International Journal of Science and Research (IJSR)
ISSN: 2319-7064
SJIF (2019): 7.583

To Establish the Influence of Schedule Crashing Technique on Project Success at Airtel Rwanda

Musoni, K.C[1], Mulyungi, M.P[2]

Department of Entrepreneurship and Technology, Leadership and Management, Jomo Kenyatta University of Agriculture and Technology
Email: *cleclesy[at]gmail.com*

[2]Nairobi, Kenya
Email: *mwendandu2017[at]gmail.com*

DOI: 10.29322/IJSRP.10.03.2020.p9948
http://dx.doi.org/10.29322/IJSRP.10.03.2020.p9948

Abstract: ***In telecom sector, managing a project, the risk of getting the project delay is very high and project managers face pressure of competitors, hence the need of speeding the project duration is high to introduce a new product on market before others. During the project implementation phase, the application of project schedule crashing technique is a solution to overcome these challenges. This research focused on the relationship between project schedule crashing technique and project success. The main purpose of this research was to establish the influence of project schedule crashing technique on project success. In order to achieve this purpose, the study adopted the descriptive research design to achieve this objective and a case study conducted. Purposive sampling technique applied to choose the sample, questionnaire used to collect data, the questionnaire distributed to all managers and team members working in Airtel Company in Kigali province, Rwanda country. The collected data was coded and was analyzed using SPSS (Statistical Package for Social science). The research found that majority of respondents indicated that they had used project schedule crashing by adding resources to cash project time. The results revealed that R square value is 0.547 equivalent to 54.7%. This implies that project Schedule crashing technique explain 54.7% of the variations in project success other factors influencing project success explaining the remaining 45.3%. This shows how important project Schedule crashing is to project success. The study concluded that Project managers and team members adopted project schedule crashing technique to effectively implement the project and to ensure project success, project schedule crashing technique to control the project time. Therefore this study revealed the extent to which project schedule crashing influence project success and this study recommended the further studies of the influence of project schedule crashing technique on project success in other project phases, in other sectors and in other telecom companies.***

Keywords: Project management, Critical path, Project schedule crashing, Project success and Airtel Rwanda

1. Introduction

The project management discipline is evolving rapidly and its growth and acceptance are continuing to increase as project delay continues to be a big challenge in many countries. Also, successful project management is through the correct utilization for knowledge, tools, skills and techniques that may elevate the project to the success point (PMBOK, 2013).Project management is a process that includes planning, putting the project plan into action, and measuring progress and performance (Watt & Bpayne, 2012). Project management develops and implements plans to achieve a specific scope that is driven by the objectives (PMBOK, 2013). However with project management, organizations have the ability to apply knowledge, processes, skills, and tools and techniques that enhance the likelihood of success over a wide range of projects. Project management focuses on the successful delivery of products, services, or results (PMBOK, 2013). A project is completed when its goals and objectives are accomplished. It is these goals that drive the project, and all the planning and implementation efforts undertaken to achieve them (Watt and bpayne, 2012). A successful project is one that meets or exceeds the expectations of the stakeholders. On any project, a number of project constraints that are competing for your attention. They are cost, scope, quality, risk, resources, and time (Watt and bpayne, 2012). Therefore to achieve the project's goals interdependent activities are carried out in four sequential stages. The project life cycle, which is a logical sequence of activities to accomplish the project's goals, is made up four phases namely; the Project Initiation phase, the Project Planning phase, the Project execution phase and the Project termination phase (PMBOK, 2013).

In the planning phase, the project manager defines elements of work, commonly referred to as tasks or activities, having defined duration and relationships. Subsequently, he assembles these activities in an implementation structure, called schedule. This schedule serves as the baseline to estimate the total project duration, assign resources, and track and control the work progress (Najib, Nabil and Joe, 2014). A common method for scheduling is the critical path method (CPM). This method combines different activities according to their precedence relationships and dependencies. Each activity has predecessors and successors, along with different dependencies like Finish to Start, Start to Start and Finish to Finish with lead or lag time for each. The total project duration is defined by the critical paths, which are the paths where accumulation of tasks durations is the longest (Levine, 2002). During the implementation phase, project managers attempt to reduce project duration for early completion or catching up on delays and the method is schedule crashing. This is usually performed using the technique of crashing. Crashing means shortening task duration by adding more cost and overlapping is parallel execution of the sequential activities

(Kamran, Reza and Janaka, 2011).

Telecom projects face challenge of delay in implementation phase. Project Managers in the Telecom Industry today are called to face tough times. Strong competition among operators forces business strategy changes, goal shifts, compelling search for competitive advantages (new technologies, new services and offerings.) while reducing time to market. This indicates the sudden turnarounds in strategies, project scope swings, variations in constraints and shifting project milestones (Ludovico &Petrarca, 2010). However, to overcome these challenges and ensure telecom projects success, this study drew the attention to the influence of schedule crashing. Many studies has been conducted of the influence of project schedule crashing on project success but no one has been done in telecommunication sector in Rwanda. Therefore, the purpose of this study was to investigate the influence of project schedule crashing to project success in telecommunication sector in Rwanda, case of Airtel Rwanda Company. This research added value to body of knowledge of project management in Rwanda. Rwanda Airtel, MTN and Tigo are the companies in the telecommunication that are competing for the Rwandan market. Airtel, the third licensed mobile telecommunications company, launched its mobile services in March 2012 and in additional this new development increased competition and drive affordability of data and voice prices for the consumers of Telecommunications services. The number of active mobile-cellular phone subscribers has increased to 53.1%, up from 41.5 % in 2011. This major growth of mobile subscribers is mainly due to the increased competition between the incumbent Telecom Operators, who offer access to data and voice services (Rwanda ICT Sector Profile, 2012).

2. Theoretical Review

Theory of Constraints (TOC)

The Theory of Constraints is a systemic way to identify constraints that hinder system's success and to effect the changes to remove them (project perfect, 2011). The main aim of every company is increasing the profit. According to this point of view, constraints are main obstacles at achieving companies' aims. In other words, everything which exists in the road of having more profit is considered as a constraint. So, if companies can handle constraints in their system and manage these constraints, they would have a continuous improvement management system thus they could achieve higher profits (Zeynep et al, 2014). Therefore, the theory supports this study of influence of project schedule crashing on project success during the implementation phase to discover the obstacles and to improve the project implementation processes and to emphasis on the better control of settled objectives to lead to project success. This theory has been applied to production planning, production control, project management, performance measurement as well as in not for profit facilities (Blackstone, 2010). This theory supports the study which is about the influence of project schedule crashing technique in order to control the project time and to ensure project goals attainment, quality and the customer satisfaction.

Goal setting theory

Goal setting theory of motivation was introduced by Locke and Latham. The theory emphasizes the important relationship between goals and performance. That is, one's values create a desire to do things consistent with them. Goals also affect behavior (job performance) through other mechanisms. For Lockeand Latham, goals, therefore, direct attention and action (Fred, 2011). Goals are used to evaluate performance and linked to feedback on results, and create commitment and acceptance (Fred, 2011). Goal Setting Theory explains the importance of the clarity, challenge, and attainability of goals, emphasizing the importance of proper feedback, and differentiates between varying types of goals. Feedback, and lots of it, is crucial. If feedback is related to the specific goal or milestone, it serves as a catalyst for action. If non-specific feedback is given, it will have no effect on the level of work output. Basically, feedback is worthless unless it pertains to the specific goal. Because feedback increases the degree to which goals regulate performance, it can be used to control employee performance, dedication, and persistence. Feedback can be used to set specific improvement goals (ProProfs, 2016). Therefore this theory supports the study, the managers use the feedback to see if they on time and make a decision to use project execution techniques such as project Schedule crashing technique to shorten the project duration and overcome the delay. The project execution is an implementation of objectives settled in the project plan, these project objectives are goals to reach and during the execution phase the feedback is necessary to stay on track, to control time with the use of project schedule crashing technique to ensure project quality, goal attainment and customer satisfaction.

3. Literature Review

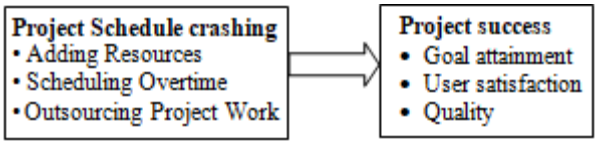

Figure 1: Conceptual Framework

In managing a project, the risk of getting the project delay is very high. Project delay can be defined as the late finished of a certain projects. Projects are considered delayed when their stipulated completion durations have not been achieved (Memon, Rahman, Abdullah & Azis, 2011). In additional, Moselhi (1993); Ezeldin and Soliman (2009), Yang (2005) mentioned the need of shortening project durations in an effort to meet targeted milestones imposed by owners and/or to make up for lost time due to delays experienced by project managers. Because of the importance of schedule compression for successful management of engineering, procurement and construction projects, considerable studies were carried out to develop methods to solve this problem. Then in performing the schedule compression process, reducing project duration requires the reduction of the longest path of its schedule network (i.e. its critical path). As such, assigning additional resources to expedite haphazardly-selected set of activities may not help in achieving this objective. The objective can rather be achieved by reducing the durations of one or more of the

activities that form the critical path (Osama and Nazila, 2013).

As the critical path determines the completion date of the project, the project can be accelerated by adding the resources required to decrease the time for the activities in the critical path. Such a shortening of the project is referred as project crashing. Therefore the most common method for shortening activity durations involves the decision to increase project resources, in comparison to working overtime (Pinto, 2010). Hence, in telecom projects, schedule crashing is referred as a process of accelerating completion of telecom projects. It aims at establishing the delicate balance between the overall cost of a project and its duration, to achieve the desired overall project objectives. The process is also known as project time reduction, least-cost expediting, project compression or schedule compression, least-cost scheduling, optimized scheduling, scheduling with time constraints, project acceleration and project time crashing or schedule crashing (Moselhi, 1993; Evensmo and Karlsen, 2008). Moreover, crashing activities involves allocating more resources (such as materials, labor, and equipment) than planned in order to complete a project more quickly (Kim, Kang &Hwang, 2011).

According to Kelly, (2009), to reduce the duration of the project, it is necessary to concentrate on reducing the critical path. The critical path as the shortest time that the project can be completed, An attempt to shorten noncritical tasks would be ineffective, as this will not allow the project to be completed any sooner .In order to reduce the time estimate and save time on the project, there will almost certainly be a requirement to increase resources. This will allow the project to finish more quickly but will result in a cost increase. Therefore a project manager who is looking for different ways to achieve this, the most obvious way is to work out which activity can be speeded up at least cost, and then crash (i.e., reduce the overall activity duration) that one first, followed by the next cheapest, and so on (Kelly, 2009). As a compression technique, crashing concentrates on the project schedule in an effort to accelerate the project's completion date. Some examples of crashing include the following: over-time, allocating additional resources to specific activities, hiring additional resources and so forth (Kelly, 2009). Therefore, companies recognize the advantage of meeting the market's demands before its competitors. Most of the time, the first company that introduces a product in the market is the one that that results with a competitive advantage in terms of market share and profit margins. This represents a very high incentive for companies to try to reduce the overall duration of projects (Pedro, 2014). Understanding the nature and the effect of these techniques and the effects of the organizations' efforts to shorten the project execution time is very useful for the industries as well as for academia (Pedro, 2014).

4. Research Methodology

In this study a descriptive research design was adopted and a case study conducted. Purposive sampling technique applied to choose the sample. The target population was 64 comprised of project managers and project team in Airtel Rwanda Company working in Kigali province. Different groups were form the entire population as indicated in the following table 1.1.

Table 1: Target Population

Type of groups	Study Population
Project managers	7
Female project team member	17
Male project team member	40
Total	64

In this study both qualitative and quantitative data were collected and the study used the questionnaire to collect the data. The questionnaire was developed an organized on the basis of the research objectives to ensure the relevance to the research problem and used as primary instrument for data collection. The questionnaire instrument was composed of questions in sections where the first section the respondents were requested to fill in his or her background about him or her and company whereas the remaining five sections consisted of variables which the researcher intended to research on. The questionnaire instrument used in this research was standardized instrument. The questionnaires administrated to the respondents in hand and after being filled, the researcher collected them for analysis. . Moreover, the validity of the data instrument for this study were checked for correct content and formatting of this study instruments to confirm with the theoretical framework.

The primary data collected has been sorted, edited, coded and analyzed. Data editing as a process of examining the collected raw data to detect any errors and omissions and to correct them when possible. Filled or answered questionnaires had been checked to ensure that all answers given were coherently and were be logically recorded to provide sufficient information. The purpose of coding was to classify the answer to a question into meaningful categories so as to bring out their essential pattern, after coding, tabulation was used to analyze data. The most popular software used in research is Statistical Package for Social Scientists (SPSS) which was used in this research for data entry. After data or responses entered into computer, the next step was data presentation, data was summarized or condensed so that there could be analysis. The researcher also analyzed the data to get statistical measures. These analyses helped the researcher make valid inferences about the topic under study. Inferential statistics were done to determine the degree of association between the variables. The study adopted the following linear model Y= a0+b1X1 where Y is project success and X1 is project schedule crashing respectively. a0, bi are constant and coefficients for independent variables respectively.

5. Results and Findings

This research analyzed an overview of project managers and team members on the influence of project schedule crashing technique on project success at execution project phase in Airtel Rwanda Company.

The influence of schedule crashing on project success
Methods used for shortening the project time

Table 2: Methods used for shortening the project time

	Frequency	Percent
Adding Resources	40	63%
Scheduling Overtime	32	50%
Outsourcing Project Work	29	45%

Source: Primary data, 2018

The definition of Crashing was generated to respondents as a process of accelerating a project in order to reach an early completion date, the respondents were asked to choose one or more methods they have used for shortening the project time. The result showed that the three methods proposed to the respondents are used to shorten the project time as following: adding Resources 63%, Scheduling Overtime 50% and Outsourcing Project Work 45%. These indicated that the company knew the different ways of Crashing the project time in order to deliver the project product before or to the time agreed with the customer and also to satisfy the customer.

Advantages of the use of Project schedule crashing

Table 3: Advantages the use of Project schedule crashing

	Frequency	Percent
Meeting the market's demands before its competitors.	47	73%
Be the first company that introduces a product in the market	45	70%
Simplification of work gaining a competitive advantage in terms of market share	43	67%
Gaining a competitive advantage in terms of profit margins	44	69%

Source: Primary data, 2018

The respondents were requested to rank one or more role of the use of Project schedule crashing to a company. The result showed that the respondents ranked the role of the use of project schedule crashing as the following: meeting the market's demands before its competitors 73%, be the first company that introduces a product in the market 70%, simplification of work gaining a competitive advantage in terms of market share 67% and gaining a competitive advantage in terms of profit margins 69%. It could be the fact that the project schedule crashing is important to the project to be delivered on time with the specifications, quality and also to satisfy the client satisfaction.

Times respondents have used schedule crashing

Table 4: Times respondents have used schedule crashing

	Frequency	Percent
1 time	9	14%
2 times	20	31%
Below 5 times	30	47%
More than 10times	5	8%
Total	64	100%

Source: Primary data, 2018

In accordance with the times respondents have used schedule crashing, the study revealed that most of the respondents had used Schedule crashing below 5 times. As shown in Table 4.8, 47% of the respondents indicated that they have used Schedule crashing technique below 5 times. This could be an indicator that this project execution technique was good and useful and the respondents continued to use schedule crashing technique to ensure the project time controlled and the project were delivered on time.

The extent to which respondents agreed on the statements on the influence of project schedule crashing on project success.

Table 5: The statements on the influence of project schedule crashing on project success

	Strongly disagree	Disagree	Moderate	Agree	Strongly agree
Project manager can achieve a substantial reduction in the project's execution time without compromising quality.	0	0	27%	59%	14%
Most of the time, the first company that introduces a product in the market is the one that have a competitive advantage in terms of market share and profit margins.	0	0	23%	64%	14%
In order to reduce the time estimate and save time on the project, there will almost certainly be a requirement to increase resources.	0	0	27%	61%	14%

Source: Primary data, 2018

The researcher also sought to establish the extent to which the respondents agreed with different statements on the influence of Schedule crashing on project success. As it is shown in table 4.8, the study found that 27% of respondents moderate agreed, 59% agreed and 14% strongly agreed that project manager can achieve a substantial reduction in the project's execution time without compromising quality. 23% of respondents moderate agreed, 64% agreed and 14% strongly agreed that Most of the time, the first company that introduces a product in the market is the one that that results with a competitive advantage in terms of market share and profit margins. 27% of respondents moderate agreed, 61 % agreed and 14% strongly agreed that in order to reduce the time estimate and save time on the project, there were almost certainly be a requirement to increase resources. It could conclude that the use of project Schedule crashing to reduce the project execution time and adding resources could led to the project completion before or on time, to deliver the project product with quality and also to satisfy the client.

Correlation between Project Schedule Crashing and Project Success

The researcher computed the Pearson correlation coefficient for project schedule crashing and project success. The value of Pearson correlation coefficient was found to be 0.68 at 0.001 level of significance. This is an indication that there is a strong positive association between project schedule crashing and project success. It implies that as the frequency of project schedule crashing increases the project success

chances also improves. This result is shown in the below table.

Table 6: Correlation between Project Schedule Crashing and Project Success

		Project Schedule Crashing	Project Success
Project Schedule Crashing	Pearsons Correlation	1	.680**
	Sig. (2-tailed)		0.001
	N	64	64
Project Success	Pearsons Correlation	.680**	1
	Sig. (2-tailed)	0.001	
	N	64	64

Source: researcher 2018

Regression analysis

The researcher was interested in finding the magnitude of change of the project success due to changes in the project schedule crashing as the independent variable in addition to the strength and direction of association between the variables. Moreover, this analysis helps in completing the linear model presented in research methodology by replacing the coefficients. The analysis involved computation of model summary, ANOVA and coefficients. The findings and discussions are presented in the below tables.

Table 7: Model Summary

Model	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.547	0.514	0.32785

Source: Primary Data, 2018

The model summary table above shows that R square value is 0.547 equivalent to 54.7%. This implies that project execution techniques explain 54.7% of the variations in project success other factors influencing project success explaining the remaining 45.3%. This shows how important project Schedule crashing is to project success.

Table 8: ANOVA

Model		Sum of Squares	df	F	Sig.
1	Regression	51.675	3	75.185	.000a
	Residual	23.356	95		
	Total	75.031	98		

Source: Primary Data, 2018

The Analysis of Variance shows the appropriateness of the model used to link the dependent variable and the independent variables. The ANOVA table presented above indicates that F statistics value is 75.185 which is fairly high and the significance value is 0.000. This implies that linear regression model fit and it is very appropriate in explaining the relationship between project Schedule crashing and project success.

Table 9: Model Coefficients

Model		Unstandardized Coefficients		t	Sig.
		B	Std. Error		
	(Constant)	0.312	0.152	0.118	0
	Project schedule crashing	0.163	0.087	7.68	0.011

Dependent Variable: Project Success
Source: Primary Data, 2018

The beta coefficients table above shows that the constant term has a coefficient of 0.312 and a significance of 0.000. The coefficient of independent variable in this study which is project schedule crashing is 0.163 and corresponding significance values of 0.01. The linear model fit in research methodology now becomes; Y= 0.312+0.163X1+εI. From this information, 1 % change in project schedule crashing results into 16.3% change in project success respectively keeping other factors constant. Therefore, there is a positive significant influence of project executions techniques captured in this study on project success.

6. Discussion of Findings

The study established that 63% of respondents indicated that they had used project schedule crashing by adding resources to cash project time. The study also established that 59% of respondents agreed that project manager can achieve a substantial reduction in the project's execution time without compromising quality. Additionally, the study high Pearson correlation coefficient of 0.680 and significant beta coefficient of 0.163. The result showed that 73% of respondents indicated that the role of the use of project Schedule crashing as meeting the market's demands before its competitors, 70% of respondents indicated that the role of the use of project schedule crashing was to be the first company that introduces a product in the market 67%, of respondents indicated that the role of the use of project schedule crashing was the simplification of work gaining a competitive advantage in terms of market share and 69% of respondents indicated that the role of the use of project schedule crashing was to gain the competitive advantage in terms of profit margins. It could be the fact that the project schedule crashing is important to the project to be delivered on time with the specifications, quality and also to satisfy the client satisfaction.

The study revealed 47% of respondents indicated that majority of the respondents had used schedule crashing below 5 times, 31% of respondents indicated that most of the respondents had used schedule crashing twice, 14% of respondents indicated that most of the respondents had used schedule crashing once, and 8% of respondents indicated that most of the respondents had used schedule crashing more than 10 times. This could be an indicator that this project execution technique was good and useful and the respondents continued to use schedule crashing technique to ensure the project time controlled and the project were delivered on time. The results established the extent to which the respondents agreed with different statements on the influence of Schedule crashing on project success. The study found that 27% of respondents' moderate agreed, 59% agreed and 14% strongly agreed that project manager can achieve a substantial reduction in the project's execution time without compromising quality. 23% of respondents' moderate agreed, 64% agreed and 14% strongly agreed that Most of the time, the first company that introduces a product in the market is the one that that results with a competitive advantage in terms of market share and profit margins. 27% of respondents' moderate agreed, 61 % agreed and 14% strongly agreed that in order to reduce the time estimate and save time on the project, there were almost certainly be a requirement to increase resources. Adding resources could

led to the project completion before or on time, to deliver the project product with quality and also to satisfy the client, therefore, with 1 % change in project schedule crashing results into 16.3% change in project success respectively keeping other factors constant, it could conclude that there is a positive significant influence of project executions techniques captured in this study on project success.

7. Conclusion and Recommendations

The study sought to establish the influence of schedule crashing technique on project success at Airtel Rwanda. The results established that majority of project managers and project team members agreed that project manager can achieve a substantial reduction in the project's execution time without compromising quality, they agreed that most of the time, the first company that introduces a product in the market is the one that that results with a competitive advantage in terms of market share and profit margins and they agreed that in order to reduce the time estimate and save time on the project, there was almost certainly be a requirement to increase resources. It could conclude that the use of project Schedule crashing to reduce the project execution time and adding resources could led to the project completion before or on time, to deliver the project product with quality and also to satisfy the client. This influenced the success of telecom projects.

This study recommends project managers and team members to adopt project execution techniques to ensure the effective project implementation and to enhance project success. The study recommends the further researches of the influence of other project techniques in project execution phases.

References

[1] Evensmo, J. and Karlsen, J.T. (2008), "Looking for the source-where do crash costs come from?" Cost Engineering, Vol. 50 No. 7, pp. 20-23.
[2] Ezeldin, A.S. and Soliman, A. (2009), "Hybrid time-cost optimization of non-serial repetitive construction projects", ASCE, *Journal of Construction Engineering and Management*, Vol. 135 No. 1, pp. 42-55.
[3] Fred, C. L. (2011). Goal-Setting Theory of Motivation. *International journal of Management, Business, and Administration.* Vol 15, n1.
[4] Ludovico, F. & Petrarca, F. (2010). Extreme project management in teleco industry. Paper presented at PMI® Global Congress 2010—EMEA, Milan, Italy. Newtown Square, PA: Project Management Institute.
[5] Kelly, É. V. (2009). Crash with confidence. Paper presented at PMI® Global Congress. North America, Orlando, FL. Newtown Square, PA: Project Management Institute.
[6] Kim, J., Kang, C., &Hwang, I. (2011). A practical approach to project scheduling: considering the potential quality loss cost in the time–cost tradeoff problem. Retrieved from https://www.sciencedirect.com/science/article/pii/S0263786311000676.
[7] Karaman.H, Reza.D &Janaka. R. (2011). Optimization of Activity Crashing and Overlapping in Schedule Compression. Retrieved from https://www.researchgate.net/publication/282016363.
[8] MBOK Guide (PMI, 2013). A guide to the project management body of knowledge. PA, US: Project Management Institute.
[9] Memon, H. A., Rahman, I. A., Abdullah, M. R., Azis, A. A. A. (2011). Assessing the Effects of Construction Delays on MARA Large Projects. International Conference on Advanced Science, Engineering and Information Technology.
[10] Najib, G., Nabil, S and Joe, R. (2014). Crash: an automated tool for schedule crashing, *International Journal of Science, Environment and Technology*, Vol. 3, No 2, 2014, 374 – 394.
[11] Moselhi, O. (1993), "Schedule compression using the direct stiffness method", *Canadian Journal of Civil Engineering*, Vol. 20, pp. 65-72.
[12] Osama,M., & Nazila.E. (2013). Project schedule compression: a multi-objective methodology. *Construction Innovation*. Vol. 13 No. 4, pp. 374-393
[13] Pedro, J. (2014). Shortening the execution time in projects: a state-of-the-art survey.
[14] Project Perfect (2011). Project Management Software Specialists in Project Infrastructure. Retrieved from https:// www.projectperfect.com.
[15] ProProfs. (2016). The Importance of Goal Setting. Retrieved from https://www.proprofs.com
[16] Rwanda ICT Sector Profile. (2012), Measuring ICT sector performance and Tracking ICT for Development (ICT4D) towards Rwanda Socio-Economic Transformation"
[17] Watt, A., & Bpayne (2012). Project Management Overview retrieved from https://opentextbc.ca/projectmanagement/chapter/chapter-17-project-implementation-overview-project-management.
[18] Yang, I.T. (2005), "Impact of budget uncertainty on project time-cost tradeoff", IEEE *Transactions, Engineering Management*, Vol. 52 No. 2, pp. 167-174.
[19] Zeynep, T.S., Sbla, N.G. & Özalp, V.(2014). Theory of Constraints: A Literature Review. Procedia – Social and Behavioral Sciences .Retrieved from https://ac.els-cdn.com/S1877042814051532/1-s2.0-S1877042814051532-main.pdf