Limits and Strengths of Various Forms of Production in the Automobile Industry

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Introduction

The automobile industry is considered as the most dynamic in the world economy. Different productions techniques are put in place to cater for the increased demand and quality of designs. In this regard, the production process has shifted from the craft production to mass production, to lead production and currently to automated production method. In the context of work system in manufacturing, the main focus will be the theoretical concepts underpinning systems of work in the manufacturing process. The paper will apply realistic situations as presented in the module to support the concepts as developed in process of automobile industry manufacturing.

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Changes in the automobile working systems were introduced by the likes of Henry Ford in the 1980s. The main work systems by the author were Assembly line manufacturing. The purpose was to incorporate mass production process and moving assembly line. Consequently, the manufacturing process was reduced by more than 10 hours. The Model T was introduced by Ford is relatively inexpensive, sturdy and simple. It means that human labour was expected to interact and work together to reduce the time spent in manufacturing. It consists of intensive division of labour and specializing (Squire & Parasuraman, 2010). To optimize the performance of unit process the workers were provided with enough training. However, such reduced time frame for the human labour has its own disadvantages as laid down by (Szalma et.al, 2004). The authors argue that reduced time to complete a task can lead to increased stressed and reduced efficiency. The authors conducted an experimental design of a vigilance scheduled for 40 minutes. The findings showed a positive linear relationship between the participants’ frustrations
and the time expected. The authors concluded that enough time and modality should be allocated to each procedure of the plant operations for reducing stress and increasing performance.

Scientific management was another important theme of manufacturing and most specifically in the automobile industry. It is a theme developed by Taylor in the 1990s. The theory argues in the concept of economic efficiency. Taylor introduced efficient manufacturing processes based on the empirical methods. In the scientific management, Taylor drifted from the engineering manufacturing process to examine the conditions of workers. He examined workers in the different manual process and confirmed that their productivity was maximized when provided with ample time of rest within the process. In this regard, he envisioned the time and motion studies which meant rational synthesis and analysis were important in the management of employees during work. In fact, Taylor deduced that the workers' productivity was relatively high in the circumstances where their output measured the amount of compensation. According to Parasuraman (2009) demonstrated the effect of switching tasks among the participants in the level of automation and the task load. The study observed how operators switched the supervision of the semi-autonomous robots. The study observed that the operations performed faster in a when switching in the same task for different actions. The author observes that task switching is an important concept that should be clearly invested in the semi autonomous automobile manufacturing process.

The module also examines the computer aided manufacturing process. It is a concept that is largely applicable to the automobile industry. The computer-aided manufacturing process uses predetermined models to ease the manufacturing process. The model is an alignment of data that can be altered according to the specification of the manufacturing to determine the end product. It is a very important concept in allowing customization of automobile designs to meet the tastes
and preferences of the manufacturer. The General Motors Research Laboratories pioneered the process in the 1960s. Although the process is very relevant current due to the growth, proliferation and development of artificial intelligence machines and processes. Computer-aided automobile engineering has little toil on the employees since it is easy to manage and correct errors in the design process as opposed to the conventional automobile manufacturing processes. In addition, the computer-aided design makes simulation easy that leads to the development of better designs and processes in the automobile industry. However, the process requires intense during and a higher degree of precision. A simple mistake in the design process can lead to the collapse of the entire manufacturing process. Miller and Parasuraman (2007) argue that flexibility is an important issue in the human and computer interactions. The authors points on the speed and the efficiency of computers to manipulate algorithms as opposed to humans. Having few humans in a long automated process can be strenuous and erroneous. There is the possibility of losing concentration when expected to work for the long period in an automated process. It is therefore recommended that the automation produced be broken down into systems that are flexible and can be easily monitored (Szalma, 2009).

Lean manufacturing is another development in the automobile industry. It is the application of the agile and scrum software development, 5S workplace organization, Kanban scheduling systems, and just-in-time inventory management. Leans process improves complexity and profitability of the automobile production process. The production workers must put enough participation and input for the success of the lead automobile manufacturing process. Moreover, they correct any inefficiencies and wastes in the process. It brings a sense of satisfaction and ownership when their ideas and suggestions are incorporated. However, according to Parasuraman (2007) argue that the human automation process such as computer
aided design must be performed with a lot of flexibility to enable user acceptance, balanced mental workload, accurate automation usage, situation awareness, and productivity. The use of the fully involved human process in the computer-aided design can help to reduce problems and defects that can be solved in the automobile manufacturing process. Therefore, according to the author, it is important to review each of the computer-aided design processes to ensure accuracy and productivity are realized. It can be achieved through increased delegation at each stage that allows manageability, flexibility, and higher maintenance. Hoc (2000) argues that the use of human-computer interactions is important in maximizing the functionality of the manufacturing process. Higher levels of cooperation between the individual involved in the interaction process must be maintained. Communication breakdown can lead to the collapse of the entire process (Sauer, Zimolong and Ingendoh, 2000). Some of the difficulties encountered in the human–computer interactions manufacturing are lack of expertise. It means that the available workforce may lack expertise in the required stage of interaction. In addition, errors can occur if the process of situation awareness is low.

Complete automation in the automobile manufacturing is replacing the tradition fabrication and manufacturing process. It allows mass production of the automobile with great quality, repeatability and outstanding speed. Automobile industry automation is currently the main determinant of a successful and a failing industry. It is a process where robots mimic human activities in the production process. The process has an increased safety, higher production and improved efficiency. Parasuraman & Riley (1997) argue on the concept of abuse, disuse, misuse and use of human labour in the automation process. The author argues that individuals’ differences and the machine factors can make the automation prediction difficult. The author further argues that the over-reliance in automation can lead limit cognitive abilities
leading to biased and erroneous decisions. The role of the manufacturing plant operations is altered in the quest of them becoming passive monitors to active controllers (Parasuraman, R., Sheridan & Wickens, 2000).

**Conclusion**

The automobile manufacturing process is a huge industry that requires massive workforce and technology. The work system requires increased levels of monitoring to ensure each process is accurate. The man techniques discussed are human and machine interactions. The advantages of such interactions are improved productivity and efficiency. However, the human operators require a lot of training, flexibility, and adequate time to manage the operations. The above research has shown that less period of time and machine functioning leads to increased pressure and impaired cognitive abilities. In fact, humans are capable of making wrong decisions leading to serious defects and loss due to lack of enough time to evaluate the process and make decisions. The study has also recognized the role of machine automation in the automobile industry. The automation has taken a larger picture where robots are used to mimic human activities and influence the manufacturing process. Automation is leading to increased productivity, reduced costs and efficiency. However, not all the automation processes are 100% accurate. A lot of monitoring and supervision need to be monitored to ensure the process is accurate. The human interactions sections have led to the development of computer aided design in the automobile industry. The process is prone to the inaccuracy in formulas and designs that may limit the success factor of the entire process leading to series defect. It is recommended to employ experienced experts to interact with the machine for ensuring its efficiency.
References


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