in Delhi and suggesting some short-term strategies for local government for reforming the apprenticeship system. Third section will try to compare the Indian apprenticeship system with International standards and what can be learned from successful apprenticeship and TVET developed countries. Last section of this paper will list out few important reforms required in the apprenticeship system in India in both short term and long term.

a) Framework of Apprenticeship in India

For a country with 485 million workforce, a miniscule number of apprentices i.e. around 3 lakhs, get trained every year. Minimum age of entry into apprenticeship system is 14 years and the minimum entry qualification is 8th pass. Duration of training can vary from 6 months to 4 years. Training comprises of Basic Training followed by practical training as per prescribed syllabus to appear for All India Trade Test at the end of the course. Training is conducted either in company or at a prescribed Basic Training Centres of the government.

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¹ Majority of these establishments are only registered on the portal and not engaging in training of apprentices (Das, 2019)



Source: MSDE (2019) and data on number of apprentices and trades from Department of Employment, Delhi ²

Figure 1: Operational Framework of Apprenticeship System in India

Figure 1 is a simplified version of the apprenticeship system to understand the types, trades and apprentices in India². Two ministries Ministry of Skill Development and Entrepreneurship (MSDE henceforth) and Ministry of human resource and development

(MHRD henceforth) are assigned the task of skilling and managing the apprentices. DGT and BOAT working under MSDE and MHRD respectively manage the apprentice system. There are broadly two type of trades offered by both ministries i.e. Designated trade and optional trade³. Trades that are notified by the

² Data in hardcopy format was gained from Department of Employment, Delhi regarding master apprenticeship data portal to know total number of approved trades and number of apprentices from January 2018 to December 2018 registered in those trades.

³ "Designated Trade means any trade or occupation or any subject field in engineering or non-engineering] or technology or any

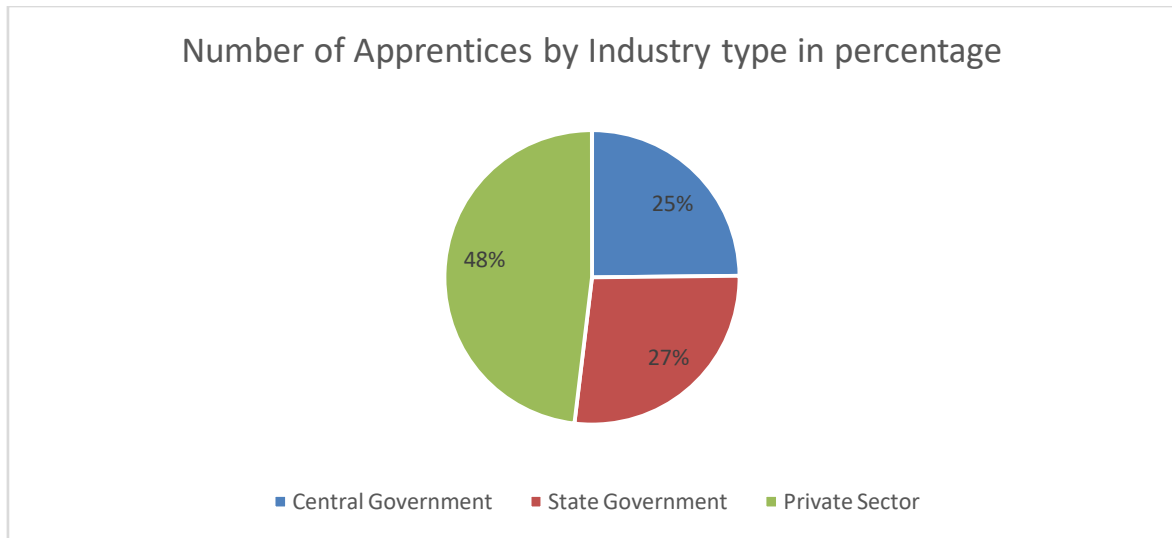
government are called designated trades and trades that are not notified by government but opted as a trade or course under apprenticeship Act are called optional trades. There are broadly four type of apprentices:

1. Trade apprentice
2. Vocational Apprentice
3. Graduate Apprentice
4. Technician (Vocational Apprentice)

As per latest estimates there are 367 groups of industries covered under Apprenticeship Act of 1961 with about 34,987 enterprises engaging apprentices. Availability of designated trades currently is 259 for trade apprentices, 163 for graduate and technical apprentices and 137 for technical (Vocational) apprentices. Among the apprentices most apprentices work as trade apprentice who receive a stipend of 70% of minimum wage in 1st year of internship, 80% and 90% of minimum wage in second and third year of apprenticeship respectively (MSDE, 2019). Stipend of technician vocational apprentice is as low as Rs.2758 per month then why would anyone find apprenticeship as an attractive option of learning while studying. Recently launched National Apprenticeship Promotion Scheme (NAPS) policy proposes to pro-actively work with industries including MSME sector to facilitate a tenfold increase in apprenticeship opportunities in the country by 2020. The scheme provides for: (i) Sharing of 25% of prescribed stipend subjects to a maximum of Rs.1500/- per month per apprentice to all apprentices under the employers. Scheme is running way behind its target of training 50 lakh apprentices by 2020. The above requires a person to work in organizational settings. Apprenticeship system should be looked at as a system through which industries reproduce themselves. Skill, knowledge and attitude are three attributes which cannot be learned by a student in classrooms alone (Das, 2019).

vocational course which the Central Government, after consultation with the Central Apprenticeship Council, may, by notification in the Official Gazette, specify as a Designated Trade." "Optional Trade means any trade or occupation not included in notified list of or any subject field in engineering or non-engineering or technology or any vocational course as may be determined by the employer lead to a competency work force(i.e. any trade or occupation not included in notified list of Designated Trades, in the field of manufacturing, services or trade, chosen by the employer under the apprenticeship programme to develop a set of workplace competencies in the Apprentice)"- MSDE (2019)

Number of Apprentices by Industry type in percentage



Source: Author's own calculation from data accessed on apprenticeship portal ⁴

Figure 2: Number of Apprentices by Industry type in percentage

Majority of Indian workforce work in private sector but that data cannot be replicated in number of interns the private sector hire. Figure two tells that 48% of workers engaged in apprenticeship are working in private sector and 52 % work in government sector (27% in state government and 25% in central government)⁴. This statistic is very worrying and one of the major reason behind outdated and lackluster performance of apprenticeship system. Students in India don't see working in private sector as an intern to be an attractive prospective as several studies have shown even after completing the internship there is no vertical mobility (Mehrotra,2014).

Employers and trainers are both apprehensive of the whole apprenticeship system. Trainees believe stipend paid to them is very low and even after completion of training they don't get a lucrative employment opportunity. Employers look at apprenticeship system mostly as a legal obligation and additional burden on establishment. Many establishments exploit the apprenticeship system by making apprentices work full time with almost no training or enhancement of knowledge and using them as low waged unskilled worker. Trainees, thereby, prefer to work in a low paid job which will fetch them a salary higher than their current stipend. Private firms, as found in numerous studies, don't comply with legislative requirements while apprentices view their training period as avenue for future employment rather than as a mode of training and all this affects quality of training (Planning Commission, 2009; Mehrotra, 2014).

⁴ Data was accessed on 10th February 2020 and data available on www.apprenticeship.gov.in which keeps on updating every month

II. CASE STUDY OF APPRENTICESHIP SYSTEM OF DELHI

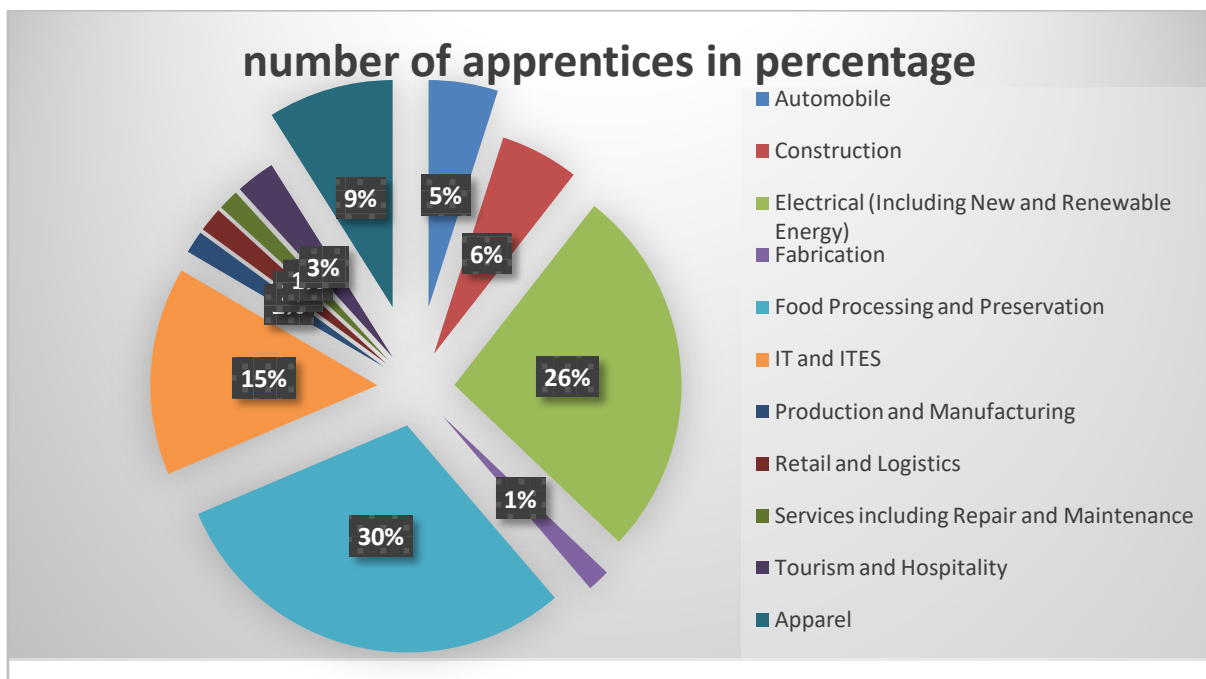
Table 1: data pertaining to apprentices in Delhi

| | Trade Apprentice | Technician Vocational | Graduate Apprentice | Technician Apprentice |
|--|------------------|-----------------------|---------------------|-----------------------|
| Number of Designated Trades | 28 | 7 | 26 | 21 |
| Number of Establishments Registered till Dec- 2018 | 81 | 10 | NA | NA |
| Number of Apprentices trained in 2018-19 | 682 | 45 | 490 | 410 |
| Stipend per month (Approx) | Approx. 10000 | 2758 | 4984 | 3542 |

Source: Data obtained from Employment department, Delhi Government

As can be seen in table 1 figure in Delhi are worse than the national average when dealing with apprenticeship. Trade Apprentices hired in a year are very low in numbers and one of the major reasons that employers give for that is very high stipend. Number of designated trades and establishments registered with

Delhi government are also very low. Having informal discussions in industries in Delhi it was also revealed that the amount that companies have to pay as stipend by complying with law is higher than actual salaries that the companies give to the workers.

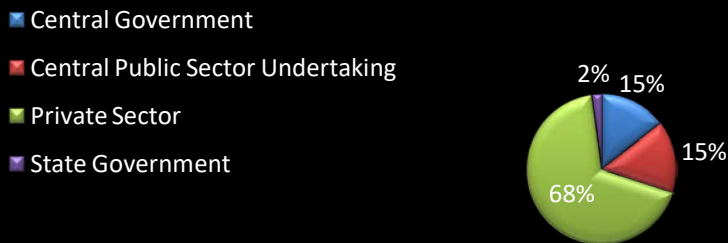


Source: Data obtained from Employment Department, Delhi Government

Figure 2: Sector-wise Apprentices hired in Delhi (in percentage)

Sectors that hire maximum number of apprentices are Food Processing and Electricals (Including Renewable Energy). Service Sector has been recently added to Apprenticeship scheme and is slowly rising in number of apprentices being hired. One of the major problems that employers face while hiring apprentices is higher stipend they have to pay in comparison to other states as Minimum wage is higher in Delhi.

Total number of apprentices



Source: Data obtained from Employment Department, Delhi Government

Figure 3: Establishment Type wise Apprentices hired in Delhi

Looking at figure 3 it can be seen that involvement of Government establishments (Both Centre and State) is low in Delhi and majority of apprentices are hired in private sector unlike the national trend. Apprenticeship Act requires every establishment with more than 6 employees to have at least 2.5% of their workforce as apprentices. High minimum wages in Delhi are complemented with influx of migratory labour and lax of labour laws. Informal Labour with some experience is available for work at a meager wage of 6-7 thousand per month which puts downward pressure on overall wages prevailing in the market. If any establishment hires apprentices and shows it under its ambit, then, he/she has to be paid around 9 thousand per month which creates resistance among employers to hire apprentices. There are some short term reforms and suggestions that can help Delhi government revive the apprenticeship system and improve number of apprentices and establishments engaged in the apprenticeship system.

1. Apprentices under State Government establishments: Every establishments needs to hire a minimum of 2.5% of their workforce as Apprentices. This law is not being followed at almost all the state government establishments. Big hotels such as: Hotel Janpath, Hotel Ashoka, Hotel Samrat, etc. are places where apprentices can learn a lot and need to follow the apprenticeship law for the same. Delhi government can come out with a Gazette Notification for effective implementation of Apprentices Act in all State Government run establishments.
2. As the amount fine for not following the provisions of Apprenticeship Act is a very meager, there is no effective compulsion under which employer follows the Act. Labour Department should step in at this level as they have data of all industries and through Labour Commissioners force the industries to comply with Apprentice Act. Education department does not have that strong hold over the employers as does the Labour Department which can be an

administrative route to solve the apprenticeship mismatch problem.

3. There are 19325 MSME establishments employing 292086 workers in Delhi. If Apprenticeship Act is rigorously followed in Delhi, the number of Apprentices will rise to 8000 which in itself can generate employment opportunities.
4. Starting new courses like B.B.A and B.Tech which have inbuilt credit system for apprenticeship. Courses designed should have credit based on Apprenticeship training provided by state and employer. Employer should engage with the trainees in shop floor, issue apprenticeship certificate at the end of the apprenticeship and the same certificate can help the trainee in completing his/her degree. B.Voc courses are designed on these lines but not a whole semester is kept for apprenticeship which should ideally be the case for a sound dual vocational education model.

III. LEARNING FROM INTERNATIONAL APPRENTICESHIP EXPERIENCE

In many countries apprenticeship system was developed centuries ago in guild system. A sound skill development system has involvement of a sound apprenticeship system. Taking examples of few famous apprenticeship systems in the world would be beneficial for suggesting reforms for the Indian Scenario. On the basis of theories of skill development, nations can be classified into 4 Varieties of Skill Formation System:

1. *Statist (Australia, Sweden, France)*: Government controls supply of apprentices while employers are forced to hire apprentices. State plays a pivotal part in the training by funding it.
2. *Segmentalist (Japan)*: Firm willingness to invest on apprentices is very high and control much of the demand and supply of labour market. Government plays a dormant role and does not interfere in hiring of apprentices in industries.
3. *Liberal Skill Formation (US, India)*: Apprentices are governed by Apprentices Act (In US it is called

Fitzgerald Act) and their limited institutional linkage with vocational education. Firms' involvement in theoretical training is less. The same is mostly done by government. There is high skill polarization of manual vocational courses apprentice at lower end and calculus based mental course apprentices at upper end.

4. *Collective Skill Formation (Germany)*: There is a commitment of both state and firm to invest in apprenticeship. While firm provided on the job training, state provided school based education in what is known as 'dual system of training'. Cost of the training is shared by employer, state and individual (Bussemeyer and Tampusch, 2012).

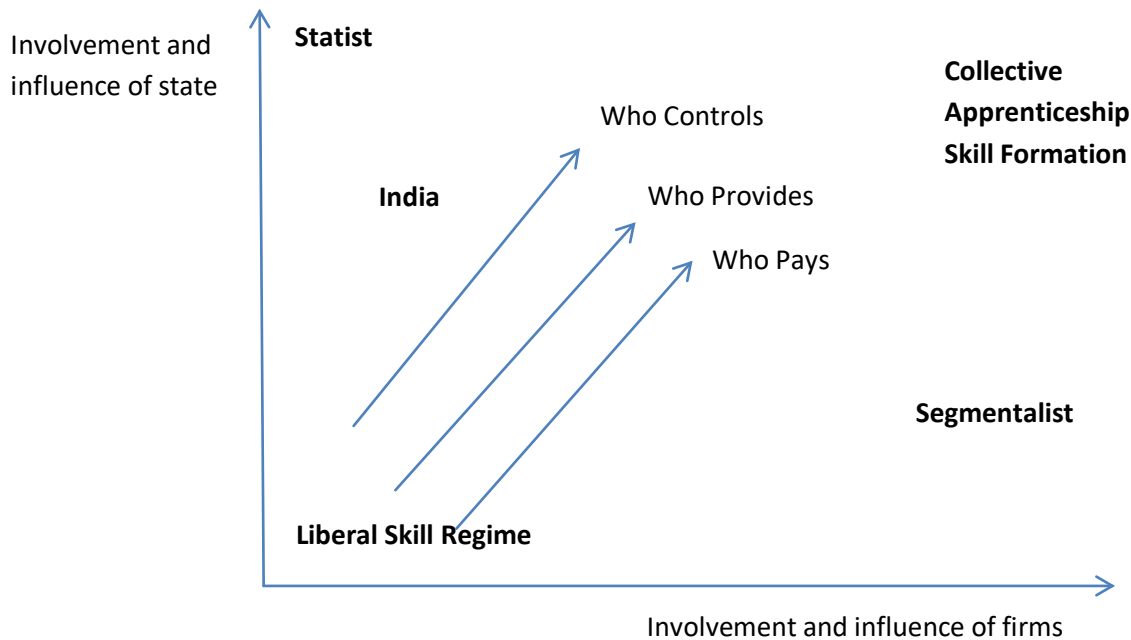


Figure 3: Varieties of Apprenticeship system

IV. NEED FOR REFORMS IN APPRENTICESHIP SYSTEM

At National Level to make apprenticeship a lucrative option, both for apprentice and employer, there is a dire need of apprenticeship reforms. When industry owners are happy to pay the fine of not complying with the apprenticeship act rather than hiring and training the apprentice then there are needs of serious reforms in the system. The system does not need a new scheme to be introduced but needs to abolish the old system and replace it with a new set of Act with key defined roles for all stakeholders. Apprenticeship Act, 1961 was formed in a different era suited for its time and despite all the amendments the act has outlived its utility. There is a need to repeal the Apprentice Act and bring in a new Technical and Vocational Education Act which should involve National Training standards, System for certification and assessment. This should bring in its domain National Skill Qualification Framework, financial involvement and other roles and responsibilities of stakeholders. Keeping Apprenticeship polarized from TVET system of the country would not reap any benefits.

The Apprenticeship Act needs to amend and allow hiring of even one apprentice by India's 76 million small scale firms where the average employment is less

than 6 people. Even if half the firms oblige with the requirement, around 40 million apprentices will be trained. There is a dire need to government to increase their stipend subsidy to make the apprenticeship more attractive for employers (Das, 2019). There is an urgent need of new Ministry of employment generation or some department which should take onus of employment generation backed by reliable statistics. Can increase upper bracket of hiring from 2.5- 10 to 2.5 to 25%.

For some short term reforms in the ongoing apprenticeship system, numerous changes are suggested.

1. In-plant internship should be made compulsory for all trainees undergoing any vocational course. Especially where core work skills are learned on shop floor and apprentice spends one third of total training period at work.
2. Mapping of training institutions with the companies conducting apprenticeship training should be done to practice cluster based training programmes at large scale. Part of this work is happening under central scheme SHREYAS but this should happen at a larger scale. Skill Sector Councils (SSC's) should help in conducting these trainings as this is part of their functions.

3. Stipend paid to all apprentices should be close to minimum wages as notified by the State Government.
4. Government should financially support MSME's in conducting Apprenticeship Training and bear at least 50% of the total cost (good!)
5. Final certification and assessment at the end of the training should be done on lines of all five attributes in the relevant NSQF level i.e. process, professional knowledge, professional skill, core skill and responsibility.

There is a need of a more comprehensive labour market information system which can be of benefit to all 3 key stakeholders- employers, job-seekers and government. This can be beneficial in laying down a skill road map for all states. Chambers of commerce and industry working in cooperation with trade unions is essential a growing apprentice system. Attitude of workers and employers need to change to make apprenticeship system self-motivating. It would not be possible to eliminate culture of 'chalega' without eliminating the culture of 'ji ji'(Gaudenz, 2012).

Strong apprenticeship paradigm requires cooperation of industrial associations, government and participating companies, it cannot be bought off the market but is in need of nurturing at the shop floor. Dearth of reliable data on apprenticeship make it difficult to the exact absorption of apprentices in the country which is why India has a dismal 1 apprentice to every 1000 workforce which makes skill development system inefficient. Any Skill Development programme is futile without a sound apprenticeship system. Skill development is a necessary condition but not a sufficient condition for growth of employment. Reforms in skill development system are needed to be backed by a sound industrial policy. This is a change required not only at Delhi level but All India level.

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APPENDIX

Amendments in the Apprentices Act, 1961

In order to help large number of apprentices, some amendments have been made in the Apprentices Act, 1961 in December 2014 and the Apprenticeship Rules, 1992 have also been amended with effect from 18 June 2016. The key amendments are: (i) The system of trade wise ratio engagement of apprentices has been substituted with a band of 2.5% to 10% of total strength of establishment. (ii) Establishments can also now engage apprentices in optional trades which are not designated with the discretion of entry level qualification and syllabus. (iii) Scope of Apprenticeship Training has been extended also to non-engineering occupations. (iv) Establishments have been permitted to outsource basic training in an institute of their choice. (v) Aggregation of apprentices can now be done through Third Party Agency (TPA). (vi) The procedural simplification has been provided through the following measures:- (a) Submission of returns and other information through online portal. (b) Submission of apprenticeship contract through portal and its time bound approval. (c) Penalties

are imposed now in the form of fine. (d) Establishments operating in four or more states would now be interfacing with the Central Government authorities

Numbers of Apprentices for a Designated Trade: As per Section 8 of the Act, the Central Government will, after consulting the Central Apprenticeship Council, by an order notified in the Official Gazette, determine for each designated trade, the ratio of trade apprentices to workers other than unskilled workers in that trade. The APTAT/DAA has no role in fixing/altering the ratio of apprentices to workers. Qualification for Being Engaged as an Apprentice is as per Section 3 of the Act, minimum qualifications for being engaged as an apprentice in any designated trade are (a) fourteen years of age and (b) satisfying such standards of education and physical fitness as may be prescribed; provided that different standards may be prescribed in relation to apprenticeship training in different designated trades and for different categories of apprentices.

Reservation of Training Places: As per the Act, in every designated trade, training places will be reserved by the employer for the Scheduled Castes, Scheduled Tribes, and Other Backward Classes. If there is more than one designated trade in an establishment, such training places will also be reserved on the basis of the total number of apprentices in all the designated trades in such establishment. The number of training places to be reserved will be as prescribed, having regard to the population of these target groups in the concerned state.

Contract of Apprenticeship: According to one of the salient features of the Act, a person will be engaged as an apprentice only after entering into a contract of apprenticeship with the employer.

Period of Apprenticeship Training: Depending on the nature of trade, the period of apprenticeship training can vary from 6 months to 4 years. As per Section 6 of the Act, the duration of previous exposure to the formal vocational training in a recognized training institute will be rebated.

Termination of Apprenticeship Contract: The contract of apprenticeship will terminate on the expiry of the period of apprenticeship training or earlier.

Payment of Stipend to Apprentices: Every trainee, while undergoing training, receives a stipend stipulated by DGET. These rates are revised in every 2 years based on the consumer price index, For trainees who have already undergone training in a recognized ITI/private ITI, the duration spent in such ITI/private ITI's be taken into account for the purpose of determining the rate stipend payable for different years of training. The cost of stipend is to be solely borne by the establishment.

Records and Returns: As per Section 19 of the Act, every employer will maintain records of progress of training of each apprentice undergoing apprenticeship

training in his/her establishment in prescribed form. Further every such employer will also furnish such information and returns in the prescribed form, to the relevant authorities, and at required intervals.

Apprentices are Trainees and Not Workers: Every apprentice undergoing apprenticeship training in a designated trade in an establishment will be only a trainee and not a worker; and the provisions of any labour law will not apply to or in relation to the apprentice.

Grant of Leave to Apprentices: In establishments where proper leave rules do not exist or the total leave of different types admissible to their workers is less than 37 days in a year, the apprentice will be entitled to the following kinds of leave and subject to the conditions specified under each kind of leave.

Casual leave will be admissible for a maximum period of 12 days in a year.

Reforming Apprenticeship Training: Casual leave not utilized during any year will lapse at the end of the year. Casual leave will not be combined with medical leave. If casual leave is preceded or followed by medical leave, the entire leave taken will be treated either as medical or as casual leave, provided that it cannot exceed the maximum period prescribed in respect of medical or casual leave, as the case may be. Medical leave up to 15 days for each year of training may be granted to the apprentice who is unable to attend duty owing to illness. The unused leave will be allowed to accumulate up to a maximum of 40 days. (What is the reform here?)

Offer and Acceptance of Employment: As per the Act, it is not obligatory on the part of the employer to offer any employment to any apprentice who has completed the period of his apprenticeship training in his establishment, nor it is obligatory on the part of the apprentice to accept an employment under the employer.



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Acknowledgments

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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.
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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 unrefereed.

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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.

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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.

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

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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.

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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.

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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.

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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.

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Key points to remember:

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- 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.

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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.

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- 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.
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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.

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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.

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- An outline of the job done is always written in past tense.
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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.

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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.



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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| <i>Discussion</i> | Well organized, meaningful specification, sound conclusion, logical and concise explanation, highly structured paragraph reference cited | Wordy, unclear conclusion, spurious | Conclusion is not cited, unorganized, difficult to comprehend |
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ISSN 9755853

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