

Identifying Productivity Lapses of Pakistan Automotive SMEs

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ABSTRACT

Colossal losses have been reported in both manufacturing and services industry of Pakistan. A thorough literature search has revealed that there is a huge gap as far as research towards conducting productivity analyses of automotive small and medium enterprises are concerned. These findings have given rise to the need that productivity analysis of these firms should be conducted in order to indicate the flaws in the system so that counter measures can be taken. This research aims to identify the reasons underlying the major productivity lapses in the automotive industry of Pakistan so that these can be minimized for resource optimization. For productivity analysis of these firms field survey was conducted using qualitative methodology. This survey was conducted in nine major automotive companies located in five major cities of Pakistan. All these companies consisted of manpower of 100 to 500, making them equivalent to small medium enterprises (SME's). Ethnography and participant observation in combination with qualitative interviewing was conducted for qualitative analysis. Triangulation methodology was utilized to avoid going native. Field surveys were conducted with the help of open ended questionnaires. Questionnaire consisted of 12 items which were extracted from the published work. A total of 65 interviews were conducted on the basis of theoretical sampling and theoretical saturation. Respondents consisted of top management, middle level management and workers. Ethnographic content analysis (ECA) was conducted which resulted in formulation of substantive theory. CAQDAS were used for data analyses. NVivo version 10 gave the strength to the analyses due to the latest tools and techniques available in this version. Analyses of survey data collected from the respondents revealed several flaws in these companies. Lack of workers' participation, highly centralized structure, lack of accountability and poor time management were the major issues highlighted. Non-productive activities like rework, material wastage, excessive and repetitive documentation, inadequate maintenance of machines and equipment, failure and breakdown of equipment and rework that is done due to poor workmanship were also found out to be major problems. Findings of this research can be utilized for improved policy making of these SMEs and working on their productivity enhancement.

KEYWORDS— Automotive, manufacturing, services, industry, SME's, productivity analysis, productivity lapses, field survey.

1- INTRODUCTION

Pakistan has been suffering colossal losses every year in both manufacturing and services industry. The reasons for these losses can be attributed to ineffectiveness and inefficiency of both public and private sectors. Changing government policies have been the major contributor in the sluggish development economy. Mostly the government policies of Pakistan have been inclined towards the public sector but public sector enterprises continue to suffer from lengthy bureaucratic procedures and low productivity. One of the leading industries is the automotive manufacturing and services industry. Despite intensive literature review researchers were unable to find much of research focusing towards the operational capabilities of these organizations [1]. These units are responsible for repair and maintenance of all kinds of equipment held and utilized by the public and private sector which is worth trillions of rupees. Unfortunately, in these workshops quality of services provided is not given priority resulting in low productivity. In those industries where quality of services provided is emphasized, productivity is neglected. There is an urgent need to understand that quality cannot be achieved without understanding and working on productivity as only the efficient utilization of inputs can result in the desired outputs [2]. Considering these facts it was felt that a detailed research has to be carried out in order to identify the problems areas in productivity of these organizations. The aim of this research is to unearth the reasons which cause these productivity lapses.

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Focus of this research is automotive industry only. However it is felt that similar kind of research is required in other manufacturing and services sectors as well.

Productivity and Productivity Measurement

Productivity and production terminologies are usually misunderstood by several researchers as well as practitioners. While carrying out research in USA companies Sumanth [2] discriminated between the two and elaborated that production is output whereas productivity is a methodology which ensures most effective and efficient utilization of resources while enhancing production and reducing inputs. Partial productivity, total-factor productivity (TFP), total productivity and total productivity model (TPM) were also convoluted by the researcher. In the industry practical implementation of these terminologies remained a problem area. Hanukah solved this problem by proving that total productivity can be measured with the help of simple and commonly used partial productivity ratios [3]. This methodology helps the firms to effectively measure and thus enhances their productivity.

Current Issues of Productivity

21st century has taken us into an entirely new technological era. With emergence of new technologies people remain connected to their office work even when they are away from their work place. These new dimensions of work gave rise to numerous controversies such as, difficulties in calculation of inputs (especially in time) and outputs (service/knowledge work). Mahadevan explained the latest trends in productivity analysis highlighting the effects of changing scenarios [4]. The author emphasized on adoption of latest TFP concepts and measurement techniques for problems identification and productivity enhancement. Six Sigma concept was coupled with productivity [5]. The author explained that how six sigma implementation has improved the productivity of several firms in Asia. Productivity and quality relationship has also been clarified by the author that both are interdependent and none is useful without augmentation and emphasis of the other. Triple-P model clarified the differences of productivity, profitability and performance as being physical phenomenon, monetary relationship and an umbrella term for both former with an aim of easy understanding and more accurate measurements [6]. The list of productivity enhancing tools used by different services industry has been enumerated and importance of productivity in generating surplus in the economy has also been highlighted in the study.

Is Productivity Measurement Required in Services?

Another myth about productivity measurement and improvement which prevailed for a long span of time was that it is calculated for manufacturing & goods delivering firms, whereas some were of the view that continuous improvement cannot be applied to the intangibles of the services sector [7]. A similar dilemma in the field of quality management was highlighted where theoretical frameworks for examining quality were focused on manufacturing and the same lacked in the field of services [8]. The authors investigated and explained how service provider and consumer interrelations affect service quality and productivity. Due to less academic research in the field of services enormous productivity growth resulted in manufacturing sector whereas services sector has been the most widely growing sector since more than two decades [9]. A huge number of industries are encompassed in this sector. Service employment in United States is at about 80%, while the other economic sectors employ the remaining 20% [10]. A similar statistics were given by Organization for Economic Cooperation and Development expressing that workforce belonging to service sector is 75% in United Kingdom and 50 % in Japan, Germany and Russia. It has been debated that services sciences is an embryonic research field [11]. They highlighted that due to over emphasis on the physical end product (goods delivering and manufacturing), services science has been neglected and only in past decade some efforts have been made in the field of largest growing field of services. They focused on the possibilities of enhancing services through service innovation so that a large number of practitioners, academicians and policy makers who are not yet engaged in this field could concentrate on this gap of literature. A new categorization was presented in a research that integrated manufacturing and services innovation [12]. The author proffered same overall framework for both the fields and identified four major sectoral groups for easy understanding and comprehensive linkages. This gap of knowledge was identified in a research and it was elaborated that more exploratory research is required in this field [13]. The authors discussed the process of launching a new product while comparing physical goods with services. A case study of automotive manufacturing firm was conducted in this research analyzing the product related services (PRS).

Categorization of Services

Differentiating between the types of services is another major research area. Several authors have categorized services in diverse areas. Fast food restaurants have been characterized as service factories, health clinics as service shops and consulting as expert services [14]. Various service typologies and classifications were

also presented in a research [15]. It has also been highlighted that in services “product” is always intangible however, can be converted to tangible measurable terms but it is conditional from industry to industry.

Manufacturing and Service Sector Productivity

Identification of the gap prevailing in service sector productivity triggered numerous researches. Use of quality metrics in manufacturing units and service centers were also suggested [16]. The research indicated the flaws of service centers which mainly focused on logistics instead of contributing to quality improvement. A number of empirical case studies from industry analyzing the impact of information technology (IT) and e-commerce on the productivity were compiled [17]. This research pointed out areas where productivity of this sector can be enhanced enormously. Implementation and effects of Enterprise Resource Planning (ERP) in the industry were investigated [18]. In view of the author most developed economies are subjugated by services sector. The authors also predicted on the basis of this research that projected economic and job growth in the 21st century will be dominated by services. A framework for identifying the contribution of manufacturing and after-sales services network was proposed [19]. The research indicated that proposed framework acts as measurement dimension for the overall service chain and efficiency and effectiveness of each activity can be calculated which has an impact on the productivity and performance of the firm. Computer software program for measuring productivity and effectiveness of a firm, society or a nation was developed [20]. The program considers the combined concept of partial productivity, total productivity measurement and reliability. The developed software was tested on a petroleum services company in Nigeria indicating excellent results. The developed software in this research has made it very easy and simple for firms to identify their productivity flaws. Differences in total factor productivity (TFP) across 22 manufacturing and 17 services industries were analyzed in Germany [21]. The research spreads over 10 years period i.e. 1995-2004 presenting differences among domestic as well as foreign firms. The structure of productivity between service and the manufacturing industries was compared in another research [22]. This research pointed out that service sector productivity in Japan is very low and needs enhancement. The author expressed that productivity analysis has been more focused on manufacturing industry even in Europe and United States and more deliberate efforts are required in the services industry.

Role of Government and Public sector in Productivity Enhancement

There has been an active role played by the governments in Southeast Asia to promote industrial growth both in manufacturing and services fields contradictory to western theories [23]. The authors argued that government participation, policies and decisions have been the backbone for industrial growth and achieving competitiveness in the region. This research reviewed two government linked companies (GLCs) in Singapore outlining their internationalization process from contextual perspective. Two different views on government involvement and public sector role in services and manufacturing and been discussed [24]: “Washington consensus” deliberating that excessive and unfair competition from public sector results in cutting down progress of private sector. Secondly, “Developmental state view” debating that there is a dire need for government to intervene and public sector to actively participate for economic growth in developing countries. The author gave the examples of Korea and Singapore emphasizing that in Asia active role of public sector is a must to achieve desired developments. Dependence on public sector industry specifically the defense industry is a must for under developing countries due to political and strategical factors [25]. The author expressed that arms embargo on these countries has been another major factor for development and enhancement of public sector. The research evaluates establishment of defense industry in Jordan while also examining the same in Brazil, South Africa, South Korea and Taiwan pointing out the positive effects they had on their countries’ economy.

Pakistan Automotive Sector Productivity

Pakistan came into the race of productivity enhancement a bit late and most recently long awaited Productivity Association of Pakistan was re-launched on 25th April 2009, in Islamabad (Asian Productivity Organization 2009). It has been established in a survey that manufacturing industry of Pakistan contributes 19% in the GDP [26]. It has also been revealed in this survey that all units have still not been registered as yet. A very huge public sector automotive manufacturing and services industry of Pakistan has been in operation since long but not much of research has been carried out on the operational procedures and productivity enhancement possibilities of this industry, security and difficult access being the prime factors [27]. Realizing the gap in literature, this research is conducted with a view to investigate the probable flaws in the productivity of Pakistan’s automotive SME’s.

Scientific Contribution of the paper

With the changing scenarios, methodologies used for measuring productivity and even defining productivity needs more thorough research and studies [2,6]. Research conducted previously was more focused on

performance and profits rather than productivity. Literature research has shown that in past two decades a lot of research studies have been carried out on productivity all over the world [6,14,15,22]. However in developing countries specifically Pakistan not much of research has been conducted in this regard. Contributions of this paper include several aspects including the points enumerated below

- 1) Due to lack of research in this specific area results of this research give a vast direction on making and implementing the policy decisions for these organizations.
- 2) This research is focused on productivity lapses in Pakistan automotive industry utilizing the field survey and interviews methodology.
- 3) Using NVivo ver 10 in depth analysis of the responses have been carried out resulting in emergence of several notable flaws to be addressed.
- 4) Results of this research give a guide way for the industry of developing countries on how enhance their productivity which can result in higher profits.
- 5) In previous research conducted on productivity analysis quantitative methodology and approach has been used. In this research qualitative methodology approach has been used which has resulted in in-depth analysis of the issues which cannot be highlighted with the help of numbers and figures only.

2- MATERIALS AND METHODS

This action research was done utilizing ethno methodology. Productivity analysis was conducted in 9 major automotive companies of Pakistan. These companies were located in five major cities of Pakistan. All these companies consisted of manpower 100 to 500, making them equivalent to small medium enterprises (SME's). This research consisted of qualitative methodologies. Ethnography and participant observation in combination with qualitative interviewing was conducted for qualitative analysis as suggested by Bryman [28]. First author of this research had served for several years in these organizations which allowed personal immersion in the actual settings. Triangulation methodology was utilized to avoid going native [29]. To ensure external reliability semi structured qualitative interviewing was conducted using questionnaire consisting of 12 items extracted from the published work. Results obtained and concurrence of researcher's ideas confirmed the internal reliability and internal validity of the research. External validity was limited only for similar type of organizations. Grounded theory strategy was used for data collection and analyses [30]. Theoretical sampling was done and on the basis of theoretical saturation phenomenon and a sample size of 65 was completed. Respondents consisted of top management, middle level management and workers. Mixes of cluster sampling along with snow ball sampling techniques were utilized. The responses of the participants were transcribed verbatim. CAQDAS were used for data analyses. NVivo ver 10 was utilized for analysis. Latest tools and techniques available in this software allowed in depth analyses of the data. In order to understand the data firstly text run query and word frequency query were run as shown in figure 1 and figure 2. Word frequency query shows the terminologies which has been emphasized by the respondents. Text run query shows how and where the specific word is used in the data. To further understand the data cluster analysis was also performed as shown in figure 3.

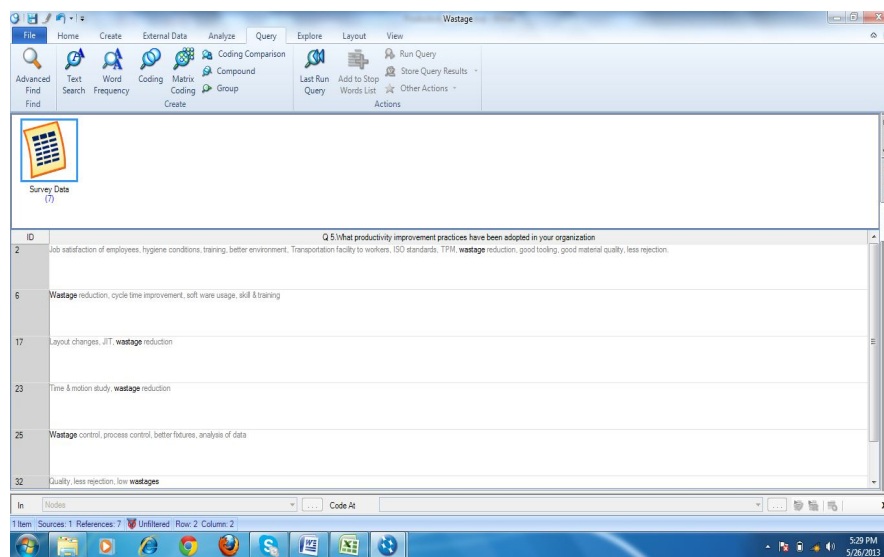


Figure 1 Results of text run query

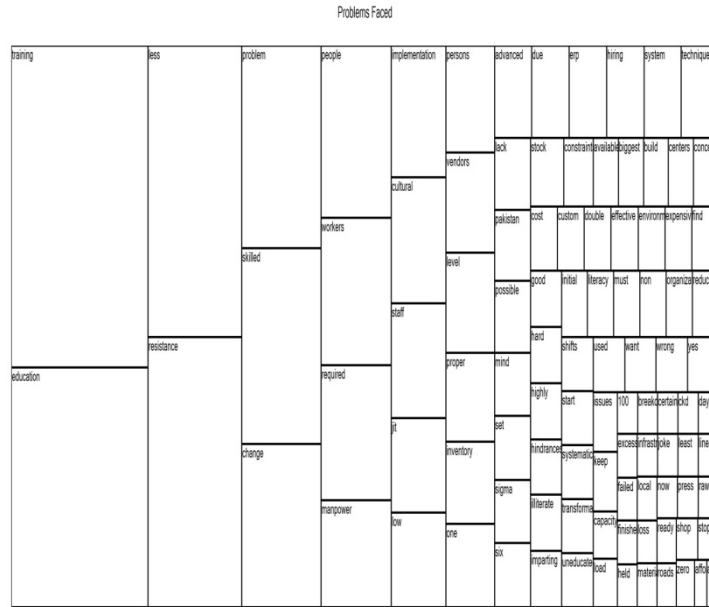


Figure 2 Word Tree results mostly emphasized words are shown as per the block sizes



Figure 3 Results of Cluster Analysis

To further understand the connection of the terminologies used coding queries were run as shown in figure 4. Combinations of simple and advanced coding queries were run to finalize axial and selective coding. For detailed in depth analysis matrix coding query was also run. For generation of the hypothesis and results group coding queries were run as shown in figure 5. In group coding queries respondents are shown on the left and the responses are shown on the right side of the graph. The node connections make it easy to understand which are the most linked points of concern for the respondents. On the basis of these analyses done results are finalized.

ID	Q 5 What productivity improvement practices have been adopted in your organization	Q 6 What latest technologies have been adopted in your organization
1	Daily improvement practice, bottle neck detection and MBO	Induction heater results in double production
3	TPS, MUDA elimination, Kanban, Kaizen, 5s	3% Automation, automation in paint shop
5	More capacity utilization, Study in operations sequence what is the bottle neck, go for line balancing, add machines and add people	We must use more older machines, must also include CNCs
6	Wastage reduction, cycle time improvement, soft ware usage, skill & training	CMM, CNC
7	Capacity utilization, time and motion and rejection control	Synthetic natural gas plant
10	Process improvement, design improvement, Stocks per minute (SPM) improvement, design	Automation

Figure 4 Results of simple coding query

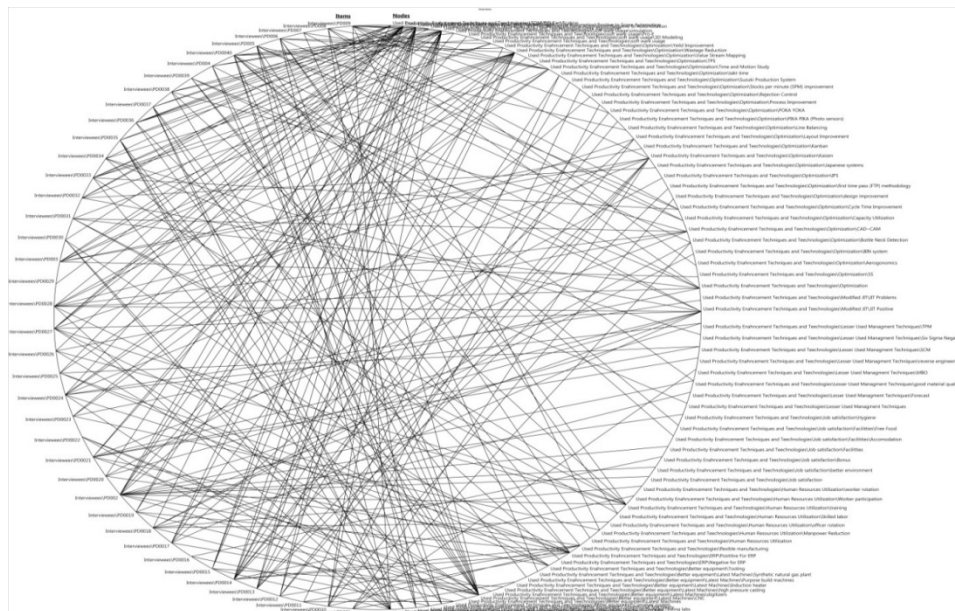


Figure 4 Results of group coding query as *connection map* for respondents vs responses

3- RESULTS AND DISCUSSION

Data compiled in field notes and responses of the respondents were entered into XL and then were imported into NVIVO version 10. For triangulation analysis data were also analyzed in IBM SPSS Text Analytic version 4.0.1. Themes that emerged from the data were coded using tree nodes. Coding sequence of open coding, axial coding and selective coding was also done [31]. On the basis of constant comparison concepts and categories were extracted from the data. Ethnographic content analysis (ECA) as suggested by Altheide conducted which resulted in formulation of substantive theory [32]. Formal theory could not be explored from this substantive theory as the research was conducted in similar organizations. However, alternate methodology was utilized for generation

of formal theory i.e. by comparing this substantive theory with existing theory and comparable settings, as suggested by Bryman & Bell [28]. The distribution of the respondents as per their designation is shown in figure 1. Graph between designation and age is shown in figure 2.

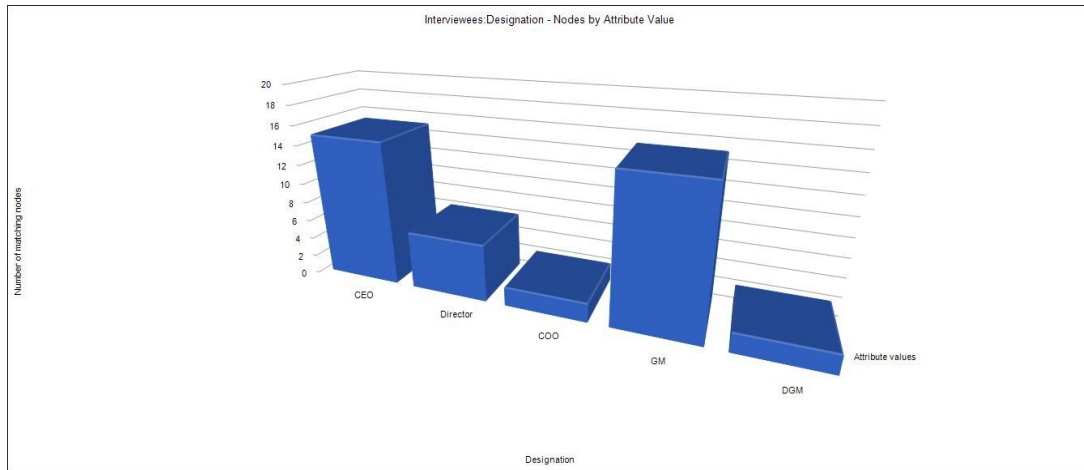


Figure 1 Graph regarding number of respondents' designation wise

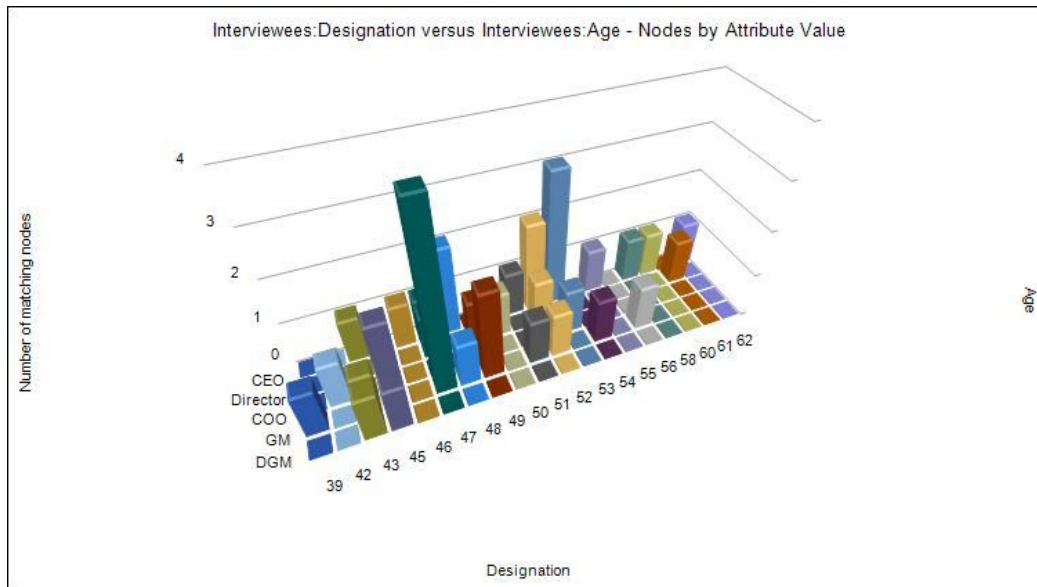


Figure 2 Graph between Designation and Age

Classifications of the respondents were made for categorical analysis. Out of 40 respondents 15 were CEOs', 5 were Directors, 2 were COOs', 15 were General Managers and two were DGMs' as shown in figure 1. Then comparison chart of two variables were made showing the designation and qualifications of the respondents. Graph is shown in figure 2. It shows that majority of CEO's are under metric (specifically from vendor industry), one is FSc, 2 are MBA qualified and two are engineers. Most of the General Managers' and Directors are engineers and very few General Managers are DAEs' (Diploma holders). This graph also shows that except for the CEO designation all other top management mostly belongs to engineer's category. This aspect is understandable considering the highly technical engineering job requirements. Point of concern is the state of CEO's qualification status as without top management commitment it is nearly impossible to implement any latest management technique or technology. Logic behind this aspect is the fact that mostly business run in vendor industry is family owned private limited companies, however, now the people who actually started the business are handing over the powers to the next generation who are generally MBA qualified and very few are engineers as well. This aspect reflects the bright and better upcoming future of this industry.

Analyses of the responses collected were analyzed in NVivo ver 10. These responses highlighted several flaws in the productivity of these organizations. Research conducted in the past has highlighted several methods to measure and analyze productivity of the organizations [33, 34]. Qualitative methods used in this research resulted in emergence of 16 themes which were categorized. This categorization identified the flaws in these companies. These categories are enumerated and discussed in subsequent paragraphs.

- 1) **Highly Centralized Structure.** As the structure of these workshops is centralized and more standardized as well as formal, hence the worker has little or no power to make decisions.
- 2) **Lack of Motivation.** Overall an environment of lack of motivation exists. Most of the workers take their job as fatigue. This aspect coupled with fear results into lack of interest and at times they feel hesitant in reporting defects and submitting recommendations to improve the process. The lack of conducive environment decreases the efficiency of the workers.
- 3) **No Worker's Participation.** Worker participation is an important tool in increasing the productivity of the organization. The quality control teams promote participation which improves total and partial productivity. There is a need to develop this atmosphere in the workshops of these companies.
- 4) **Poor Time Management.** Time management involves the minimization of the wasteful elements of the employee's work. Due to poor time management in these workshops, the wastage rate of worker's time is enormous. Secondly, only timely provisioning of funds and parts can ensure timely completion of the tasks. It is an essential ingredient in critical path method (CPM) analysis of operational flow of workshop.
- 5) **Lack of Accountability.** Accountability is a process of holding somebody responsible for any undesirable action. Accountability is backbone and essence of any organization which has to excel in the present environment. In these workshops no accountability methodology exists which causes economic losses and delay in achieving results.
- 6) **No proper Training Programs.** Unskilled workers are hired and trained on the job. There are no formal training programs. The workers due to job repetition are able to perform their job well. However it is eminent that proper training is a must without which the productivity of the workers cannot be increased.
- 7) **Employee Involvement and Team Work.** The success of any organization lies in the enthusiastic involvement of the workers and cohesive teamwork. This aspect is lacking in these organizations. Improvement in processes can only take place if all the workers from the lowest grade to all the tiers of management are involved in making it happen, which is not the case in these enterprises.
- 8) **Slow Procurement Processes.** Procurement also takes time and this in turn creates a lot of problems. The time taken in procurement is due to ineffective forecasting and planning.
- 9) **Lose Inventory Control.** Huge finished goods stocks and work in process inventories in these organizations are depiction of poor inventory control system. There is a dire need to have a computerized inventory control system on modern lines. Inculcating concepts like "Just in Time" inventory control system can reduce the wastage of money, material, space and time.
- 10) **Improper Quality Management.** The section/team responsible for quality assurance & control is always hard pressed with regards to time. As a result, minor problem/defects are sometimes overlooked. Moreover, lack of training is also sore point in the members of these companies.
- 11) **No Work Measurement.** It involves the measurement of work by placing a time value on it. This technique determines the time required to perform an operation by specified methods under specific condition. There is no work measurement being done in these workshops. If introduced, it could have a very positive effect on the organization.
- 12) **No Research and Evaluation.** Continuous research and evaluation is an effective technique to increase the productivity of an organization and should be done formally. Unfortunately this is another gray area in these companies.
- 13) **Non-Productive Activities.** Certain non productive activities reported by the respondents of these organizations, which result in poor time management, quality and making the product cost ineffective are:-
 - a) Excessive and repetitive documentation.
 - b) Delay in the supply of spares.
 - c) Lack of interest by most of the workers.
 - d) Costs incurred on tests and inspections.
 - e) Inadequate maintenance of machines and equipment
 - f) Failure and breakdown of equipment.
 - g) Lack of timely provision of spares.
 - h) Delay caused in making decisions involving repair and maintenance versus replacement.
 - i) Breakage and wastage of materials.

- j) Rework that is done due to poor workmanship.
- 14) Deficiency of New Tools/Equipment. Acute deficiency of latest tools and technology are resulting in decrease in the efficiency of workers.
- 15) Mismanagement of Human Resource. One of the major drawbacks in these organizations is HR mismanagement. On several places extra manpower is employed which is not justified. This results in the workers working at a slow pace and they are not as productive as they should be.
- 16) Under-Utilization of Workshop Capacity. Most of the workshops are not currently operating at their optimum potential output. As the workers are employed on permanent basis, hence the workers are over-employed and their expertise is being wasted as well as under-utilized.

CONCLUSION

A detailed productivity analysis of automotive SME's was conducted in this research. Productivity analyses of these enterprises have revealed the fact that there are some major flaws in the prevailing systems of these production units. These flaws are resulting in loss of trillions of rupees to the Government of Pakistan. The main reason for these flaws is that quality of production is not given due consideration, mainly due to lack of adequate planning and urgency created by the end users. This results in more tendencies to rework and more mistakes resulting to increase in scrap. Another major setback in the system is non adherence to the latest trends and technologies. This area was ruled by foreigners for centuries and despite having independence from more than half of century still system of 1935 is mostly adhered to. Most of the major production units in these countries are the ones raised and established by the old rulers. More or less in these specific production units same old rules and procedures are followed which have been abandoned by most of the nations of the world. In last few decades science and technology have revolutionized the world. Most of the tasks which were performed by a human being have been replaced with robotics and other latest machines. Complete data management and information have been converted onto computers but unfortunately in the third world countries dependence is still on the old file system and paper work. We are living in a world where each and every passing moment is giving birth to a new idea and a new innovation. In 21st century if developing nations fail to couple up with latest trends and technologies they will not only be left behind in the race of advancement but will ultimately become a burden on the other countries of the world. In third world countries the biggest aim emerged recently is to get quality certifications. Every organization thinks and believes that if they get ISO 9001:2000 certified their business will prosper and they will achieve extraordinary productivity and ultimately the huge profits. This is just a myth; race for one certification or another is not the only solution available. Ultimate aim of the companies should not only be to get certified but to adopt the state of the art techniques adopted by the world class producers resulting into the ultimate aim of being the world class producers themselves. Results of this research have pointed out that there are several grey areas like lack of workers' participation, highly centralized structure, lack of accountability and poor time management. Non-productive activities like rework, material wastage, excessive and repetitive documentation, inadequate maintenance of machines and equipment, failure and breakdown of equipment were also found out to be major problems. This research makes it eminent that a lot of research work is required in this specific field to explore and identify these problem areas as done in the other countries of the world [35]. After identification the first and the foremost thing is to take immediate remedial actions to overcome these flaws and enhance the productivity of these companies. These kind of series of research will also prove suitable to develop policies by the Government for helping these organizations to enhance their productivity.

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