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Project Material Management and Performance of Construction Projects: A Case of Pitrad Ibamba Ltd in Kigali City, Rwanda

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Abstract

The study aimed to determines the role of material management in the performance of construction projects in Rwanda. The study used two theories, the theory of constraints and the theory of change. The study found that accurate material planning is important for the performance of construction projects. The study also found that the cost of storing materials and the standard of transport mechanisms have a significant impact on the performance of construction projects. The study recommends that contractors adopt best management practices, such as giving enough and professional figures of labor and materials, using detailed cost estimation, and using adequate bidding documents. The study also concluded that contractors focus on issues that impact cost management, involve experts in cost estimation, and renew staff members through in-service training, refresher courses, and workshops on cost management systems. The study recommends that there is a need for in-service training and capacity building for construction management of material in Rwanda. Further studies are needed to establish the efficiency of these mechanisms for managing construction projects.

Keywords: *Project Material Management, Performance, Construction Projects, Pitrad Ibamba Ltd, Kigali City*

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1.1 Background of the Study

From a global perspective, material management concerns the planning and control of all essential efforts to ensure that materials and equipment of the correct quality and quantity are appropriately specified and procured at reasonable costs, and are available when needed (Barry, Leite & O'Brien, 2014). Material management plays a crucial role in the success of construction projects, as the outcome of every project relies on having proper resources such as materials, labor, plants, and equipment delivered to the site at the right time. Without proper material management in construction projects, there may be delays, cost overruns, construction waste, and low productivity. The impact of material management needs to be explored to gain better insight and understanding towards improving project performance through effective material management (Ezhimathi & Shanmugapriya, 2016). According to Ezhimathi and Shanmugapriya (2016), material management is a vital function in the productivity of projects. Material management strategies involve scientific techniques for planning, organizing, and controlling materials from their initial purchase to destination. In the construction industry, project costs often increase primarily due to inappropriate material management. Therefore, project planning, project scheduling, and project budgeting are significant aspects of material management.

Construction projects are some of the most common and challenging human endeavors. Each project involves sophisticated and complex processes that require the skills and knowledge of various professionals (Shehu, Holt, Endut & Akintoye, 2015). Mac-Barango (2017) states that material management provides an integrated system approach to the coordination of material activities and the total material costs. Thus, one of the objectives of material management is to ensure that the right item is in the right place at the right time, at a reasonable cost. Material management practice involves people, organizations, technology, and procedures used to effectively identify, quantify, acquire, expedite, inspect, transport, receive, store, and preserve materials, equipment, and associated items throughout the life cycle of capital projects. Nowadays, management and designers are mainly concerned with cost control, often without emphasis on material management measures (Caldas, 2015).

According to Whyte, Isaac and Lilly (2018), material management is a coordinating function responsible for planning and controlling material flow, maximizing the use of the firm's resources, and providing the required level of customer service. It can significantly improve a company's profit. Material management consists of activities related to planning, requisitioning, storage of input material and work in progress, and their conversion into units delivered to the client. From a regional perspective, project material management practices involve procedures that coordinate planning, assessing requirements, sourcing, purchasing, transportation, storage, and control of materials, minimizing waste and optimizing profitability by reducing the cost of materials (Saidu & Shakantu, 2016). Muleya and Kamalondo (2017) argue that construction material management comprises reduction in the amount and environmental impact of material waste, generally by reducing the material consumed in the project. Therefore, material management is an integrated process of designing, constructing new structures, or remodeling existing ones using materials more effectively and efficiently, significantly contributing to the performance of the construction industry.

Rwanda, as a member of the East Africa Community, procures construction materials from other member states. There is intense competition within the region; for instance, cement from Uganda

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is a significant competitor for Rwandan cement manufacturers. According to the Ministry of Trade and Industry Report (MINICOM, 2018), among the competitors, local companies constitute 57%, Chinese companies represent 29%, and Indian granite industries account for 14%. The challenges in competition mainly arise from a lack of machinery to improve the quality and quantity of materials, which contributes to 40% of output, limited market access (20%), and low prices offered by competitors (20%). The construction sector in Rwanda is growing rapidly, while construction materials make up a substantial cost element in the delivery of construction projects. The cost of materials and related management costs vary between 50% and 70% of the total construction costs, depending on the type of project (Patil & Pataskar, 2013). Material management in the construction sector in Rwanda faces more impediments than other sectors of the economy, owing to the unique nature of each project. Several conflicting parties are involved, and project material management is constrained by time, money, quality, and high risks (MINICOM, 2018).

1.2 Problem Statement

In Africa, the construction companies more specifically in Kenya, Nairobi County suffer from several instances of project failure attributed to the poor material management. Project delays occur due to the transport delays, material damage due to poor storage facilities, poor initial planning and also inadequate purchasing procedures which bring about stoppage of work due to material shortage, surplus material on site and inadequate storage space for materials (Mac-Barango, 2017). Kioko (2014), poor material management technique in some construction projects have crucial impact on projects implementation in the fact that it leads to increase of abandoned projects resulting from increased projects costs and timelines which are unviable in the long run.

The incomplete project in the construction sector pose a great risk to the livelihoods of the society considering that some have collapsed resulting into the loss of lives and property. Poor material handling and mismanagement and transport material problems all these lead to poor performance of construction projects (Mac-Barango, 2017). Based on the current study, construction projects in Rwanda more specifically in Pitrad Ibamba Ltd encounter problems related to poor planning, unreliable transport, poor storage, and poor purchasing power leading to abandoned projects. The overall effects of poor material attributes significantly lead to increased time, costs overruns, and poor quality of projects. At worst of the contracted projects in can also lead to protracted legal battles and arbitration due to costs, time overruns and bad quality of projects. It is for this reason researcher intends to assess the role of material management and performance of construction projects in Rwanda, with a case study of Pitrad ibambaLtd.

1.3 Objectives of the Study

i. To determine the role of project material planning on performance of construction projects of Pitrad ibamba Ltd in Rwanda
ii. To assess the effect of project material storage on performance of construction projects of Pitrad ibamba Ltd in Rwanda
iii. To assess the contribution of material transport facilities on performance of construction projects of Pitrad ibamba Ltd in Rwanda

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2.0 Review of Related Literature

2.1 Empirical literature review

2.1.1 Project material Plan and Construction performance

A study conducted by Khandve (2015), in India to assess the effects of material estimation cost using qualitative approach. The study revealed that material estimation cost lead to the adequacy and effectiveness of service provision. The study also put more emphasis on material plan and high level of productivity and profitability of the company. A study conducted by Lewis, Cheetham and Carter (2019), in London was about to determine role of material management planning and the performance of manufacturing companies. The study used a descriptive study design and questionnaire was distributed among 164 respondents. A simple random sampling technique was used. The study identified that half of sales income in affirm is spent on materials. Therefore, a firm is spending 50% of its volume on materials and the profit is say 10% of sales volume. The 2% reduction in material cost boosts the profit to 11% of sales or the profit increased by 10%. To achieve the increase in profit through sales efforts, 10% increase in sales volume would be necessary.

A study conducted by Assaf and Al-Hejji (2016) in Swiss explored the impact of financial planning upon project success in the construction industry. The study used a descriptive survey design and concentrated Swedish initiatives. Education, culture and financial standing remain the factors influencing the project management methodologies and approaches. On the other hand, several middle level managers lack authority due to the fact that they are in charge of certain area over which they have decision making authority. several building firms are more flat with middle management wielding significant power. A study conducted by Akpan and Chizea (2018), in Nigeria was about to show the determinants of time planning system in the construction firms. The study used census sampling techniques and questionnaire and interview was used to collect data. In this study, 84 respondents participated in research completion. The study revealed that time planning necessitates to the sensible evaluation of the actual implementation with standard that are pre-established and if implementation is different from the conventional objectives/goals then the corrective action is enforced immediately.

Another study showed that Whyte, Isaac and Lilly (2018) conducted a study to assess the effect of material planning on performance through a survey designed of selected construction firms. The study used cross-sectional research design and data were collected using questionnaire. Thus, census sampling technique was used to select the respondents. The study targeted construction projects not completed in time in London. Thus, the study revealed that the project management primary objective is to meet otherwise surpasses the material usage sponsors anticipation of the project.

2.1.2 Project material storage and construction performance

The study conducted by Gulghane and Khandve (2015) was about the assessment of role of material storage and is effect on the construction industry. The study used a descriptive study designing both qualitative and quantitative approaches. In this study, a simple random sampling technique was used and the information was collected among 188 respondents. In this study, research findings revealed that the general pertaining issues of material storage remain poor is

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most of construction industries in Nigeria due to inability of ordering materials on time and this led to delay in project implementation, low level of ordering, inadequate materials or stealing material. A study conducted by Assafand and Al-Hejji (2016), in assessed various voids arising from the absence of proper material managements on construction site. The study was carried out in Ahmedabad in which researcher focused on material management storage strategies to be used.

The study used a descriptive research design and both quantitative and qualitative approach was used. A simple random sampling technique was used the study findings revealed that since each step was managed the voids could be avoided this was strongly agreed by 80% of respondents and 16% of respondents also agreed. The study argued that team coordination between site and the organization, proper control tracking, and monitoring of the system, awareness and accountability, efficient management information system will end in better results. A field survey conducted by Jonathan and Ernest (2020), in Nigeria showed that the sustainable material management is an integrated approach towards the reduction of the material wastage during construction in order to increase cost profitability, material optimization, and environmental protection. In this study a descriptive research design was used and questionnaire as well as interview was used to collect data. As indicated 85% of construction industry minimize costs of material waste and increase the profit margin at 10%.

Thus, the study argued that from the planning and storage phase of the building to the selection of materials and disposal of waste during building production, the adoption of life cycle analysis improves the chance of achieving the goals of construction sustainability. Another study conducted by Kerzner (2019), reiterates that cost estimation lead to the effective forecasting relying on the availability of information. The study used a descriptive study design and data were collected using both questionnaire and interview. In this study, stratified random sampling technique was used. The study states that the effects of organization conditions and project success puts more focus on data collection, project managers and project experts. The study concludes that organization, critical success factors and dependencies as well as storage practices influence the performance of construction project.

2.1.3 Project material transportation and construction performance

A study conducted by Bekr (2018), showed that described that improper material management transportation on the increased cost throughout construction project. The study used a descriptive research design and 261 respondents were assessed using questionnaire. In this study 99.5% of respondents confirmed that efficient and effective management of materials resulted in considerable saving in project costs which brought about increased saving by 25% from 2015 to 2017. Materials may deteriorate in stare or get stolen if special attention is not taken. Therefore, delays or additional cost may be sustained if materials required for particular works are not available.

A survey conducted by the study conducted by Saidu and Shakantu (2016) in USA about the issue of project success criteria in manufacturing industry, revealed that project success is influenced by project programmers, project managers. The emphasis in this study is the cost of transportation to minimize the profitability of construction industry. In addition, it revealed that scope criterion is considered to be of utmost importance for project success. Based on the nature and geographic area of Rwanda, researcher raise the gap related to inappropriate decision making between project

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planners and implementers which leads to less outcome. In addition, changes in macro and micro environment affect project success. Therefore, all these form the criticisms as they were not mentioned by previous researchers.

2.2 Theoretical framework

2.2.1 Theory of change (ToC)

According to Shehu *et al*., (2015) theory of change emerged in 1990s as the enhancement of the then evaluation theory. This theory is considered as the tool for creating solutions to complex social problem. The uniqueness of this theory is in distinguishing between desired and actual outcome. The theory of change requires stakeholders to model their desired outcome before they decide on the form of intervention that are needed in order to achieve the outcome. Modeling is what turns out to be capacity building so that the stakeholders may be able to decide the internationalist mechanism. The theory of change is taken as tool of thinking through the step from the situation to the goal because it determines the inter-relationship between project activities as decomposed in construction work structure and outcome in the sense of project performance for the case of current study. Theory of change has been raised from the project theory and evaluation in order to effectively develop thought that inspire construction project performance and innovation in social and political change (Paina & Wilkinson, 2017). The implication of this theory to the current study is that there must be trainings of stakeholders for change to take place and the researcher argued that the right atmosphere in the form of capacity building must be created for expected change to take place in the construction industry, the right practice of material management must be adopted in order to achieve the construction project performance.

2.4.2 Theory of constraints (ToC)

The theory of constraints was developed by Mac-Barango (2017) in his novel well known as the Goal and this theory kept evolving but its structural foundation is based on the philosophical of management best practice as a management tool which emphasizes on the organization WBS to enhance project performance. The application of theory of constraints in the construction project is important in the sense that material management is not only view as tool for performance of construction projects rather for promoting the efficiency of planning, storage, and transportation However, theory of constraints goes further as the way of solving problem inherent in project that are preventing project from achieving more of its goals (Clarisen, 2021). The theory of constraints is guided in the beliefs of existence of at least one constraint that manifests as an obstacles and weakest point in each application of work construction structure to require material management practices. The theory of constraints in project management focuses on planning of activities, effective resource allocation which improves technology that allows increase in project performance against schedule, time, scope and quality of the project.

2.4.3 Theory of lean construction

This theory was established by Muleya and Kamalondo (2017) and focus on the issues and techniques to provide solution in the construction industry. The theory affords a look on procedures that are used in the construction industry to attain adequacy and success of construction industry. The implication of lean construction is that it is used to maximize the value and minimizes the waste based on specific techniques of the project delivery.

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2.3 Conceptual Framework

This conceptual framework illustrates how the relevant variables (independent and dependent) for this study relate to each other.

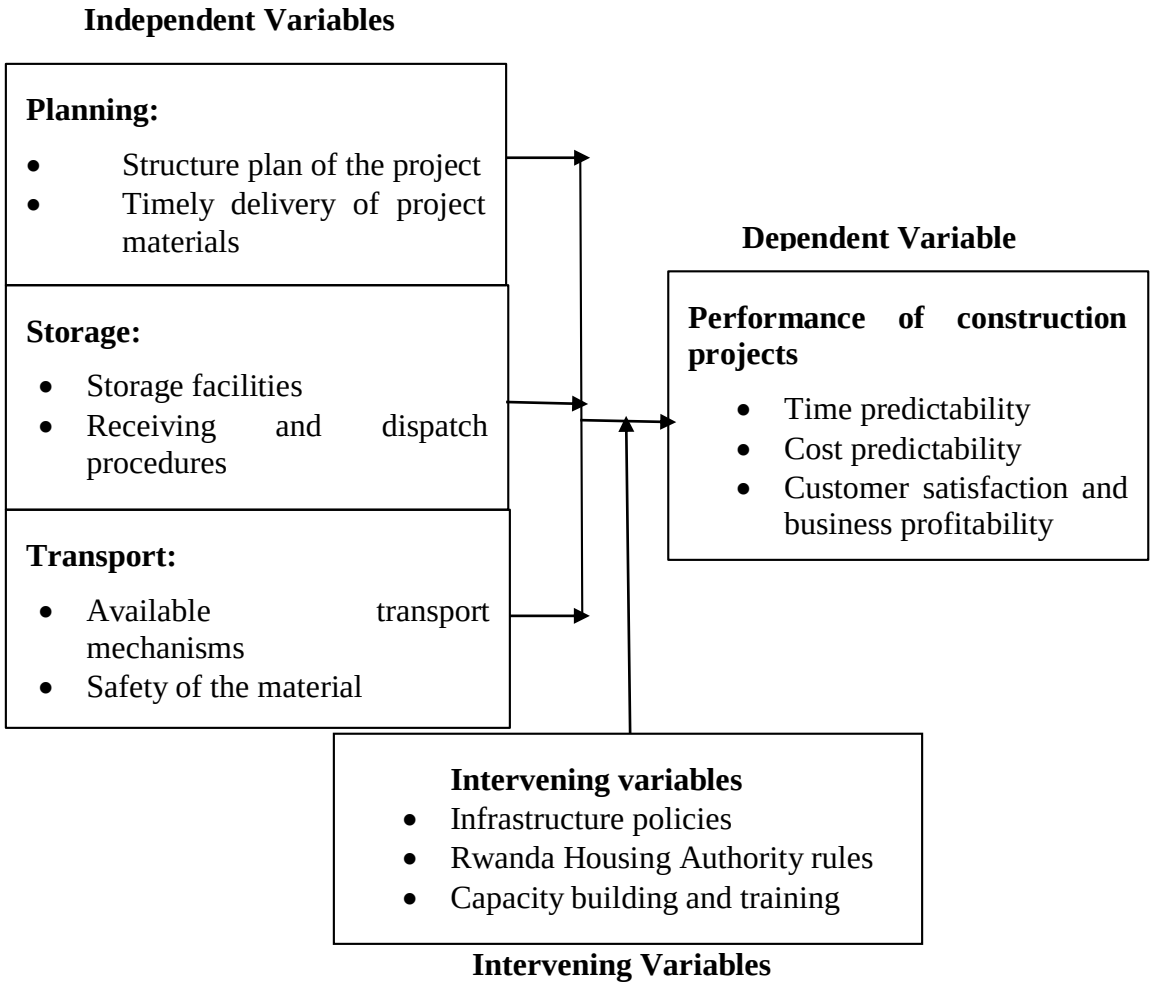

Figure 1: Conceptual Framework

3.0 Research Methodology

Both quantitative and qualitative approaches were used to analyze the relationship and effects through correlation and regression. The target respondents included 171 construction company managers, construction company assistant managers and lower-level construction company employees such as those from the headquarters of the construction company in Kigali and community leaders. The study sample size was 120 respondents. The study used a questionnaire and interview guide to collect data. The qualitative data analysis based on assessing opinions of research participants in the form of quote during focus group discussion about the subject. The

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quantitative data analysis was based on descriptive statistics related numerical provided in terms of percentage, mean and standard deviation for the statements reflecting the research objectives.

4.0 Discussion of Findings

The researcher gave questionnaires to 120 respondents in Petrad Ibamba Ltd. out of 120 questionnaires distributed all 120 were adequately completed and collected. The returned questionnaire revealed a response rate of 100.0% that is suitable and relevant for analyzing information.

4.1 Descriptive results

4.1.1 Level of Performance for Construction Project at Pitrad Ibamba Ltd

This sub-section discusses various the level of Performance for construction project at Pitrad Ibamba Ltd. These include time predictability, cost predictability, customer satisfaction and business profitability. The study further sought to determine whether the level of performance for the project have been improved.

Table 1: Level of Performance

	Strongly Disagree		Disagree		Not Sure		Agree		Strongly Agree		Total		
Statements	**N**	**%**	**N**	**%**	**N**	**%**	**N**	**%**	**N**	**%**	**N**	**Mean**	**Sd**
Time predictability	83	69.3	27	22.2	8	7.2	2	1.3	0	0.0	120	4.0	1.2
Cost predictability	0	0	25	13.0	0	0.0	78	39.9	93	47.1	120	3.7	1.5
Customer satisfaction and business profitability	0	0	5	2.6	0	0.0	93	47.7	97	49.7	120	3.6	1.0

The study similarly established that time predictability has been improved at Pitrad ibamba Ltd. The study also established that project time schedule is clearly improved and project are completed on time at Pitrad ibamba Ltd, 47.1% of respondents strongly agreed and 39.9% agreed that cost predictability exist. In this regards, 47.7% and 49.7% of respondents respectively agreed and strongly agree with the Customer satisfaction and business profitability is highly adopted at Pitrad ibamba Ltd. The findings concur with the study carried out the suitability of equipment also necessitates being in appropriate environment and adequate quantity.

4.1.2 Project Material Planning and Performance of Pitrad Ibamba Project in Rwanda

This section presents and information on the Role of project material planning on performance of construction projects of Pitrad ibamba Ltd in Rwanda. In this regards, material cost estimation refers to the examination of the predictable cost of any construction project. The adequacy of this estimation had a clear impact on desired gain of the construction contractor. Therefore, some unforeseen event may be more to the basic estimation to enhance the degree of confidence, this premium is influenced by different factors. These indicators are planning strategy is important for

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material management in the construction, an accurate planning of materials contribute to the performance of construction industry, the poor planning strategy led to the delay of the project delivery, clear developed plan contributed to the performance of construction project, and a revised plan is made to achieve the construct project performance.

Table 2: Project Material Planning Practices

	Disagree		Not Sure		Agree		Total		
Statements	**N**	**%**	**N**	**%**	**N**	**%**	**N**	**Mean**	**Std.D**
The planning strategy is important for material management in the construction	24	20.1	23	19.2	73	60.7	120	3.8	1.5
An accurate planning of materials contribute to the performance of construction industry	38	31.3	6	5.1	76	63.6	120	3.4	1.5
The poor planning strategy led to the delay of the project delivery	15	12.7	12	10.2	93	77.1	120	4.1	1.2
Clear developed plan contributed to the performance of construction project	36	30.2	8	6.6	76	63.2	120	2.8	1.7
A revised plan is made to achieve the construct project performance	15	12.2	9	7.8	96	80.0	120	3.8	1.6

The project manager or stakeholders begin with the provision of initial material cost estimation known as feasibility study. Results evidenced that 60.7%, a mean of 3.8, std equal to 1.5 agreed with the importance of planning strategy for material management in the construction. Moreover, 77.1% of respondents, with a mean of 4.1, standard deviation of 1.2 evidenced that at Petrad Ibamba Ltd, they used to accurate planning of materials contribute to the performance of construction industry.

In addition, results show that 63.2% of respondents with a mean of 2.8 and standard deviation of 1.7 evidenced that Petrad Ibamba Ltd with the poor planning strategy led to the delay of the project delivery. Findings show that 80.0%, with the mean of 3.8, std equal to 1.6 indicated that the Petrad Ibamba Ltd used to clear developed plan contributed to the performance of construction project. A revised plan is made to achieve the construct project performance.

Qualitative data was collected from key informants to deepen the analysis. In This regards, the researcher perform interview with the managing director of Petrad Ibamba Ltd. The managing director focused on actual possible strategies used in construction industry, with client expecting a better service and project that meet their requirements more. The director

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says "in *material planning for our construction projects, we have adopted adequate strategies including the important for material management in the construction, an accurate planning of materials contribute to the performance of construction industry, the poor planning strategy led to the delay of the project delivery, clear developed plan contributed to the performance of construction project, and a revised plan is made to achieve the construct project performance"*. This information did not contradict the findings from ordinal respondents in quantitative data.

Table 3: Regression Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	**Std. Error**	**Beta**	**t**	**Sig.**
1	(Constant)	3.588	.449		7.994	.000
	Important Planning strategy	.002	.072	.002	.026	.979
	An accurate material planning	.015	.063	.014	.240	.810
	The revised strategy led to the project delivery delay	.025	.063	.024	.405	.686
	Clear developed plan	.036	.061	.035	.591	.555

Information given in Table 3 coefficients of material planning variables r-size effect of the performance of construction project. The study findings felt that the important planning strategy affecting time predictability (n=-0.002; p-value=0.979). In addition, an accurate material planning is insignificantly affecting the time predictability (b=.014; p-value=0.810). However, the revised strategy led to the project delivery delay is insignificant linked with time predictability (b=0.024; p-value=0.686). Finally, the clear developed plan is insignificant associated with Time predictability (b=-0.035; p-value=0.555). This means that any change in the application of project material planning practices did not produce automatically produce a change in the time predictability at Pitrad Ibamba Ltd in Rwanda.

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Table 4: Regression Coefficients between Material Planning Practices and Cost Predictability

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std.Error	Beta	t	Sig.
1	(Constant)	4.682	.360		13.001	.000
	Important Planning strategy	.047	.058	.046	.802	.423
	An accurate material planning	.172	.050	.199	3.419	.001
	The revised strategy led to the project delivery delay	.030	.050	.034	.596	.551
	Clear developed plan	.031	.049	.037	.639	.523

Information provided in Table 4 shows regression coefficients of material planning variables in explaining cost predictability. The study findings felt that the important planning strategy is insignificant affecting cost predictability (b=0.046; p value=0.423). Moreover, an accurate material planning is insignificant linked with cost predictability (b=0.034; p-value=0.551). Meanwhile, the revised strategy led to the project delivery delay is insignificant associated with cost predictability (b=0.037; p-value=0.551). Finally, clear developed plan is significantly affecting the cost predictability to beneficiaries (b=0.199; p-value=0.001). The study could be acknowledged to be relevant to demonstrate the way in which project material planning affect the level of project success.

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Table 5: Regression Coefficients Material Planning of Project Communication and Cost

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	3.90	.376		10.591	.000
	Important Planning strategy	.011	.061	.011	.183	.855
	An accurate material planning	.042	.052	.048	.804	.422
	The revised strategy led to the project delivery delay	.013	.053	.015	.257	.798
	Clear developed plan	.004	.051	.005	.078	.938

The findings given in Table 4.8 demonstrated the regression coefficients of material planning variables in explaining customer satisfaction and business profitability. It demonstrated that important planning strategy is insignificant affecting customer satisfaction and business profitability (b=0.011; p value=0.855). Furthermore, an accurate material planning is insignificant in customer satisfaction and business profitability (b=0.048; sig=0.422). In the same context, the revised strategy led to the project delivery delay is insignificant in affecting customer satisfaction and business profitability (b=.015; p value=0.798). Finally, clear developed plan is insignificant in affecting customer satisfaction and business profitability (b=0.005; p-value=0.938). It implies that variation in material planning did not product any Customer satisfaction and business profitability.

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Table 6: Storage of Material Practices and Increase of Time predictability

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	3.449	.400		8.626	.000
	Suitable costs of storage	.037	.057	.038	.657	.512
	Changes in material storage costs	.143	.059	.140	2.412	.016
	A desired value of storage costs	.166	.070	.138	2.364	.019
	Improvement in storage cost	.039	.063	.035	.608	.543

Information presented in Table 6 demonstrated that suitable costs of storage was insignificantly affecting the time predictability (b=-0.038; p-value=0.512). The means that a variation in changes in material storage costs did not significantly affect the time predictability and the vice versa. Results show that a desired value of storage costs was significantly affecting the time predictability (b=0.140; p-value=0.-016). Since the p-value was < 0.05, meaning that a change in storage affect significantly the time predictability. Furthermore, results on improvement in storage cost felt that it is significantly affecting the time predictability (b=0.138; p-value=0.019). Therefore, the study denoted that improvement in storage cost significant affect time predictability and the vice versa. Finally, improvement in storage cost are insignificantly affecting the time predictability (b=0.035; p-value=0.0543.

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Table 7: Storage of Material Practices and Cost predictability

Model		Unstandardized Coefficients		Standardized Coefficients		
		B		Beta	t	Sig.
1	(Constant)	3.449	.400		8.626	.000
	Suitable costs of storage	.037	.057	.038	.657	.512
	Changes in material storage costs	.143	.059	.140	2.412	.016
	A desired value of storage costs	.166	.070	.138	2.364	.019
	Improvement in storage cost	.039	.063	.035	.608	.543

Data presented in Table 7, evidenced that Suitable costs of storage was significantly affecting cost predictability (b=0.038; p value=-0.038). This means that a change in changes in material storage costs affect significantly cost predictability and the vice versa. Results show that a desired value of storage costs affects significantly cost predictability (b=0.140; p-value=0.016). Since the p-value was < 0.05, meaning that a change in a desired value of storage costs affect significantly cost predictability. Moreover, results on improvement in storage felt that it is significantly affecting the cost predictability (b=0.138; p value=0.019). Therefore, it denoted that changes in material storage costs significant affect the cost predictability and the vice versa. Finally, a desired value of storage costs was insignificantly affecting the Cost predictability (b=.035; p value=0.543). The study findings imply that a variation in improvement in storage cost did not affect the Cost predictability and the vice versa.

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Table 8: Storage of Material Practices and Customer Satisfaction and Business Profitability

Model		Unstandardized Coefficients		Standardised Coefficients		
		B	Std.Error	Beta	t	Sig.
1	(Constant)	4.126	.333		12.383	.000
	Suitable costs of storage	.010	.048	.013	.214	.830
	Changes in material storage costs	.068	.049	.081	1.372	.171
	A desired value of storage costs	.034	.058	.035	.587	.558
	Improvement in storage cost	.016	.053	.018	.299	.765

Results in Table 8 evidenced that suitable costs of storage was insignificantly affecting the customer satisfaction and business profitability (b=0.081; p value=0.171). This means that a change in changes in material storage costs significantly affect customer satisfaction and business profitability and the vice versa. Results show that a desired value of storage costs did not significantly affect customer satisfaction and business profitability (b=0.035; p-value=0.058). Since the p-value is <0.005, meaning that a change did not affect significantly efficient and customer satisfaction and business profitability. Moreover, results on improvement in storage felt that it is insignificantly affecting customer satisfaction and business profitability (b=0.35; p value=0.558). Therefore, it denoted that improvement in storage insignificant did not affect customer satisfaction and business profitability and the vice versa.

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Table 9: Transport of Material Practices and Time Predictability

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	2.737	.481		5.695	.000
	Poor transport of materials	.069	.070	.059	.997	.320
	Specified transport platform	-.041	.058	.043	.719	.473
	Standard of transport mechanisms	.097	.067	.085	1.445	.149
	Right quality of material transport	.026	.069	.023	.382	.703

Data from Table 9 related to control of transport of materials and time predictability indicated that poor transport of materials was insignificantly affecting the time predictability (b=0.059;p-value=0.320). Therefore, specified transport platform was insignificantly affecting the time predictability (b=-.043; p- value=0.473). Therefore, insignificant effect was found between standard of transport mechanisms and an increase of time predictability (b=.085; p-value=0.149) the right quality of material transport was insignificantly affecting the time predictability (b=0.023; p-value=0.703).

Table 10: Transport of material Practices and Cost predictability

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	4.888	.393		12.448	.000
	Poor transport of materials	.039	.057	.040	.678	.498
	Specified transport platform	.070	.047	.088	1.487	.138
	Standard of transport mechanisms	.108	.055	.115	1.973	.049
	Right quality of material transport	.024	.056	.025	.417	.677

Information given in Table 10 related to transport of materials and cost predictability indicated that poor transport of materials was insignificantly affecting cost predictability (b=0.040; p-value=0.498). Therefore, specified transport platform was insignificantly affecting cost predictability (b=0.088; p-value was 0.138). This information evidenced a positive relationship with the standard of transport mechanisms was cost predictability (b=0.115; p-value=0.049).

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Finally, the right quality of material transport is more likely to affect insignificantly cost predictability (b=0.025; p-value=0.677).

5.0 Conclusion

The study examines the effects of material planning, storage, and transport on the performance of construction projects at Petrad Ibamba Ltd. The study found that material planning is important for managing resources and reducing project delivery delays. Material storage can help to improve building quality and reduce costs. Material transport in the company did not meet the government's standards of reliability and integrity. The study concluded that material planning, storage, and transport are all important factors that can affect the performance of construction projects.

6.0 Recommendations for Future Studies

Reconsidering information analyzed in chapter four, it was compulsory to afford recommendation to management of Petrad Ibamba Ltd, and other construction firms on the way in which construction material management in Rwandan construction companies were boosted. There is a need of adopting the best management plans. Giving enough and professional figures of labor and adequate materials using detailed cost estimation and using adequate bidding documents. This study proposes that contractors focuses on issues that remarkably impact cost management, involvement of expert in cost estimation renewing staff members through in-service training, refresher course and involvement in workshops of cost management system. Construction sector may consider effects of developing ICT to systematize their cost information management systems. The research proposes the necessity to use material storage and information communication technology for attaining higher level of success and ameliorating the ultimate outcomes of site construction. There is a need to afford stuffiest in service training and capacity building for construction management of material in the country in order to have adequate site in construction.

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