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Production Planning and Control for the Comparative Advantage of Basic Metal Industry

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Abstract

This study is to assessed and investigate the challenges, trends and problems of production planning and controls on basic metal industries comparative advantages. Since the study is conducted with field observation, questioner ,company reports used as primary data and literature review of research articles, books, manuals, magazines, and electronic-sources which used as secondary data. A case study also conducted at the selected two basic metal industries. However, the collected data were analysis using descriptive analysis, SPCT(fishbone diagram).Due to improper production planning and control systems, problems plant lay-out, waste in manufacturing process ,quality, manufacturing planning and control, deficiency of control and monitoring, low production capacity and effectiveness, lack of smooth service and support delivery problems management information system, insufficient skill levels of employee, lack of unity including poor coordination, warehouse problems were instigated as the challenges and problems of basic metal industries. As a result of these challenges the global competitiveness of Ethiopian basic metal industries are poor. Therefore to attempt the above problems, in this study the strategies and ways forward for implementing production planning and controlling(PPC) systems to Ethiopia basic metal industries were done, so as to improve the global competitiveness of basic metal industries.

Index terms— production planning and control, comparative advantage, basic metal industry, implementation, challenges.

1 I. Introduction and Back

Ground of The Study anufacturing facilities are complex, dynamic, stochastic systems. From the beginning of organized manufacturing, workers, supervisors, engineers, and managers have developed many clever and practical methods for controlling production activities. As a result numerous manufacturing industries have recognizing the importance of manufacturing strategy in their businesses performance and efficiency. Although, manufacturing industries apply and use those strategies in order to meet customer expectation and reduce production difficulties. Since in complex manufacturing environment, a comprehensive production planning and controlling process is adopted in order to ensure the best utilization of resources, improve production capacity and maximize a firms profitability. However these system provides for in manufacturing of basic metal industries production system is very important to make the sector more competitive due to the nature of the product. In this range production planning and control (PPC) systems are crucial for Basic metal industries(BMIs) to meet the increasingly high customer demands and expectations in the present, highly competitive, manufacturing climate. Because the approach involves system and resource planning, capacity and resource allocation, setting up and control framework. In addition production control, planning and scheduling may be defined as the technique of foreseeing every step in a long series of separate operations, each step to be taken and control at the right time and in the right place and each operation is to be performed in maximum efficiency. This ensures entrepreneurs

to work out the quantity of material, manpower, machine and money required for pre-determined level of output in a given period of time. Thus, it is necessary to explore the effect of production planning and control on Basic metal and engineering industries(BMIE) performance and competitiveness. As a result this study is intended investigate and assessed the practices, the impact of production planning and control on Ethiopian Basic metal industries and Way forward for improving the firm performance and global competitiveness were done.

2 a) Statement of the problems

The manufacturing sector in Ethiopia contributes significantly to the development of the country. In spite of its contributions, it is plague by the following constraint. proper production planning ,Control and scheduling cannot be properly realize in the industries. As a results poor decision -making, problems procurement, production, in transportation and distribution, and in information processing and communication are seen. in addition cost of imported raw materials: Power fluctuations, Labour Intensive production, are the challenges that are seen in Ethiopian basic metal industries. Also inconsistent flow of production enquiry sheet preparation and evaluation, Raw material ordering, purchasing and supply system doesn't seem to follow any scientific inventory control system. Due to this Ethiopia basic metal industry are infant for Growth transformation program(GTP)economic contribution and poor competitive advantages. Since to Tackle the above problems this research was designed.

3 b) General Objectives

The main objective of this study is to investigate the effects of production planning and control on basic metal industries, so as to secure the comparative advantages by directing improvement strategies.

4 c) Research Methodology

The study is conduct through field observation, literature review of research articles , books, magazines, manuals, company report and electronic-sources which are discuss related to basic metal manufacturing industries growth, opportunities, economic contribution, challenges, strengths and performances in relation to production planning and controlling systems. The literature review focus on competitiveness, production planning and control function, principles, models, components such as Material Requirement Planning (MRP), Capacity Planning (CP), scheduling),Master Production Schedule (MPS) and Resource Planning are considered and assess in detail. The investigation consider attempts to explore production planning and control issue on basic metal industry trends, performance, competitiveness strategy, planning challenges, production planning and controlling effort is assessed. Followed by model development based on the literature survey and case study analysis is done. Finally the conclusion and recommendation of the study is done. Since for analysis of the problems, the researcher mainly uses SPCS tools like Cause and effect (Fish bone diagram), and descriptive analyses are used.

5 II. Literature Reviews

In this section from the previous research work a total of 124 articles were found out that published articles in the PPC area. Since, from this 124 articles in this section goes through 27 selected articles which are related one or more PPC classes presented . It makes the base for the discussion which comes on the next section. First we review the definition, concept, theory of production planning and control role in manufacturing industries. Then we expressed the components, principles, functions and Strategies used in production planning and controls. In the next step we review the models of production planning and Control have been developed by different researchers and production planning and control as a revenue of competitiveness are assessed. After that the gaps and miss points in the previous study related to production planning and controlling are identified. The globalization of the economy and the liberalization of the trade markets have formulated new conditions in the market place which are characterized by instability and intensive competition in the business environment. Competition is continuously increasing with respect to price, quality and selection, service and promptness of delivery. International cooperation, elimination of barriers technological innovations cause competition to make stronger. In terms of manufacturing emphasis is placed on reducing cost while improving quality. Although competitive priorities defines the set of manufacturing objectives and represents the link to market requirements and meet customer needs, which have the dimensions commonly used are; cost, quality, flexibility, and delivery [5].

6 b)

Production Planning and Control Production: that transformation of raw materials to finished goods. Planning: Planning is the process of selecting and sequencing activities such that they achieve one or more goals and satisfy a set of domain constraints. IT looks ahead, anticipates possible difficulties and decides in advance as to how the production, best, be carried out. Control: phase makes sure that the programmed production is constantly maintained. System: is a whose function is to convert a set of inputs into a set of desired outputs.

7 c) Production scheduling

Scheduling deals with the efficient allocation of tasks over resources. The general scheduling problem is, given a number of tasks and a number of resources, set the dates when each task should be accomplished on each resource. Since, production scheduling is a decision-making process that is used in manufacturing and service industries to achieve efficiency and minimize production cost. Since production schedule framework should be designed to meet company goals filling customer requirements with minimum total cost [10].

8 d) Production Control

Production control (PC) is the function of management which plans, directs and controls the material supply and processing activities in an enterprise [8]. Since PC concerned with, determining whether the necessary resources to implement the production plan have been provided. If not ,it attempts to take corrective action to address the deficiencies (shortages).Also Shop floor control, Inventory control are the main activities of production control. Production planning: is the planning of production and manufacturing processes in a company or industry. Planning is also the primary managerial function for enterprises, which is the direction and instruction to coordinate and cooperate the enterprise's overall operation [6]. While, this is one of the most important activities in manufacturing enterprises. Since production planning, utilizes the resource allocation of activities of employees, materials and production capacity, in order to serve the customers. However production planning and control (PPC) plays a fundamental role in any manufacturing unities. This provides making routine for proper plant layout, raw materials requirement, utilizing resources, and maintenance of machineries are done. This results in a positive way by the improvement of productivity, quality, customer satisfaction, profit and global competitiveness. In the meantime, PPC concerned with implementing the plans, i.e. the detailed scheduling of jobs, assigning of workloads to machines (and people), and the actual flow of work through the system [7]. Also coordinate with different departments: such as production, marketing, logistics, warehouse and other departments depending upon the nature of organization. The other point is there are different types of production methods are found in a manufacturing firms, such as single item manufacturing, batch production, mass production, continuous production etc. have their own type of production planning. Production planning can be combined with production control into production planning and control, or it can be combined and or integrated into enterprise resource planning. Since currently, the framework that is most commonly applied to the deconstruction of planning activities is the use of three hierarchical levels that range from strategic to operational planning are strategic planning ,tactical planning and operational planning focuses. Since typically, these activities include the detailed production scheduling, inventory control, and lot sizing.

Since mainly production planning concerned with deciding which products to make, how many of each, and when they should be completed, Scheduling the delivery and/or production of the parts and products, Planning the man power and equipment resources needed to accomplish the production plan and major activities like MRP,MPS(MPP),CP,APP are emphasis by production planning.

i. Aggregate production planning Aggregate production planning (APP) is the process of determining output levels of product groups over the coming six to eighteen months on a weekly or monthly basis; the plan identifies the overall level of outputs in support of the business plan. APP is a medium term capacity planning that determines minimum cost of workforce and production plans to meet customer demands. Main inputs of aggregate production planning are resources, demand forecast and employment policies. Since, APP aim is to determine the production quantity and inventory level in an aggregate term. However, The company starts its plan by stating its business plan. Business plan is a statement of an organization's overall level of business activity for the coming six to eighteen months, usually expressed in terms of monetary values of sales for its various product groups.

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10 . Master Production Schedule

The Master production planning/ master production schedule (MPS) sets the quantity of each end item to be completed in each week of a short-range planning horizon. The MPS sets its production schedules based on forecast, orders and lot size of the customer order [9]. It uses information from both forecasts and orders on hand, and it is the major control (driver) of all production activities. In fact, the MPS begins as a trial schedule. If these schedules are feasible, the schedule becomes input for the MRP system. MRP sees this schedule as given: the system cannot check if a schedule is correct or incorrect, for example if a schedule goes beyond production capacity or not. The MPS can be updated or modified anytime a production-manager wants. As a result of these changes the MRP-input changes, as does the production output. Thus the MPS is in reality the mother of all schedules, and it is a plan for future production of end items, set by market forecasts, customer orders, inventory levels, and other information necessary to make correct schedules. Hence, an effective master production schedule provides the basis for , Making customer delivery promises , exploit the capacity of the plant effectively, Attaining the strategic objectives of the firm as reflected in the production plan and Resolving tradeoffs between manufacturing and marketing. iii. Material Requirements Planning

After preparing the master production schedule, we need to think of availing all the necessary materials to manufacture the planned items. Materials requirements planning (MRP) is a means for determining the number of parts, components, and materials needed to produce a product. MRP provides time scheduling information specifying when each of the materials, parts, and components should be ordered or produced. In a comprehensive definition MRP is a time phased priorityplanning technique that calculates material requirements and schedules supply to meet demand across all products and parts in one or more plants. this is a material control system that attempts to keep adequate inventory levels to assure that required materials are available when needed. Although Materials Requirement Planning (MRP) is based on the philosophy that each raw material, part and assembly needed in production should arrive simultaneously at the right time to produce the end items in Master Production Schedule (MPS). So inventory levels could be reduced, production capacity could increase as well as the profits. Source: [10] iv. Capacity planning Capacity planning-concerned with determining labor and equipment resources required to meet the current master schedule as well as long-term future production needs of the firm. Production capacity is the maximum limit or ceiling on the load (product) that an operating unit can handle. It is the rate at which outputs are achieved from a process. It can be expressed as number of units that can be produced per unit of time, maximum size of a work piece that a machine can handle, or maximum weight of a work piece that can safely be loaded on a machine. Although capacity planning determines what labor, time and equipment resources are required to meet the current MPS as well as long term production needs of the manufacturing industries [9].

Since, output level of an item is dependent on the production capacity of operating units (plants, departments, machines or workers) used to produce the item. For manufacturing industries , production capacity is the maximum limit or ceiling on the load (product) that an operating unit can handle. This is the rate at which outputs are achieved from a process. According to [12] the capacity measures used in auto and steel companies are in terms of outputs. Inputs are used as capacity measures for job order companies. As a result, an estimate of capacity may be measured in terms of either input or outputs.

11 Capacity Efficiency = ???????????? ???????????????? ???????????? ????????????????

In addition for performance estimation purpose capacities are grouped in to two. They are design capacity and effective capacity. Design capacity is the amount that a firm would like to produce under normal circumstances and for which the system was designed. Effective capacity is defined as the maximum possible output given a product mix, scheduling difficulties, technology, machine maintenance, quality factors, and so on. In addition different production and Scheduling strategies are used by many companies around the world. Some of these most commonly used strategies are Chase strategy , Make-to-Stock, Assemble to Order and Make to Order [9] [11]. These strategies are allows manufacturers to produce goods in long production runs, taking advantage of production efficiencies, the company continuously produces goods equal to the average demand for the goods, produce goods after receiving an order from the customer and assembled products from a stock selection of ingredients. This improves the competitiveness of the firms and enhance comparative advantage.

12 e) Advancement of Production planning and controls

In manufacturing industry the amount of information available to manufacturers and their suppliers for decision-making has become an important factor in improving manufacturing productivity. Manufacturing firms have always sought ways to improve their competitiveness. During the first half of the twentieth century, internal manufacturing efficiency on the shop floor was largely sufficient for successful operations. Though, with growing struggle, companies have been forced to find new ways to improve their operations and to look beyond the walls of the factory. Currently, manufacturing firms need to be competitive in different aspects, such as quality, delivery, cost efficiency, and flexibility, and must therefore plan and control their operations accordingly [20].

Since for achieving sustainable and competitive production environment planning and control task has become more critical for improving complex systems ; lead times are shorter, improve product life cycles, reduce bottlenecks more effective and efficiently. Sourece: [20] The above figure illustrates how the important point of production planning and control has shifted over the last 50 years. The perspective has successively evolved from lower (shop floor) to higher planning and control stages. the figure clearly show that the developments in information and communication technologies (ICT) have assist the gradual improvement of computer based systems for PPC. Thus, current advanced PPC systems significantly utilize advanced computerized systems and programs. This is highly interlinked with the fact that manufacturing has been simplified with Computer Aided Manufacturing (CIM) systems [9]. In addition to this Computer-aided design (CAD) is provides any design activity that involves the effective use of a computer to create, modify, analyze, or document an engineering design.CAM/CIM mainly concerns for Flexible manufacturing systems can react quickly to product and design changes. A FMS includes a number of workstations, an automated material handling system, and system supervisory computer control. Since due to the global competition and fast change customer requirements, implementing CAM/ CIM systems in manufacturing industries is beneficial. Because CIM program could provide products with better quality, lower costs, better support, and in a short lead-time. But Implementing CIM requires organizational and technical understanding and strategic approach. As a result any organization

should know the way of implanting CIM approach for program improvement and global competitiveness. Thus Ethiopian Basic metal industries should considered Computer-integrated manufacturing (CIM) for blend recent developments in manufacturing with information technology to achieve competitive advantage.

13 f) Analysis and Discussion of Literature review

In the previous sections a literature review was presented on variety of perspectives towards production planning and controlling concepts, theory , function, the practice, implementation strategies, the models that developed and practiced for manufacturing industries , so as to improve manufacturing firm performances are assessed. However, a general so far important issue is that many of the studied articles have hardly built on previous works. Most researcher seem to open a new window and develop their argument, models, factors, parameters, the potentials for considering the preview related works.

While, the previous research [21], [22],[23], [24], [18],[25] [17] , we found that, the majority of papers is done using different types of models but they analysis and studied some aspects of production planning and control.

Also, each of the papers has not any certain rationale for choosing the models they used. Although, the challenge for today's business companies is not only how to adapt to changing business environment but also how to draw competitive advantage from the way in which they choose to do so. Seeing that, a root to achieve competitive advantages, the companies have happening to seek to optimize production systems. Given that, traditional production planning, scheduling and control mechanisms were found insufficiently flexible to respond to this new paradigm. In the fact that, in the current competitive environment, effective and efficient production planning and control has become a necessity for endurance in the market place since, using PPC in the industry can have an advantage for customers, producers, employees and stakeholders, and also for the nation. Better planning leads to increased productivity in the firm, efficient deliveries of the products at proper time, more products available to the consumers at cheaper price, flexible manufacturing process and better quality.

Another point we found that, inspiration the growing of production planning and control systems for manufacturing industries improvements. In this respective the systems was evolved from lower (shop floor) to higher planning and control ICT support stages [20]. However, this development is in a much earlier stage and by far not as widespread among the manufacturing systems as the quality and the customer satisfaction production initiative. However, the potential efficacy of improvements in manufacturing firms are evident. As main concerns of production planning and control systems are to balance from different aspects of the firms from supply of resources to demand, from the market, to allocate resources in the most effective way, from production to distribution , customer satisfaction to sustainability of the business and production to make recycling part is most promising in being effective and efficient in resource utilization and improve performance and competitiveness of manufacturing industries. On the other hand the preliminary miss point is that ,in various production planning and scheduling models applied to discrete parts manufacturing industries and process industries. It is seen that models have been developed in single stage and multi-stage production environment. Most of the models in multi-stage production environment have focused on fabrication and assembly types of product structures. The production environment with recycling process and its associated complexities has not been addressed in the literature **??**23]. But in manufacturing process recycling is an important issue in bringing down production costs.

The review also indicates that, the existing models on production planning and control do not address the complexities of the production environment to improve firm competitiveness **??**24]. Since it needs to develop an integrated models to address production planning and controlling tasks, production planning and controlling decisions, inconsistency often occurs in capacity requirements of production planning decisions and controlling decisions. As well we discussed that in the above literature while the issue of developing country firm competitiveness relayed to production planning and controlling systems is not address. In addition to these most of the previous research work were done, using secondary day but to tackle the exact problems and improve the practical environment the study should supported by case studies. As a result, in this study we considered a case studies for improvement of manufacturing firms. According to WSA reports, global steel consumption has been highly dominated by Chinese, Asia and European Union countries. However, taking closer look into African situation along with the Middle East, consumption, it has been growing slowly.

14 III. World Region Crude Steelmaking Capacity

Although, consumption of steel products follows the trend of economic activity in individual countries. Since the volume of steel consumed has been the indicator for measuring development and economic growth of the countries. Whether it is construction or industrial goods, steel is the basic raw material. Since, Steel consumption increases when economies are growing, as governments invest in infrastructure, electric power, transport, and as new factories and houses are built. After being in the focus in the developed world for more than a century, attention has now shifted to the developing regions. Even though , the industrial growth of African including Ethiopia basic metal industry is low. As a result currently the global competitiveness of Ethiopian Basic metal industry is poor.

15 a) Ethiopian Basic Metal Industries Competitiveness and PPC

The government of Ethiopia the Growth and Transformation Plan has given high priority to the metal and engineering industry sector. The steel industry is made up of basic metal manufacturing companies and the engineering sector. The Ethiopian basic metal industry produces two categories of products: long and flat products. Long products include reinforcement bars and tubular sections and wires, while flat products comprise LTZ profiles and various sheets: such as steel (lamera), corrugated, and EGA. The engineering sector consists of manufacturers of doors and windows, tankers, vehicle bodies, truck trailers, spare parts, and machinery like concrete mixers and vibrators [4]. Since ,an objective and target has been set to enhance the productivity and competitiveness of basic metal sector. It is planned to increase the annual per capital consumption of the country from 12Kg to 34.72kg and the capacity utilization of the existing industries to 95%. Also, substituting of imported metal products and supporting other manufacturing industries are some of the main targets of basic metal and engineering industry sector as indicated in the growth and transformation plan. Even though [29] report shows that, basic metal industry has under-performance both in terms of production and revenue generation. A according to report , the performance of the sector are decline compared to expected targets. Out of the total planned production of 343,105tns, only 52% was achieved by 60 industries in various areas. From the saw that even if the performance of basic metal industries had some improvements from year to year but the planned and the actual production capacity have great differences/variations.This indicates that the performance of basic metal industries going to back-warded. As a result the global competition of the sector still infant and null. In addition to this, the following figure shows the iron and steel manufacturing process consists of four distinctive stages, spanning multiple industries: exploration and extraction, mining beneficiation, metallurgical beneficiation and shaping and conversion/fabrication and manufacturing/end user industries. Eeven though iron ore is believed to exist in Ethiopia, it is not mined in the country. Bars and billets are produced from iron ore, coiled wire rods, from which nails are made, and coiled sheets are imported as raw materials. The above figure also clearly shows that the Ethiopian steel industry heavily depends on imported raw materials for production process. The only locally available raw material in the country is scrap metal, which the factories buy for between 2.80 Br and 3.20 Br a kilogram me. It is smelted and converted into bars and billets. The billets are used to make reinforcement bars. The bars are used to produce spare parts and simple machines like concrete mixers and vibrators. Since, the Ethiopian basic metal industry dependency of imported materials, results high material cost, reliability in foreign suppliers is problematic, supply chain system problems, delay in cleaning goods through custom are the major problems that faced in Ethiopia basic metal industries **??**30]. The survey study shows that, due to this and other influences most of basic metal industries are working below the normal achievable capacity installed. As a result , the performance and competitiveness of Ethiopian basic metal industries is poor.

16 IV. Results and Discussion

Under this section to investigated and analyses the challenges of basic metal industries in based on the data gathered from i. Interview, Field observation, Questioner and literature survey results are done. Since the researcher observed and assessed in Ethiopian basic metal industries, inanition to their potentials to begins to industrialization , there were a lot of problems were investigated related to production planning and control systems. Based on this investigations and results the problems are grouped into the following two groups i. Manufacturing and Related Problems and mismanagement and Human Resource Related Problems were investigated.

17 a) Manufacturing Process and Related Problems

A. Manufacturing planning and control: poor manufacturing planning and control causing waste in the production process, deficiency of control and monitoring; serious efforts to find solution to problem and to determine implementation were not there. In most of basic metal industries there were lack of product and market diversification and development. B. Waste in manufacturing process, due to improper resource utilization, poor manufacturing sequence , poor effectiveness in labor utilization, have frequent movement during manufacturing process, a lot of wastes were seen in the industry. This results unnecessary loss of material and waste formation were occurred in most basic metal industries. C. Problems plant lay-out, Facilities are expanding everyday as a result of changes in technology and innovation. Since facility layout must be flexible to cater to modern changes and pant lay -out is a dynamic rather than statistics concept meaning thereby if once done it is not perm ant in nature rather improvement or revision in the existing plant lay out must be made over time. But most Ethiopian Metal and engineering industries dos not considered this points. As a result of improper plant layout most metal industries lost their competitive advantages. D. Quality: lacks robust design is a design which is executed at pre production planning stages to manage the controllable factors which affect the product quality related to parameter, customer specifications, standards, lack of defect control, lack of effective defect and redundant work recording in order to find the way to reduce and control the problems. E. Low production capacity and effectiveness: the challenges formulated because of improper production sequence, poor equipment arrangement(Raw materials, Tools and products). In addition to these the production capacity of basic metal industries are poor due to using old machine, idle machine (maintenance problems), problems in

demand production (skill , financial constraints, number of machines, resource problems). F. Lack of smooth service and support delivery :

Lack of fast and smooth delivery of support and service is a key problem witnesses in the sector in particular the electric power supply interruption and supply problem has been witnessed extensively. Additionally failure to assist financial in the appropriate manner, shortage of foreign exchange, gaps and witness in logistic supply problems related with land supply and duties and tax levied in the products, law level of incentive for the sub sector. In most basic metal industries there were no R & D, for doing design improvement to forecast the market situation. due to this there wear unbalanced demand and supply, problems to see different alternative/opportunities. But practical production planning is dependent on the available capacity and actual demand of products on the market. In particular, the actual demand of products governs the amount of production which can be sold without unnecessary finished goods build-up. As a result this alternative suggests that the actual sales plan of the company has to be developed after sufficient market assessment and sales forecasting. 6. Warehouse problems: Despite the new technologies in e-commerce, supply chain integration, quick response, just-in-time delivery and efficient consumer response that connect the manufacturing with the end customers, businesses are still struggling to eliminate the existence of a warehouse. The biggest problems in Ethiopian basic metal industries were the production sequence problem and space utilization in the warehouse. Thus in order to meet the customer's requirements warehouse needs to be properly coordinated and maintained.

18 b) Management and Human Resource

19 c) Cause and effect Analysis

The problems that (findings) assessed in Ethiopian basic metal industries by different approaches are from the above major problems, we can also grouped into four Sub-main problems of the industries. [22]. Even though In the case of Ethiopian basic metal industries because of poor facility lay out systems, production capacity is reduced, high materials-handling costs, crowded space for production machines, lost labor, machine, and space utilization and productivity, Problems on OHS, inventory counts problems, due to non warehouse inefficient loading and unloading of shipping vehicles) were investigated in this study. D. Resource (warehouse facility, R&D, Raw material, Finance, Inventory, Manpower, Lack of updated stock Status File). The above figure indicates that the various causes of each factor were determined and this leads poor competitive advantage of basic metal industries. from the above cause and effect diagram observe that, due to the four major problems and a lot of minor cases of these problems the performance and competitive advantage of basic metal industries are weakness and poor. However, successfully tackle and control the constraints of basic metal industries plays great role for the competitiveness of sector at national and global levels. Therefore, from numerous manufacturing industry performance improvement systems alternative, production planning and control has to be given the first priority. Since, improving production planning, controlling and related issue are a critical task for basic metals industries.

20 d) The way forward for strategies implementing PPC to

Basic metal Industries Therefore to attempt the above problems the production planning and controlling approaches should be apply to Ethiopia basic metal industries. Thus, for using implementing PPC to basic metal industries the following strategies are ways forward for sustainable basic metal industry development and competitiveness in the country.

While, there are a variety of considerations that go into the development and implementation of an

21 V. Conclusion and Recommendations

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Figure 1: Figure 1 :

Figure 2:

Figure 3:

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Figure 4: Figure 2 :

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Figure 5: Figure 3 :

Figure 6:

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Figure 7: Figure 4 :A

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Figure 8: Figure 5 :

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Figure 9: Figure 6 :

Figure 10:

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Figure 11: Figure 7 :

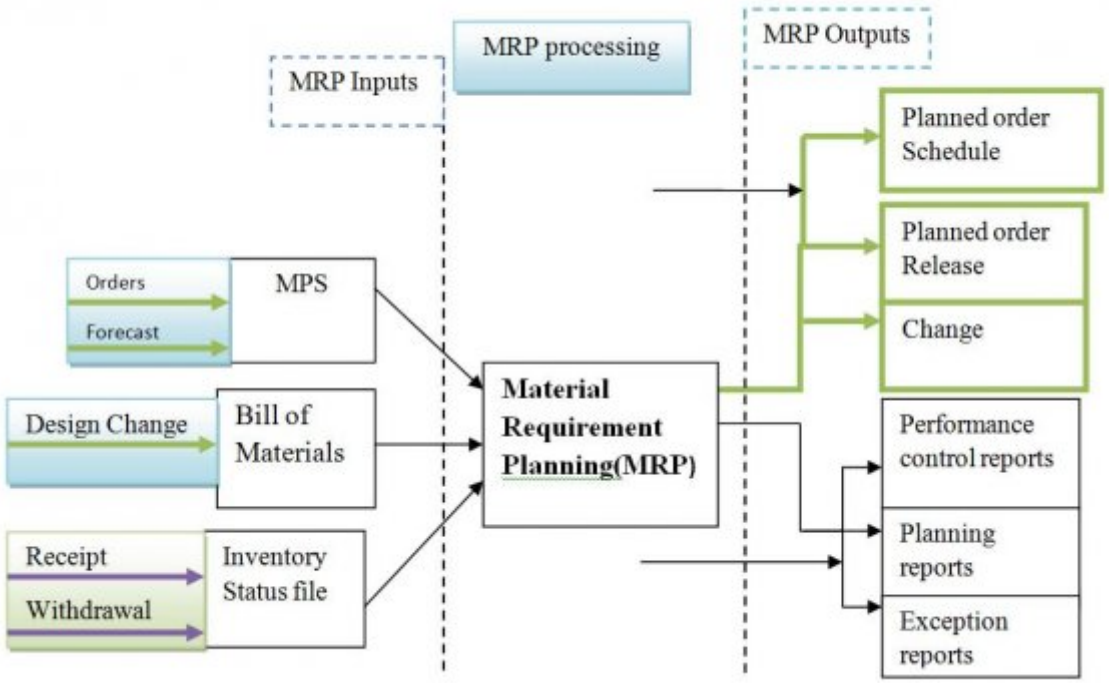

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Figure 12: Figure 8 :

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Figure 13: Table 1 :

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B. Manufacturing Process (machine, method, product quality, Waste in manufacturing process, maintenance, production time, production sequence, costGlobal Journal

Figure 14:

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optimization model for manufacturing planning and control. Any planning problem starts with a specification of customer demand that is to be met by the production plan. In most contexts, future demand is at best only partially known, and often is not known at all. Consequently, one relies on a forecast for the future demand. To the extent that any forecast is inevitably inaccurate, one must decide how to account for or react to this demand uncertainty.

Although, a single PPC methods have limitations on performance and competitions of the firms. However to overcome the limitation of standard individual PPC systems such as MRP,MPS,CP or other, it is possible to develops a hybrid systems to combining two or more systems have an impact on changing environment. This is done combining the advantages of PPC elements (like MPS, ERP, MRP) simple logic and theory of constrains (TOC) ability to synchronize all production and material flow in a manufacturing firm. Because TOC is systematic management approach that focuses on actively managing those bottlenecks that impede a firm's progress toward its goal of maximizing profits and effectively using its resources.

Manufacturing workshop should be both flexible and effective nature to improve the competitive performance of the industries. both flexibility and efficiency through Product and Process Layouts. As a result basic metal industries should consider hybrid production/facility layout methods. Since the arrangement of the facility provides in such a way that, systematic and functional arrangement of different departments, machines, equipments and services in a manufacturing establishment.

The main objective of lay out design, that is to minimize distance traveled, is not always suitable for all the manufacturing industries. Some congestion in a specific area may have to be tolerated while maintaining minimum separation between facilities. Instead of criterion of minimizing total distance travelled, one may wish to minimize the maximum distance travelled. Since by considering this concept basic metal industries also should emphasis warehouse design and implementations.

.1 a) Conclusion

This paper Analyzed the sector competitiveness, production planning and control systems of the Ethiopian basic metal industries. The performance and competitive advantage of basic metal industries are assessed in the context of production planning and control system. Since from the study the constraints, opportunities and the threats of basic metal industry sector performance and competitiveness are identified. Using field observation, research questions and Literature review methods problems in manufacturing process, Management problems (not more emphasis production, coordination), Maintenance problems(some machines not properly work, Improper production Sequence(in some section neither process nor product lay-out), Problems on wear house, Resource planning, fluctuating production volume (Market shortage, delay, some case performance problems occur) are investigated as the problems and constraints of Ethiopian basic metal industries. Since to tackle this problems proper production planning and controlling systems are considered and implementations are critical to basic metal industries so as to improve the performance and global competitiveness of the sector.

.2 b) Recommendation

It will not totally be a question that the competitiveness of the basic metal sector in Ethiopia should increase this time. Nevertheless, the approach to attain better competitiveness situation is the challenging issue. As alternative means to sector improvement and growth, Ethiopian basic metal industries can implement production planning and control strategies as a better choice for sector performance and competitive advantages. Since, there has to be a strong commitment to responsible bodies towards implementation of the systems.

Future research study, use this study as reference for developing integrated production planning and control frame work to basic metal industries.

[Bawoke et al. ()] , M Bawoke , " Development , Production , Control (ppc) System , Of , Order , In Ethiopia . 2004. Addis Ababa University institute of technology (AAiT

[Global Steel Report ()] , *Global Steel Report* 2016.

[Baris Kacar ()] 'A COMPARISON OF PRODUCTION PLANNING FORMULATIONS WITH EXOGENOUS CYCLE TIME ESTIMATES USING A LARGE-SCALE WAFER FAB MODEL'. L M & U N Baris Kacar . *Proceedings of the 2013 Winter Simulation Conference*, (the 2013 Winter Simulation ConferenceRaleigh, NC; USA) 2013. p. .

[*E M R ()] 'A mathematical model for dynamic cellular manufacturing systems with production planning and labor assignment'. *E M R , T.-M . *POMS 23rd Annual Conference*, (Chicago, Illinois, U.S.A) 2011. (Seyed Vahid Daei Niakia)

[TJ I C ()] *Basic metal and Engineering industry Firm-level Study*, TJ I C . 2010. Addis Ababa Ethiopia: Un-Published report. (Agency (JICA))

[Wahab ()] 'Case Study: Improving Production Planning in Steel Industry Light of Lean Principles'. S M F A T Wahab . *Proceedings of the 2012 International Conference on Industrial Engineering and Operations Management*, (the 2012 International Conference on Industrial Engineering and Operations ManagementAlexandria, Egypt) 2012.

[Tiamiyu and Mohammed ()] 'Development of a Flexible Plant Layout System for Small and Medium Scale Industries in Nigeria'. P G A O M Tiamiyu , I Mohammed . *The Pacific Journal of Science and Technolog* 2014. 15 (2) .

[Association ()] *Global steel*, W S Association . 2016.

[Kitaw ()] *Improving Basic Metal Industries Global Competitiveness Through Total Quality Management &Just In Time (In Case of Ethiopian)*, W D & D Kitaw . 2017. Addis Ababa University Institute of Technology (AAiT

[Opatowska ()] 'Improving the production planning and control process'. J Opatowska . *Finanse Journal of Management and Finance* 2015. 13 (4) .

[Cheng ()] 'Integrated production planning and control: A multi-objective optimization model'. LX , -B. Wang Cheng . *Journal of Industrial Engineering and Management* 2013. (4) p. .

[Pochet ()] *Mathematical Programming Models and Formulations for Deterministic Production Planning Problems*, Y Pochet . 2001. Belgium.

[Fourtunne (2016)] *Metal and Engineering Industry Underperforms*, Fourtunne . Nov 15. 2016. 2016 Published on Nov 15. 2016. 17. (Published on)

[Opoku ()] 'Optimal Production Schedule: A Case Study Of Pioneer Food Cannery Limited'. S Opoku . *Kwame Nkrumah University Of Science And Technology* 2013.

[Filho ()] 'Production control systems: Literature review, classification, and insights regarding practical application'. C F F A M G Filho , * . *African Journal of Business Management* 2011. 5 (14) p. .

[Bansal ()] 'Production Planning'. Y V & U B Bansal . *IJRDO -Journal of Computer Science and Engineering* 2015. 1 (5) .

[PRODUCTION PLANNING AND CONTROL International Journal of Scientific Research Engineering Technology ()] 'PRODUCTION PLANNING AND CONTROL'. *International Journal of Scientific Research Engineering & Technology* 2014. 3 (3) .

[Kitaw ()] *Production Planning and Control and Competitiveness of Ethiopian Metal and Engineering Industries*, M Kitaw . 2014. AAiT.

[Kitaw ()] *Production Planning and Control for Competitiveness: Ethiopian Food and beverage sector*, Y L & D Kitaw . 2014.

[Mansoureh ()] 'Proposing an Aggregate Production Planning Model by Goal Programming Approach, a Case Study'. S Mansoureh . *Journal of Data Envelopment Analysis and Decision Science* 2014. (Farzam Rad1*)

[Gunasekaran ()] 'The design of computer-integrated manufacturing systems'. VT ~P , Y.-O A Gunasekaran , * . *Int. J. Production Economics* 1994. 34 p. .

[Garengo2 ()] 'Using Theory of Constraints to Control Manufacturing Systems: A Conceptual Model'. R P A P Garengo2 . *Industrial Engineering & Management* 2013. (Panizzolo and Garengo)