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ANALYSIS OF CONTINUOUS IMPROVEMENT PRACTICES IN THE MANUFACTURING INDUSTRIES OF ETHIOPIA

Dr. Solomon Alemu Tesfaye
Assistant Professor in Adama Science and Technology University, Department of Social sciences.
Po-Box: 1888, Adama, Ethiopia
e-mail: solalemu2@gmail.com
Cell-phone : +251-911-10-26-86

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Abstract

Increasing global competition makes continuous improvement practice strategically important to all kinds of organization be it large or small scale enterprise, manufacturing industries or service giving organizations. Theoretically Continues Improvement Tools believed to link higher quality to lower costs and higher market share. Therefore, analysis of the awareness level, and the proper implementation of continuous improvement practices of selected Manufacturing Industries in Ethiopia is the major objective of this study. The manufacturing industries were categorized into five sub-sectors namely, Textile and Apparel Industry Leather and Leather Product Industry, Metal Engineering Industry, Chemicals and Allied Product Industry, Major Food and beverage Industries to collect relevant data for the study. Data were collected through structured questionnaires distributed to experts of selected manufacturing industries. The result of the study revealed the fact that, the manufacturing industries level of awareness of CIP tools is relatively poor. On the other hand, their level of awareness about the application of CI and its benefit is commendable. Despite good awareness level of the benefit of CIP the level of implementation of CIP in all observed industries is poor with the exception of the metal engineering sub-sector whose implementation is somewhat moderate. The major reason for such poor implementation of CIP is lack of awareness of important tools of CI and their consistent implementation in all areas of the manufacturing industries.

Acronyms

CI	Continues Improvement
CIP	Continues Improvement Practice
GDP	Gross Domestic Product
GTP	Growth and Transformation Plan
MOI	Ministry of Industry
QC	Quality Control/ Circles
TQM	Total Quality Control

I. INTRODUCTION

Continuous Improvement is an ongoing practice of any organization implemented to improve the overall quality of their product and/or their service. CI involves a serious consideration of the needs of the organizations' internal and external customers, and actively involving them in the improvement process. Scholars have a common consensus that CI is not a short tem phenomenon, rather it is a long-term strategy focusing on improving productivity thereby enhancing competitiveness through continuously improved quality, speed to market, flexibility, reduced cost and ultimately customer value and satisfaction. It looks at improvements in a systematic way to improve quality over time and ranges in scale from smaller programs to significant strategic initiatives. Continuous improvement is not the same as quality assurance rather goes beyond quality assurance to find ways of lifting the quality of product produced or the quality of services delivered. Hence, it is a change management tool designed to enhance competitiveness of any business organization. Currently Ethiopian manufacturing sector is characterized by low capacity utilization and weak competitive position in the international market partly due to poor labor productivity, poor quality and high cost of production.

One of the major goals of Growth and Transformation Plan (GTP) was the establishment of broad based, sustainable and speedy economic growth so as to alleviate poverty from the nation. This can be achieved by ensuring more rapid and sustained development of the industry sector and enabling the sector to play its key role in the economic development. The industry sector expected to grow significantly from year to year and ultimately to achieve 27% share of GDP by the year 2025.

In the two GTP periods the performance of the industry sector in terms of its contribution to GDP is improving but not satisfactory. According to the 2018 mid-term report of Ethiopian National Plan Commission, the GDP share of the industrial sector in the year 2016 is about 17% and this shows a moderate improvement from the year 2015 which is about 15% as indicated in the table below.

Table 1: Trend and Share of Manufacturing Sector to GDP

Economy Sector	Average (1998-2002)	Average (20011-15)	Base year 2015	2016
GDP Share in %				
Agriculture and allied	49.5	41.7	38.6	36.7
Industry • Manufacturing	10.3 3.9	12.8 4.4	15.0 4.8	16.7 6.0
Service	41.4	46.1	47.0	47.2

Source: GTP II Mid-Tem Report of National Plan Commission (2018)

As shown in the table 1, the contribution of the manufacturing sector for GDP is not growing as expected. Most if not all firms claim that the major reasons for their low growth among others are low productivity, poor quality and relatively high cost of production which leads to lower competitive position in the local and international market.

Continuous Improvement in the manufacturing industry believed to be instrumental to bring about quality, improved delivery, reduces production cost, improved quality of work life, and enhance flexibility in use of resource and ultimately to be responsive to customer demands.

Therefore, the major objective of this study is to assess the awareness, implementation status of Continuous Improvement Practices of the Ethiopian Priority manufacturing sector.

II. MATERIALS AND METHODS

The primary data are collected from selected industrial leaders, employees and major stakeholders using in depth interview of industrial leaders and questionnaires administered by enumerators. Observation of selected manufacturing industries was also conducted to obtain firsthand information about the implementation status of CI. Whereas, previous studies on related studies, literatures on continuous improvement theory, philosophies, and other relevant documents are used as secondary source of data.

To collect the relevant data, first manufacturing industries are stratified in five sub-sectors namely; Textile and Apparel Industry, Leather and Leather Product Industry, Metal Engineering Industry, Chemicals and Allied Product Industry, Food, Beverage and Pharmaceutical Industries.

From the manufacturing industries a total of 19 industries are selected considering their year of establishment. Questionnaires are distributed to 112 respondents selected from these 19 selected manufacturing industries. The collected data are analyzed using both descriptive and inferential statistical analysis.

III. RESULTS AND DISCUSSION

3.1. Profile of Selected Manufacturing Industries in Ethiopia

The selected manufacturing industries from which respondents have been drawn are categorized by ownership type and industry size and is presented in table 2.

From 19 manufacturing industries included in the study, 74% of them are privately owned and the remaining industries are publicly owned enterprises. When the manufacturing industries are categorized by their size, about 58% of them are large and 37% of them are medium size enterprises. It is only 5% of enterprise that can be regarded as small enterprises measured by number of workers.

Enterprises included in the study are predominantly large and medium size enterprises and these are the one which are expected to implement CIP to enhance their productivity and their competitiveness in the global market.

Table 2: Profile of manufacturing sector by ownership and industry size

Industry Sub-Sector	Ownership type		Industry Size			Total
	Private	Public	Small	Medium	Large	
Chemical and Allied	4	1	1	1	3	5
Leather and Leather Product	5	-	-	3	2	5
Metal Engineering	1	1	-	1	1	2
Food Beverage and Pharmaceutical	1	2	-	1	2	3
Textile and Apparel	3	1	-	1	3	4
Total	14	5	1	7	11	19
%	74	26	5	37	58	100

Source: Field survey, 2019

3.2. Awareness of Manufacturing Industries on CI Tools

There are different CI tools that can be implemented by manufacturing industries to improve their productivity, quality of their product, to reduce their cost and to improve their competitiveness in local

and international market. Commonly, industries tend to implement CI tools that they are most familiar to them.

Thus, the awareness level of the existence of CI tools in addition to the CI tool that they are currently implementing in their respective organization is assessed and the result is summarized in table 3.

Table 3. Awareness level of selected manufacturing industries on CI tools

Industry Sub-sector	CI Tools							
Chemical and Allied	TQM	Suggestion System	Just In Time	Lean Manufacturing	Six Sigma	Quality Circle	Kanban System	Five "S"
Leather and Leather Product	61.5%	7.7%	39%	23.1%	19.2%	57.7%	7.7%	65%
Metal Engineering	33.3%	26.7%	27%	20.0%	13.3%	53.3%	-	40%
Food Beverage and Pharmaceutical	20%	40%	40%	-	-	60%	-	20%
Textile and Apparel	58.8%	35.3%	24%	17.6%	11.8%	64.7%	5.9%	94%
Chemical and Allied I	57.9%	31.6%	32%	21.1%	15.8%	73.7%	-	32%
Total	53%	24%	36%	27%	22%	66%	7%	49%

Source: Field survey, 2019

In fact all tools listed in table 3 are CI tools that can be employed to improve the performance, efficiency and productivity of the manufacturing industry at different circumstances. From the study, it can be noted that the manufacturing industries are not equally aware of all CI tools. It is the quality circle which is known by majority of the manufacturing industries (66%) followed by TQM (53%). Whereas, CI tool known as Kanban System is least known (7%) by manufacturing industries followed by six-sigma which is known by 22% of manufacturing industries in the country. The study showed that more than half of the respondents are not aware of the existence of all CI tools except the above mentioned two CI this calls for a serious attention to create awareness to them if the manufacturing industries have to improve their productivity and their level of competitiveness in the international market.

3.3. Awareness of Manufacturing Industries on the Application of CI Tools

CI tools can be applied in all areas of the manufacturing industries ranging from production process to administration process. Understanding of this fact will affect the commitment and effectiveness of the implementation of CIP in the sector. Manufacturing industries awareness level regarding where CI can be effectively implemented in their respective industries has been assessed and the result is presented in table- 4.

Table 4: Awareness about the Application of CI

Industry Sub-sector	Production Process	Administration Process	Compline process	Service process	Sales Process
Chemical and Allied	84.6 %	38.5 %	65.4%	38.5%	50.0%
Leather and Leather Product	91.3%	39.1%	47.8%	4.3%	21.7%
Metal Engineering	40%	40%	20%	60%	40%
Food Beverage and Pharmaceutical	88.2%	23.5%	23.5%	29.4%	29.4%
Textile and Apparel	94.7 %	31.6%	68.4%	36.8%	57.9%
Sector Mean	**79.8%**	**34.5%**	**45.0%**	**33.8%**	**39.8%**

Source: Field survey, 2019

In reality, CI can be practiced almost in all units of the manufacturing industry. However, almost respondents of all sub-sectors feel that, it can be implemented in the industry production process except the metal sub-sector who feels that CI tools are effectively implemented mostly to improve the provision of service process in their industry. Most respondents did not think that CI can be implemented in the administration process. From the result it could be noted that, most, if not all manufacturing industries of all sub-sectors do not have a clear understanding where CI can be implemented and this may negatively affect the practice and effectiveness of its implementation.

3.4. Understanding of manufacturing industry about the benefit of CIP

Manufacturing industries may be committed to CI practices if they believe that they will get benefit from its implementation. The selected manufacturing industries were asked to express their feeling on the benefit of CIP and the results are presented in order of their benefit in figure 1.

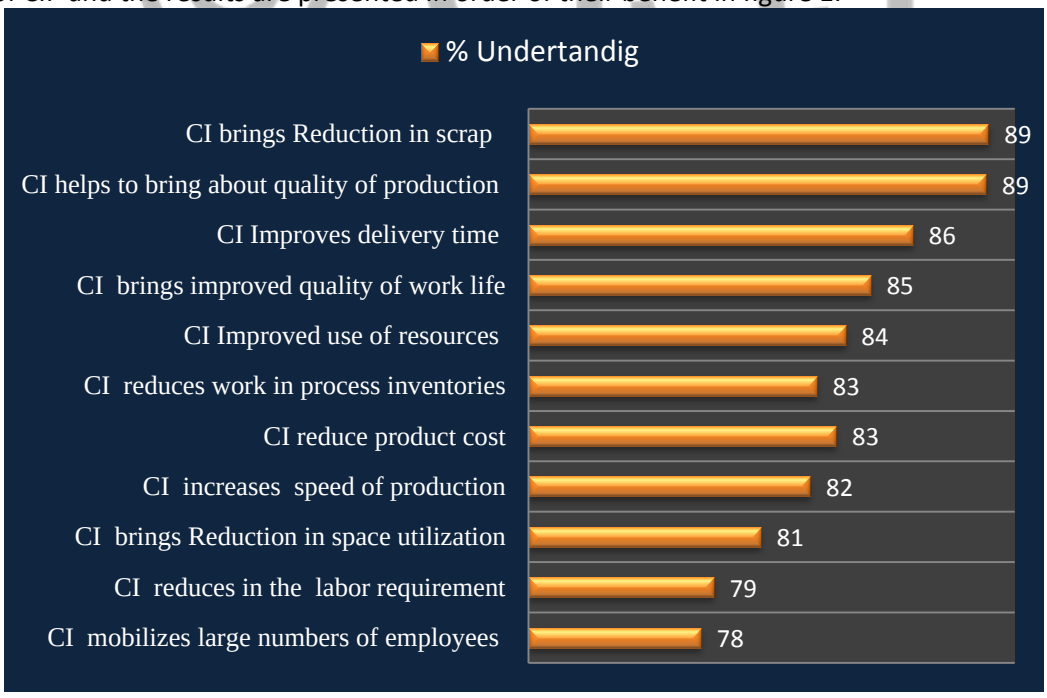

Figure 1: Level of understanding of manufacturing industry about the benefit of CIP

Assessment of the perceived benefit of CIP depicted in figure 1 revealed the fact that the most important benefit of CI practice are reducing scrap and enhancing quality of production. Improvement

of delivery time, reduction of cost of production and improvement of quality of work life are also benefits of CI which are ranked next to the previous two perceived benefits. The remaining benefits are also recognized by significant proportion of selected manufacturing industries in the country.

However, very important benefit of CI practices like mobilizing large numbers of employees towards organizational improvement is least recognized by most manufacturing industries.

3.5. Implementation Practice of CIP

Implementation level of CIP of the selected manufacturing industries was assessed using 5 point linker-scale measurements from strongly disagree (1) to strongly agree (5)and the result is presented by sub-sectors and by sector average in table 5.

Table 5. Implementation level of CIP by sub-sector

Industry Sub-Sector	Strategy	Leadership	Infrastructure necessary to CI	Measurement and Information Deployment	Operation Management	Training	Change and Adoption	Mean
Chemical	3.2	3.0	2.5	2.7	2.9	2.8	2.9	2.9
Leather & leather products	2.7	3.0	2.5	2.4	2.5	2.6	2.5	2.6
Metal	3.4	3.5	3.3	3.3	3.3	3.6	3.4	3.4
Pharmacy & Food	2.4	2.6	2.8	2.4	2.4	2.8	2.6	2.6
Textile &Apparel	2.80	2.6	2.4	2.7	2.5	2.6	2.6	2.6
Sector Mean	**2.90**	**2.9**	**2.7**	**2.7**	**2.7**	**2.9**	**2.8**	**2.8**
SD	**0.40**	**0.37**	**0.37**	**0.37**	**0.38**	**0.41**	**0.37**	**0.35**

Source: Field survey, 2019

Strategy: Continuous Improvement has to be a part and parcel of strategic management of the manufacturing enterprises. For successful implementation of CIP, different level of management should integrate CI in their long term and operational plan as an important objective of the organization (Pedro etal., 2012)

The findings indicate that CI is not strategically planned and not aligned with departmental or production unit goals almost in all sub-sectors except the metal sub-sector. In fact, even in the metal sub-sector the level of strategic integration is weakly exist. If we look at the manufacturing sector as a whole, the degree of integration CI in the strategic plan is not satisfactory if not poor (mean value 2.9). From this all it can be generalized that, the sector is characterized by absence of target and common understanding of direction, lack of CI strategy with absence of long term objectives linked to CI and none existence of measurable objectives related to CIP and its implementation.

Leadership: Refers to how formal and informal guidance is exercised across the organization, including the mechanisms developed for decision making. Leaders need to have a clear motivation and understanding as to why improvement is important. The top management also needs to have adequate experience in the CI tools and must be supportive the sustained implementation of CIP in the respective industry (Bhuiyan and Baghel, 2005).

The role of leadership of the manufacturing sector in this regard has been examined and the result was somewhat moderate and neutral in the selected manufacturing sector as a whole. Actually, leadership has to be in the fore-front of all CI activities. If we look at the leadership role in each sub-sector, it seems that it is only in the Metal sub-sector that leadership play relatively desired role as per expectation. In the remaining sub-sectors the leadership role is either poor or close to average. Given the assessment result it can be concluded that leadership in the manufacturing sector can be characterized by lack of clear motivation and understanding as to why improvement is important. The sector has inadequate leadership experience particularly in the CI practices. Finally the top management support to the CI practice is not adequate.

Infrastructure necessary to CI: Successful implementation of CIP requires setting up an appropriate infrastructure, necessary organizational structure to support the CI implementation process and allocation of resources to departments to explore new ways of doing things (such as R&D). In addition, there has to be a system where by the organization celebrates innovation and creativity when new ideas or great changes are derived from any CI initiative. (A. Brown etal. 2008)

The assessment result of how the manufacturing sector stands in this regard has be conducted and the perception of the respondents indicated that, in the manufacturing sector necessary infrastructure to CI is poorly organized. This entails that there is no appropriate infrastructure**,** organizational structure to support the CI process. The allocation of resources to departments to explore new ways to do things (such as R&D) is nearly none existence.

Measurement and Information Deployment (MID): This is about looking at to what extent information related to improvement and performance dimensions of outcomes is simple and available to every associate and how systematic the information deployment is (Bhuiyan and Baghel (2005). In this regard the implementation of CI requires developing and displaying CI metrics which is consistent with overall and departmental CI goals.

It seems that the manufacturing industries do not have a clear understanding about the need to develop and display CI metrics in accordance with their over goal and CI goals. Most of them do not measure CI effort and little or no effort is made to develop IT supported CI measurements. CI data is poorly collected and managed. In short, the sector is characterized by lack of measurement with inadequate information analysis and deployment system. The feedback system is not well developed to ensure the successful implementation of CI practices.

Operational Management (OM): This is about the CI management process at the operational level, including active involvement of associates in identifying needs, solutions, and actions required to solve problems. Also examines the extent to which CI is incorporated into work methods, and how employees are being awarded for contributions (S. Prošić 2011)

In this regard the result based on the assessment of selected respondents' perception revealed the fact that the CI management process is also poor. The CI management process in most selected manufacturing industries is relatively weak and the involvement of associates in identifying improvement needs and problems and action taken to address the problem is limited. CI is in not incorporated into work methods and those workers who are active in the process are not well recognized and rewarded for their contribution. It seems that the manufacturing industries are also unable to organize multidisciplinary CI teams to facilitate the generation of improvement or innovative ideas.

Training (TR): Determines to what extent training has become a formal process inside the organization, and to what extent it has been applied to functional areas (J. Madrigal 2012). It is about examining to what extent CI is a component of the induction phase for workers in the manufacturing sector and CI training is part of workers' development plans in the sector. The result showed that the manufacturing sector performance in this regard like the previous constructs is also poor or weak. This implies that continuous training plan for CI is not well developed. The role of manager in the CI process is not active as it should be. Above all CI goals are not well set at the individual level.

In general, the selected manufacturing industries are characterized by lack of learning as a value in the organization, lack of training and above all lack of problem solving skills in most if not all manufacturing industries.

Change Adoption : This will examines how the need for change, as improvement, is understood, and the effort that the organization is making to adopt new ways to doing things. Vanek, Spakovska, Mikolas and Pomothy (205). This is about creating working environment suitable for change and new ideas creating clear vision of why change is required and the overall support of the organization to adopt change. The assessment result indicates that the change adoption practice of the manufacturing sector is somewhat weak (mean value 2.9). It is the metal industry sub-sector that performs relatively better than all other sub-sectors. This means that overall support of the organization to adopt change is relatively weak. Change adoption is not also well supported by success stories and the feedback system to avoid backsliding of the change in not well developed.

3.5.1. Implementation of Continuous Improvement Practice by Ownership Type

The table below (table 6) presented the implementation of continuous improvement practices by ownership type of the manufacturing industries. Even if the overall implementation of continuous improvement practice is somewhat poor, there is statistically significant difference in the implementation of CI practices between public enterprises and privately owned manufacturing industries. The public manufacturing enterprises exhibit relatively better implementation of CI practice than their counterpart privately owned manufacturing enterprises. This is due to the fact that there is a policy that forces the public enterprises to implement CI tools and they are required to report the implementation status periodically as an indicator of their performance.

Table 6 : Implementation of CIP by ownership type

Ownership	Mean	SD	F	Sign
Public	2.90	0.73		
Private	2.58	0.62	7.634	0.007
Total	2.73	0.68		

Source: Survey data

3.5.2. Implementation of Continuous Improvement Practice by Industry Size

The study has tried to assess the implementation status of continuous improvement practices by the industry size and the result is summarized in table 7.

Table 7: Implementation of CIP by the industry size

Size	Mean	SD	F	Sign.
Large Manufacturing Industry	2.8	0.66	9.083	0.0000
Medium Manufacturing Industry	2.26	0.52		
Small Manufacturing Industry	3.6	0.44		

Source: Computed based on survey data

The result in table 7 clearly shows that there is statistically difference in the relative implementation of continuous improvement practices by size of the manufacturing industries. The implementation status of continuous improvement is much higher than the medium and large manufacturing industries in the country. In fact this result cannot be taken at its face value.

3.5.3. Implementation of Continuous Improvement Practice by Industry Type

The implementation of continuous improvement practices might be different from one industry sub-sector to another. The study has tries to identify the implementation practices of continuous improvement by manufacturing sub-sector and the result is summarized in table 8.

Table 8: Implementation of CIP by industry type

Industry Type	Mean	SD	F	Sig
Chemical and Allied	2.83	0.83		
Leather & leather products	2.84	0.69		
Textile & apparel	2.68	0.64	0.641	0.635
Food & Beverage	2.6	0.54		
Metal Engineering	2.45	0.32		

Source: Computed based on survey data

The finding of the study revealed that fact that, different sub-sectors of the the manufacturing industries in Ethiopia are not different in their implementation level of continuous improvement practices as the mean implementation continuous improvement practices in not statistically significant. Hence it can be concluded that there is no variation in the implementation of continuous improvement practices among different sub-sectors of the manufacturing industries in Ethiopia.

IV. CONCLUSION

The manufacturing industry in Ethiopia is still at its infant stage. It is characterized by sluggish growth with poor capacity utilization (less than 50%). The quality of their product is not as it should be and the sector is so far unable to compete in the regional as well as in the global market.

CI is considered as an important tool to increase successes and reduce failures of the manufacturing industries. CI is believed to increased employee commitment and ultimately leads to improved performance of the manufacturing industries and helps to improve the quality of their product. Above all CI requires low capita investment as it is about making small improvements continuously rather than large dramatic changes.

Despite such huge benefit, the implementation of CI in the selected manufacturing industry is poor. The low or poor implementation of CI practices is due to different reasons. Most if not all of the manufacturing sector are not aware of the existence of different CI tools and their importance to their industry. Those who are aware of the different CI tools feels that CI is important to improve the quality of their product and efficiency of the production process. There is no either clear understanding among industrialists where the CI can be practiced. Most of them think that CI can be implemented in the production process and they don't see it application in other working processes such as, administration, sales, service and compliance processes.

Paradoxically, the selected manufacturing industries in Ethiopia seem that they are aware of the overall benefit and principles that needed to up hold when implementing CI in their respective industries. Such result may be obtained due to the fact that the benefits listed are clear to any one and their response might be based on their common sense.

In general, the successful implementation of CI depends up on the industrialists' level of awareness about the CI tools. As expected, the implementation of CI in the manufacturing sector is poor and is not well planned without clear strategic goals of CI attached to the overall goal of the organization. The sector has inadequate leadership experience and the top management support to the CI practice is not adequate. There is no appropriate infrastructure**,** organizational structure to support the CI process. The allocation of resources to departments to explore new ways to do things (such as R&D) is nearly none existence.

Above all, the sector is characterized by lack of measurement with inadequate information analysis and deployment system. The feedback system is not well developed to ensure the successful implementation of CI practices. CI is not incorporated into work methods and those workers who are active in the process are not well recognized and rewarded for their contribution.

The manufacturing industries are also unable to organize multidisciplinary CI teams to facilitate the generation of improvement or innovative ideas. As a result change adoption is not well supported by success stories and the feedback system to avoid backsliding of the change is not well developed in Ethiopian Manufacturing Industries.

Finally, the finding revealed the fact the implementation of CI practices associated by, industry ownership and size. Public enterprises and large size industries tend to implement CI tools better than their counterpart, privately owned enterprises.

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CONFLICT OF INTEREST STATEMENT

There is no conflict of interest regarding the publication of this manuscript as it is my original work

REFERENCE

[1]. Brown, Julie Eatock, Dorian Dixon, Brian J. Meenan, John Anderson, (2008) "Quality and continuous improvement in medical device manufacturing", The TQM Journal, Vol. 20 Iss: 6, pp.541- 555
[2]. Bhuiyan and Baghel (2005), Conditions for successful implementation http://smallbusiness.chron.com/7-conditions-successful-implementation-kaizen-strategy-17802.html
[3]. Ethiopian Minister of Finance and Economic Development 2010, Growth and Transformation Plan of Ethiopian Government I (GTP I), Addis Ababa, Ethiopia
[4]. Ethiopian Ministry of Industry(2013): Ethiopian Industry Development Roadmap 2025, Addis Ababa, Ethiopia
[5]. Johanna Madrigal (2012), Assessing Sustainability of the Continuous Improvement Through the Identification of Enabling and Inhibiting Factors. PhD Dissertation paper, Virginia Polytechnic Institute and State University
[6]. National Plan Commission of Ethiopia (2015), Growth and Transformation Plan II of the Ethiopian Government. Addis Ababa Ethiopia
[7]. National Plan Commission of Ethiopia (2018), Growth and Transformation Plan II Midterm Report of the National Plan Commission, Addis Ababa, Ethiopia
[8]. Prošić Slobodan 2011: International Symposium on Engineering Management And Competitiveness (EMC2011) June 24-25, 2011, Zrenjanin, Serbia
[9]. Pedro C, Oprime, Glauco Henrique de Sousa Mendes, Ma´rcio Lopes Pimenta (2012): Continuous improvement: critical factors in Brazilian industrial companies; International Journal of Productivity and Performance Management Vol. 61 No. 1, 2012 pp. 69-92
[10]. M. Vanek, K. Spakovska', M. Mikola's, and L. Pomothy† 2015 :Continuous improvement management for mining companies (The Journal of The Southern African Institute of Mining and Metallurgy Volume 115 February 2015(119-124)