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*Original Article*

### Views of the Kenyan Construction Industry Players Regarding the Impact of Resource Planning and Leveling on Construction Project Performance

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The successful completion and performance of a construction process is pegged on three basic performance parameters which have evolved to be regarded as the three pillars of any successful construction project. These include finishing the project within budget and schedule without compromising on the desired quality. It is however important to note that these factors are all affected by the level of resource management within the project. Questionnaires were used to collect both quantitative and qualitative data from contractors who were chosen randomly. Out of 106 questionnaires distributed, 81 were received back by the researcher. This represented a response rate of 76%. An overwhelming majority of contractors in the country shared a similar opinion that Resource Planning and Leveling (RP&L) contributes to reduced cost of a project, reduced completion period of a project and improved quality of a project. This means that RP&L generally contributes to the improved performance of construction projects. Qualitative data obtained from open-ended questions were analysed thematically. A total of 97 possible solutions were suggested by respondents as solutions to overcoming challenges associated with RP&L. These solutions were grouped into a number of themes namely: technical (52%); financial, (3%); resource management, (7%); project planning and control, (14%); top management involvement, (7%); communication, (3%) and others, (13%). 98% of the contractors suggested that RP&L was a contributor to project success. The remaining 2% claimed that it could both be a contributor and hindrance depending on how it was carried out. Contractors proposed different ways in which RP&L could contribute to project success. These were also analysed thematically under the following topical areas: scope management (6%); schedule management (28%); cost management (14%); quality management (3%); integration management (1%); stakeholder management (1%); risk management (7%); resource management (23%) and others (16%).

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## INTRODUCTION

The successful completion and performance of a construction process is pegged on three basic performance parameters which have evolved to be regarded as the three pillars of any successful construction project. These include finishing the project within budget and schedule without compromising on the desired quality. It is however important to note that these factors are all affected by the level of resource management within the project.

Every construction project requires resources such as labour, finances, equipment, management and supervision among others. While resource planning involves assigning these resources to the various departments and sections of work, resource leveling is concerned with ensuring that a fairly constant amount of each resource is maintained on-site during project execution. Proper resource planning requires knowledge of available resources and the anticipation of the resources that will be acquired within the course of the project and those that will no longer be available for use.

Who stands to benefit from proper RP&L? Resources benefit the most because they get to

avoid problems such as over-allocation and becoming overwhelmed. The contractor can also avoid delays that are as a result of poor allocations. They can also identify and utilize unused times. Clients also get value for their money in the sense that they get good quality of work at a desired cost and at a reasonable time period.

## LITERATURE REVIEW

According to Masu, (2006) and cited by Lamka, Githae and Diang'a (2015), construction project performance is determined by the scale of completion of a project within the original set contract sum, the set standards, the contract duration, client satisfaction and environmental sustainability. Saqib, Farooqui and Lodi, (2008) classify project critical factors into seven broad categories: Project Management Factors; Client-related Factors; Procurement-related Factors; Contractor-related factors; Project Manager-related Factors; Design team-related Factors; and Business and Work Environment-related Factors. Out of these categories, 77 factors are enumerated by the authors. Some of the Client-Related factors identified in this research include Influence of client/ client's representative; Client's experience;

Client’s knowledge of construction project organization; Client’s emphasis of quick construction; Client’s emphasis on low construction cost; Client’s project management and Client’s confidence in construction team.

According to Shenhar, Levy and Dvir (1997), as cited by Chan (2001), there are four dimensions of project success: Project efficiency; Impact on customers; Business success and Preparing for the future. Atkinson, (1999) instead talks about two dimensions: Delivery Stage (which includes cost, time, quality and efficiency) and Post Delivery Stage (which includes Impact on customer and business success). Lim and Mohamed (1999) group project success indicators into two broad categories: Micro Viewpoint (time, cost, quality, performance and safety) and Macro Viewpoint (time, satisfaction, utility and operation).

According to Egan (1998) and as cited by Takim and Akintoye (2002), the following have been identified as the key indicators of project success; Construction cost, Construction time, Defects, Client satisfaction (product), Client satisfaction (service), Profitability, Productivity, Safety, Cost predictability (construction), Time predictability (construction), Cost predictability (design) and Time predictability (design).

**METHODOLOGY**

Questionnaires were used to collect both quantitative and qualitative data from contractors who were chosen randomly. Out of 106 questionnaires distributed, 81 were received back by the researcher. This represented a response rate of 76%. Quantitative data were analysed using IBM SPSS Statistics which is a piece of software that takes in raw data and combines them into new statistics that can be used as predictors (Griffith, 2010). To avoid instances where the software generates incorrect analysis, the researcher ensured that the correct data was fed into the system. Qualitative data on the other hand was analysed thematically.

**DATA ANALYSIS AND DISCUSSION**

**Effect of RP&L on Construction Project Performance**

Three aspects of construction project performance were considered in this research; cost, duration and quality.

*Effect of RP&L on Cost of a Project.*

Respondents were asked to indicate to what extent RP&L contributed to the reduced cost of a project. The results were tabulated below.

**Table 1: Effect of RP&L on Cost of a Project (Frequencies)**

		Frequency	Percent	Valid Percent	Cumulative Percent
<b>Valid</b>	<b>Moderate</b>	4	4.9	5.0	5.0
	<b>High</b>	34	42.0	42.5	47.5
	<b>Very High</b>	42	51.9	52.5	100.0
	<b>Total</b>	80	98.8	100.0	
<b>Missing</b>	<b>System</b>	1	1.2		
<b>Total</b>		81	100.0		

*Source: (Author, 2016)*

From Table 1 above, when respondents were asked to rate the extent to which they thought RP&L contributed to the reduced cost of a project, 5.0% responded “Moderate”, 42.5%, “High”, and 52.5%,

“Very High”. These responses produced a mean of 4.48 as indicated in Table 2 below. It is clear from this that an overwhelming majority of contractors in

the country share a similar opinion that RP&L contributes to the reduced cost of a project.

**Table 2: Effect of RP&L on Cost of a Project (Mean)**

	N	Minimum	Maximum	Mean	Std. Deviation
Reduced project cost	80	3	5	4.48	.595

*Source: (Author, 2016)*

As discussed in the literature review, project cost is one of the parameters used to measure project performance. The reduced cost of a project translates to improved project performance.

#### *Effect of RP&L on Duration of a Project.*

From table 3 below, when respondents were asked to indicate to what extent RP&L contributed to the

reduced completion period of a project, 15.0% responded “Moderate”, 40.0%, “High”, and 45.0%, “Very High”. These responses produced a mean of 4.30 as indicated in Table 4. It is clear from these results that the majority of contractors in the country are of the opinion that RP&L (RP&L) contributes to the reduced completion period of a project.

**Table 3: Effect of RP&L on Duration of a Project (Frequencies)**

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Moderate	12	14.8	15.0	15.0
	High	32	39.5	40.0	55.0
	Very High	36	44.4	45.0	100.0
	Total	80	98.8	100.0	
Missing	System	1	1.2		
Total		81	100.0		

*Source: (Author, 2016)*

**Table 4: Effect of RP&L on Duration of a Project (Mean)**

	N	Min	Max	Mean	Std. Deviation
Reduced completion period	80	3	5	4.30	.719

*Source: (Author, 2016)*

#### *Effect of RP&L on Quality of a Project.*

Respondents were asked to indicate to what extent RP&L contributed to the improved quality of a project. The results were tabulated below.

**Table 5: Effect of RP&L on Quality of a Project (Frequencies)**

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	None	1	1.2	1.3	1.3
	Moderate	9	11.1	11.3	12.5
	High	43	53.1	53.8	66.3
	Very High	27	33.3	33.8	100.0

		Frequency	Percent	Valid Percent	Cumulative Percent
	<b>Total</b>	80	98.8	100.0	
<b>Missing</b>	<b>System</b>	1	1.2		
<b>Total</b>		81	100.0		

*Source: (Author, 2016)*

**Table 6: Effect of RP&L on Quality of a Project (Mean)**

	N	Min	Max	Mean	Std. Deviation
<b>Improved project quality</b>	80	1	5	4.19	.731

*Source: (Author, 2016)*

From Table 5 above, when respondents were asked to rate the extent to which they thought RP&L contributed to improved quality of a project, 1.3% responded “None”, 11.3%, “Moderate”, 53.8%, “High”, and 33.8%, “Very High”. These responses produced a mean of 4.19 as indicated in Table 6 above. It is clear from these results that most contractors in the country share a similar opinion that RP&L contributes to the improved quality of a project.

#### ***Effect of RP&L on Overall Performance of a Project.***

Atkinson (1999) and Lim and Mohamed (1999) agree that cost, time and quality are the three most important success indicators of construction projects. When both reduced project time and cost are achieved without compromising on the quality of the works, the project is said to be a success.

**Table 7: Effect of RP&L on Overall Project Performance**

Items	Mean	Min	Max	Range	Variance	N
Reduced project cost; Reduced completion period; Improved project quality	4.321	4.18	4.47	0.288	0.021	3

*Source: (Author, 2016)*

Results above (Table 7) therefore indicate that when contractors practised RP&L in their respective projects, there was improved performance.

#### **Is RP&L a contributor or hindrance to project success?**

When respondents were asked to give their opinion on whether RP&L was a contributor or hindrance to project success, 98% of them supported the idea that RP&L was a contributor to project success. The remaining 2% claimed that it was both a contributor and hindrance depending on how much emphasis is paid to the process. Respondents with this opinion claimed that too much emphasis on RP&L may have a negative impact on the project. Projects always take a life of their own so the adaptability of the

plans should keep up. They also argued that implementing a strict resource-leveling plan on-site may cause working conditions to be too constrained for project success. This argument has been supported by Love (2008) by asserting that investing in planning activities beyond an optimum point results in an increase in overall project costs.

Respondents were also asked to explain how RP&L contributed or hindered project success. 69 reasons were given to support the fact that RP&L contributes to project success. These factors were analysed thematically under the following project aspects.

***Scope management factors***

Scope management involves ensuring all the client requirements are met as stipulated in the project brief and that there is no deviation from such. Factors listed under this category included: a clear definition of project path with respect to resources; it defines the most efficient procedural process to adapt so as to deliver a project successfully; it helps stick to the project scope and it clearly outlines the scopes and timelines thus helping avoid overstretching or under stretching the project's scope.

***Schedule management factors***

Schedule management is concerned with ensuring that the project is completed on time. Factors raised by respondents and related to schedule management include: it helps develop a large scope of plan for work activities ahead of time hence resources can be planned for in advance hence reducing delays; enhances timely completion of projects by ensuring less or no delays in details or material delivery; resource leveling is a major contributor to project success as it ensures all activities and events and milestones are met within the specified time limits; helps avoid overrun in time and also straining of resources; required manpower and equipment is determined at an early stage thus reducing waste of time.

Other factors included: resource leveling is a contributor to project success through the development of stable and efficient use and distribution of resources over project time; it provides a framework through which the project will complete using the least available resources and in the shortest time possible; helps the project manager avoid delays caused by bad allocations; helps the project manager identify and take advantage of unused times by analysing task dependencies; brings scheduling flexibility; availability of resources at the required times ensures smooth flow of work; it reduces project

delays thus minimising contract disputes between client and contractor, and lastly it helps define clear timelines for successful completion of any project.

***Cost management factors***

Cost management-related factors included: enhances proper allocation of labour and equipment hence cutting down the cost of production; given the method minimizes resource fluctuations, it's therefore cost-effective; by better and efficient use of resources which will bring a financial saving and easy workflow for the contractor and eventually the client; and reduced wastage of materials.

***Quality management factors***

Respondents claimed that very high improved workmanship in conjunction with proper supervision and that RP&L contributes to project success by ensuring better quality of work.

***Integration management factors***

RP&L ensures that each employee is aware of their role thus enabling smooth coordination of the project.

***Stakeholder management factors***

Resource leveling contributes to a project's success by enabling top management to avail enough funds for a given period in order to achieve targets for certificate application.

***Risk management factors***

Risk management associated factors included: Forecasting hence identification of probable risks; it's a contributor to project success, for the simple reason that planning reduces uncertainty or helps mitigate the effect of risks of delays or lack of resources. Moreover, when resources are unplanned, project execution is largely left to the idiosyncrasies of individual managers with real potential of detrimental effect. It also contributes to success by foretelling likely problems to be

encountered thereby enabling the management to prepare well; further, it's a contributor to project success since a project manager is able to identify risks and resolve them earlier, hence the project will be complete on time as per the initial schedule.

### **Resource management factors**

RP&L enables improved resource management through reduced wastage of resources; with resource leveling, a project utilizes resources allocated to a maximum; it also reduces downtime; it also enables the project manager to track labour depending on the clustered tasks at hand; it ensures that resources are available at the required time for project use; by carrying out resource leveling, maximum utilization of available resources is achieved, reducing wastage and maintaining the allocated budget; helps in balancing skilled labour, the material being delivered in time and ensuring machines are in good condition; it enables proper planning of resources, minimizes waste and idle resources and enable optimization of available resources.

Other resource management related factors include: it helps make the most of available resources thus ensuring utilization of resources consistently throughout the project; identifies project resource gap according to resource numbers, skills and work hours; creates a realistic estimation of your project resource needs; help in avoiding overutilization/underutilisation of specific resources; it ensures optimal allocation of resources to the tasks at hand and thus avoiding wastage (idle labour/plant); when resources are well planned, they are available at the right time, right quantity minimizing wastage and extra costs, right type, quality hence leading to success; it increases efficiency when undertaking the project by utilizing the available resources to the maximum and lastly RP&L helps avoid straining of resources.

### **Others**

Factors grouped under this category included: it enhances efficiency and improve delivery in a project; creates competence within the project; acts as an enhancer and tracker to project resources ensuring balanced and effective flow to success; helps in the management of cash flow & prioritization of critical path deliverables; a very important tool for contract administration; a contributor due to higher level of organization and allocation of resources; and it ensures any unforeseen challenges can be corrected through fast-tracking, crashing or increasing labour among other methods to level the resources

### **CONCLUSION**

Contractors in the Kenyan construction industry support the idea that increased RP&L contributes to reduced cost of a project, reduced completion period of a project and improved quality of a project. Contractors are in consensus that RP&L contributes to the overall success of construction projects not only in the three main aspects of projects namely; time, cost and quality but also other dimensions such as scope management, integration management, stakeholder management, risk management, resource management among others.

### **REFERENCES**

- Atkinson. (1999). Project management: cost, time and quality, two best guesses and a phenomenon, it's time to accept other success criteria. *International Journal of Project Management*, 17(6), 337–342.
- Chan, A. (2001). Framework for measuring success of construction projects, 1–21.
- Egan, J. (1998). *Rethinking construction: report of the construction task force on the scope for improving the quality and efficiency of UK construction*. London.

Griffith, A. (2010). *SPSS For Dummies, 2nd Edition* (2nd ed.). Indianapolis: Wiley Publishing Inc.

Lamka, A., Githae, W., & Diang'a, S. (2015). *Investigation of factors influencing construction site labour productivity in Nairobi County, Kenya*. Jomo Kenyatta University of Agriculture and Technology.

Lim, C., & Mohamed, M. (1999). Criteria of Project Success: an exploratory reexamination. *International Journal of Project Management*, 17(4), 243–248.

Love, P. E. D. (2008). Risk Management Model for International Construction Joint Ventures, 9364(November 2016), 2008. [http://doi.org/10.1061/\(ASCE\)0733-9364\(1999\)125](http://doi.org/10.1061/(ASCE)0733-9364(1999)125)

Masu, S. (2006). *An Investigation into the causes and impact of Resource mix practices on the performance of construction firms in Kenya*. University of Nairobi.

Saqib, M., Farooqui, R. U., & Lodi, S. H. (2008). Assessment of Critical Success Factors for Construction Projects in Pakistan. *First International Conference on Construction In Developing Countries (ICCIDC-I) "Advancing and Integrating Construction Education, Research & Practice,"* 392–404.

Shenhar, Levy, & Dvir. (1997). Mapping the Dimensions of Project Success. *Project Management Journal*, 5–13.

Takim, R., & Akintoye, A. (2002). Performance Indicators for Successful Construction Project Performance. *Association of Researchers in Construction Management*, 2(September), 2–4.