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Abstract

The research aimed to scrutinize the contribution of project management knowledge areas on the performance of affordable housing projects in Rwanda, case of Kigali City. The specific objective of the study was to examine the contribution of project cost management, to find out the contribution of project risk management, and assess how project quality management contributes on the performance of affordable housing projects. Institutional theory, resource-based view and dynamic concept of formation of business knowledge were used in theoretical review. A sample of 93 respondents among 121 of total population was engaged. For data analysis, SPSS version 23 was used. The findings indicated that cost management, risk management and quality management can influence the performance of affordable housing projects. It was recommended that there should be housing for different categories of people and their status; if it is for single person, small family or large family. The City of Kigali should advocate for the benefit of beneficiaries to get access to finance from different financial institutions in order to facilitate them getting those affordable houses. The cost of housing should be considered but without forgetting their quality.

Keywords: *Project management knowledge area, performance, affordable housing projects*

1.0 introduction

Affordable housing are houses whose prices are reasonable to small income earners. At present, at least 60 percent of city inhabitants are hiring, referring to data from City of Kigali (CoK). Existing records indicate that City of Kigali had the population around 1.3 million in 2015 which is predictable to rise to three point eight million in 2040.

Affordability in housing markets is one of the most important problems fronting low-revenue families, due to the unceasing increase of construction expenses. It is designated by the relationship between the family income and the housing budget. It is essential to know that governments calculate the limits of income for affordable housing for those families with lower income (Moor, 2011). It is a rational quality reasonable to those people with lower earnings. It comprises various type of housing facility, each through its own suitability criteria for meeting diverse desires and jointly forms housing different requests and together forms a housing range (Ram & Needham, 2016). According to the Institute of Policy Analysis and Research-Rwanda (2018), affordable housing is a relationship between housing and people.

Offering suitable land and affordable housing for the large number of urban citizens is one of the strategies to solve the increase of informal house building. Kigali City's housing shortage is increasing regardless of a different strategy taken by the COK to solve the problem. According to PMI (2016), a knowledge area signifies a whole set of theories, terms and actions that make up a qualified field, project management field or area of specialization. This research intends to examine the importance of project management knowledge areas on the success of affordable housing projects implemented in Kigali City.

1.1 Problem statementBottom of Form

A large number of Kigali City's residents who need houses are those with low revenue who are not able to afford the prices of normal housing prices. At present, at least 60% of city inhabitants are renting, referring to data from City of Kigali (CoK). Existing records indicate that City of Kigali had the population around 1.3 million in 2015 which is predictable to rise to 3.8 million in 2040. As of the accessible Kigali housing market, it has been found that by 2022, the City of Kigali will need at least 344,068 dwelling units (DU), meaning that beyond 30,000 units might be built yearly to satisfy the housing request (Claude, 2016).

Figures from the CoK display that about 80% of city residents receive below Rwf300,000 monthly revenues. This makes renting high-end houses a misbelief to several of them. There is an increase house demand in Kigali where about forty-four thousand houses are needed between 2012 and 2022 meaning that an average of about 31 thousand units are needed yearly. The supply of houses per year is about 1,000 houses that leads to a deficit of 30,279 units yearly (Claude, 2016).

Housing affordability in 2021 became worse than previous years because of the pandemic Covid 2019 which caused the income of low and middle income generator to decrease. The number of severely unaffordable markets rose 60% and the affordability declined by nearly 2/3. The housing cost caused the cost of living also to deteriorate (Cox, 2021).

In Rwanda, based on the assessment of affordable housing sector done in 2019 by CAHF, Rwanda's housing landscape is dominated by households living in Umudugudu-rural viallges (49.2% of all households) and isolated rural housing (25.6%) and 8.9% in unplanned cluster housing, 12.6% in small urban settlements and 1.6% in modern planned areas. In Kigali, 79% live in unplanned urban settlements, and only 2.6% live in modern planned areas, 13.4 are in isolated rural housing and 2.7 in Umudugudu (CAHF, 2019).

2.0 Literature review

2.1 Empirical Literature

Citi Bank (2020) defines an affordable housing as a housing that the tenant (s) pay less or 30% of their revenue for gross housing prices, as well as utilities. Emmanuel (2016) used a mixed research method to explore the fundamental elements further than revenue that affect families to access decent and reasonably priced housing in Rwanda. In his study, he found that there is a great level political the commitment of city of Kigali in catering for housing problem in Kigali. The studied records indicated that housing and occupation situation in Rwanda is in circumstances that intensely require structural change in order to offer both decent and affordable housing to a great number of populations of City of Kigali. Due to the affordability difficulties, families prefer living in housing which does meet minimum principles of inhabitability which more gives increase to informal settlement (Emmanuel, 2016).

Storch (2016) said that Rwandans getting Rwf100,000 or Rwf300,000 monthly wage can just afford the inexpensive homes on the market that drive for Rwf10 million per unit while the main part of affordable houses on the market are amongst Rwf20 million and Rwf28 million for each. In Kigali, there are different sites of affordable housings. Those are: Niboye in Kicukiro District, Kabuga hillside housing and Masaka in Kicukiro District, Batsinda I& II in Gasabo District, Palm Estate in Kagugu, Gasabo District, Nyamirambo in Nyarugenge District, etc.

Project performance guarantees that the organization maximizes on success and minimizes the consequences of risks and uncertainties events in positions of realizing the project's goals (Kululanga & Kuotcha, 2010). According to Mohammed (2020), the basic components and criteria to measure project performance are cost, time, scope, quality and profitability as many organizations expect to earn returns on project invested capital. For Pinto and Slevin (1987), project performance is assessed through project cost, quality, users' satisfaction, and timelines and achieving project overall objective.

According to Project Management Institute (2016), a knowledge area is a recognized area of project management well-defined by its knowledge requirements described in terms of its constituent processes, practices, inputs, productions, tools and methods. Project Management Institute, identified 10 knowledge areas which are the following: project integration management, project scope management, project schedule management, project cost management, project quality management, project resource management, project communications management, project risk management, project procurement management and stakeholder management (PMI, 2016).

Project Management Institute (2016) states that the project managers should be talented in those project management knowledge areas. Project managers should apply his/her work experience, understanding and methodologies and abilities to manage the organization and the project. All these will help the project manager to achieve desired deliverables.

PMI, 2016 explains the project cost management as the practice concerning planning, appraising, budgeting, investing, financing, managing and, evaluating and monitoring costs in order to enable the project to be accomplished as it was planned and budgeted. According to Project Management Institute (2016), cost management plan involves describing the way project cost was appraised, budgeted, monitored. This procedure is very significant as it delivers leadership and guidance on the management of these project costs.

The second procedure of project cost management is appraising prices that develop the calculation of the financial resources desired to finish the work. There is a benefit on this

process where it defines the financial means necessary for the completion of the project. Through this process, cost baseline are also determined.

The last project cost management process is controlling costs where costs are monitored and changes are managed for the benefit of the project in order to be performed well. According to Project Management Institute (2016), the project is considered as a short-term endeavor, unique, in agreement with the organization's tactic and considered to create a product that has never been done through ought before. The objective of a project is to produce the output which is unknown and involves different risks.

For PMBOK (2016), project quality management comprises the process for integrating the business' quality policy concerning planning, managing and controlling project and product quality requirements for meeting stakeholders' objectives. This serves to support continuous process enhancement actions as undertaken on behalf of the acting business. The project quality management practices are: planning quality management, managing quality and controlling quality.

2.2 Theoretical framework

2.2.1 Institutional theory

Institutional theory is known as a common and potent explanation for both individual and business action. According to Dacin, Goodstein and Scott (2012), institutional theory is a vibrant theory that has been synthesized and differentiated with an amount of other approaches. Fogarty (1996) found that the institutional theory provides a rich and complex view of the organization and its processes, and seeks to explicate how they are shaped by processes within and external to the firm. Ideally, the Institutional Theory has also been named as the institutionalism and adaptation theory, based on the central notion that business contexts are characterized by amplification of norms and necessities that businesses have to approve and to obtain maintain and legality.

2.2.2 The resource based view theory

The resource-based view (RBV) is an outline of management used to establish the strategic assets a company can use to realize viable competitive advantage. For Barney (1991), resource-based view suggests that companies are mixed as they own mixed means, which means that organization might have diverse strategies as they have various resources. Since this theoretical framework, exporting organizations consist of varieties of assets and individuals that have skills.

2.2.3 Dynamic theory of organizational knowledge creation

Nonaka is a developer of a dynamic theory of business knowledge creation in 1994. The author wanted to propose standard for, managing the active features of business knowledge creating the process. Organizational knowledge creation of a firm is different from the formation of the knowledge a single person. This occurs when all the typed of knowledge formation are managed form a repeated series. The sequence is formed by sequences of modifications among various styles of knowledge transformation. different causes that persuade these modifications between various styles of knowledge transformation are noticed. The first one is the socialization method that generally begins with the creation of a term of field of collaboration. The field eases the allocation of members' experience and viewpoints. The second one is the externalization type which is activated by consecutive circles of significant discussion (Nonaka, 1994).

3.0 Methodology

The descriptive research design was used to analyze the contribution of project management knowledge areas on the success of affordable housing projects in Rwanda. A sample of 93 respondents among 121 of total population was engaged using a simple random sampling method. Data was collected through questionnaires and interview guide. SPSS version 23 was used to analyze data. After, followed the presentation, interpretation of research findings and finally there followed the summary of study findings, conclusions, recommendation and proposals.

4.0 Key results and findings

4.1 Response rate

From a number of 93 of intended respondents all of them responded to questionnaires and none was given back being empty. This means that 93 questionnaires were responded at the response rate of 100% as shown by the following table 1 of response rate.

Table 1: Response rate

Questionnaires	Returned questionnaires	Responded questionnaires	Response rate
93	0	93	100%

4.2 Demographic data

4.1.2 Education level

Respondents questioned have different education level from primary school, secondary, bachelor's degree and masters. The findings present the following results according to the following table 2.

Table 2: Educational level

		Frequency	Valid Percent	Cumulative Percent
Valid	Secondary	37	39.8	39.8
	Diploma	12	12.9	52.7
	Bachelor's	29	31.2	83.9
	Masters	15	16.1	100.0
	Total	93	100.0	

Considering the above Table 2 above, 31.2% have a bachelor's degree, 39.8% have secondary school, 12.9% have diploma while 16.1% hold a masters' degree. Repondents questioned are composed by different categories; engineers, managers, investors, clients, etc. That is why their levels of education differ. However, some respondents meet in the same category. Nevertheless, staff are only found in those having Master's and Bachelor's degree even among investors or clients are some having those level of education.

4.2.2 Experience

Respondents have different experience. The following table 3 details.

Table 3: Experience

		Frequency	Valid Percent	Cumulative Percent
Valid	1-2 years	2	2.2	2.2
	3-5 years	68	73.1	75.3
	Over 5 years	23	24.7	100.0
Total		93	100.0	

According to the respondents' information, 2.2% have 1-2 experience, 73.1% of them have the experience between 3-5 years while 24.7% of them have over 5 years. As it is indicated in this table above, there are different levels of experience. This does not mean working in Kigali City as staff only, but also having any involvement in affordable housing projects, either investor, client, constructors, etc. When Kigali City started the project, some residents started also joining the project according to their capacity of income generation and interest in such houses. Different investors and partners also were involved, staff hired for this specific project. All those are found in the above experience indicated in this table.

4.3 Presentation of Findings

Respondents were asked to respond if they own houses in Kigali City, their range of monthly income, prices of houses they have, affordability of houses, the quality for different beneficiaries and factors of performance of affordable housing in Kigali City. Different answers were provided as illustrated in the following tables and details.

4.3.1 Owning a house in Kigali City

Table 4: Owning a house in Kigali City

		Frequency	Valid Percent	Cumulative Percent
Valid	Yes	29	31.2	31.2
	No	64	68.8	100.0
Total		93	100.0	

According to the table 4, a percentage of 31.2 of respondents have a house in Kigali City, while 68.8% do not have a house in Kigali City. There are different factors causing people not having houses in Kigali City. One of various causes is that it is not easy to have a house in Kigali City because of high price of houses and building costs. However, it is possible to get it if it has a bad quality and at a bad location, otherwise, the cost is high. Another factor is that the constructors or investors in the real state business target to earn high income. That is why some houses are found in different locations being unoccupied because of lack of purchasers.

Table 5: Is it easy to have a house in Kigali?

		Frequency	Valid Percent	Cumulative Percent
Valid	Yes	25	26.9	26.9
	No	68	73.1	100.0
Total		93	100.0	

The table 5 shows how it is difficult to have a house in Kigali City where 73.1% of respondents stated that it is not easy to have a house in Kigali City. Only, 26.9% agreed that it is easy to get a house in Kigali City. Even the Government of Rwanda worked together with commercial banks to facilitate beneficiaries to get affordable housing easily, interest rate charged by those banks is so high and this cause those beneficiaries to fear requesting loans to buy affordable houses. Some residents prefer to build their houses themselves instead of purchasing built houses called affordable. What is noticed is that the cost of construction is so high and this leads the residents preferring renting instead of building.

4.3.2 Range of monthly salary or income

Table 6: Range of monthly salary or income

		Frequency	Valid Percent	Cumulative Percent
Valid	Under 100,000	14	15.1	15.1
	100,001-300,000	37	39.8	54.8
	300,001-500,000	14	15.1	69.9
	500,001-800,000	3	3.2	73.1
	Above 1 million	5	5.4	78.5
	Unemployed	20	21.5	100.0
Total		93	100.0	

The population of Kigali City is composed by different kind of people. Some of them have jobs generating monthly income or salaries while others do not have any job. Those are unemployed and are represented by a percentage of 21.5. For those who have monthly revenue, 15.1% have under Frw100,000, a percentage of 39.8 have between Frw100,001 and 300,000, a percentage of 15.1 earn between 300,000 and 500,000 while 3.2% are ranged between 500,001 and 800,000 and 5.1% gain above one million.

4.3.3 Range of the cost houses

There are various ranges of houses in the City of Kigali as illustrated by the table 8. However, the ranges indicated are not exhaustive because there are even houses costing 100 million and above. In the research, prices assumed to be affordable were focused.

Table 7: Range of the cost of houses

		Frequency	Valid Percent	Cumulative Percent
Valid	Under 15,000,000	19	20.4	20.4
	Between 15 and 25 million	25 ₁₀	10.8	31.2
	Between 25 and 40 million	40 ₉	9.7	40.9
	Above 40 million	2	2.2	43.0
	None	53	57.0	100.0
Total		93	100.0	

The table 7 shows that 20.4% of respondents own houses costing under 15 million, 10.8% own houses ranged between 15 and 25 million, 9.7% agreed to have houses costing between 24 and 40 million, 2.2% own houses costing above 40 million, while 57% of respondents do not have any house in Kigali City; meaning that they rent houses to live in.

4.3.4 Housing affordability

The table 8 indicates the affordability of housing in Kigali City basing on the answers from respondents.

Table 8: Affordability

		Frequency	Valid Percent	Cumulative Percent
Valid	Yes	16	17.2	17.2
	No	77	82.8	100.0
Total		93	100.0	

This table 9 specifies that 82.8% of respondents are not agree with the affordability of housing in the City of Kigali. Only 17.2% gave a positive response. The percentage of negative response means that even those who have houses in Kigali agree that it is difficult to own houses in Kigali City through building or buying them.

4.3.4 Quality of affordable houses

In Kigali, affordable houses have different qualities according to the range of targeted beneficiaries material used and locations.

Table 9: Quality of affordable houses

	Have good quality	Low cost	Durability	Customer satisfaction
SD	29%	37.6%	26.9%	38.7%
D	12.9%	21.5%	15.1%	23.7%
N	25.8%	3.2%	1.1%	4.3%
A	17.2%	16.1%	25.8%	20.4%
SA	15.1%	21.5%	31.2%	12.9%
Mean	2.7634	2.6237	3.1935	2.4516
Std. Deviation	1.4249	1.6212	1.6501	1.4928

According to the table 9, in general, the quality of affordable houses is not good as indicated in the table that 15.1% are strongly agree and 17.2% are agree with the good quality of affordable houses while 29% are strongly disagree, 12.9% are disagree and 25.8% are neutral. For the cost of affordable houses, 37.6% of respondents are strongly disagree with the low cost of them, 21.5% are disagree, 3.2% are neutral, 16.1 are agree while 21.5 are strongly agree. Concerning the durability, 26.9% are strongly disagree, 15.1% are disagree, 1.1% are neutral, 25.8% are agree and 31.2% are strongly disagree. A percentage of 38.7 states to be strongly disagree with the customer satisfaction of affordable houses, 23.7% are disagree, 4.3% are neutral, 20.4% are agree while 12.9% are strongly agree.

4.4 Relationship between project management knowledge areas and performance of affordable housing projects

To establish the relationship between dependent and independent variables, regression analysis and correlation analysis were used.

Table 10: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Sig. F Change
1	.760 ^a	.578	.563	.24187	.000

This table 10 indicates that Pearson correlation coefficient r is 0.760 and the significance value P of 0.000 which is < 0.005 meaning that the study is reliable. $R=76\%$ shows a moderate positive correlation between project management knowledge areas and performance of affordable housing project.

Table 11: Regression coefficients

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.027	.369		2.787	.006
	CM	.270	.063	.347	4.311	.000
	RM	.134	.104	.125	1.296	.198
	QM	.375	.076	.450	4.971	.000

CM stands for Cost management, RM stands for Risk management, while QM is the quality management.

The regression formula used is $Y = \beta_0 + \beta_1X_1 + \beta_2X_2 + \beta_3X_3 + \dots + \beta_nX_n + \epsilon$ where:

Y = Performance of affordable housing project

B_0 = Constant

β_1, β_2 and β_3 = Regression coefficient

$\beta_1 - \beta_3$ = Intercept of independent variables

$X_1 - X_3$ =Independent variables

ϵ = Error term

CM stands for Cost management, RM stands for Risk management and QM for Quality management, the regression equation is $Y = 1.027 + 0.27CM + 0.134RM + 0.375QM$. This means

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that cost management contributes 27% to the performance of affordable housing projects, risk management contributes 13.4% while quality management contributes 37.5%.

Table 12: Correlation coefficients

		PAHP	CM	RM	QM
PAHP	Pearson Correlation	1	.589**	.589**	.668**
	Sig. (2-tailed)		.000	.000	.000
	N	93	93	93	93
CM	Pearson Correlation	.589**	1	.507**	.398**
	Sig. (2-tailed)	.000		.000	.000
	N	93	93	93	93
RM	Pearson Correlation	.589**	.507**	1	.643**
	Sig. (2-tailed)	.000	.000		.000
	N	93	93	93	93
QM	Pearson Correlation	.668**	.398**	.643**	1
	Sig. (2-tailed)	.000	.000	.000	

According to the table 4.16, a good connection among managing cost and the success of affordable housing projects is illustrated (0.589), a moderate correlation between risk management and the performance of affordable housing projects. (0.589) and a good association between quality management and the performance of affordable housing projects. (0.668).

5.0 Summary and Conclusion

The study found that the cost management influences the performance of affordable housing projects. Respondents strongly agreed that cost planning affects the performance of affordable housing projects, cost estimating and cost budgeting affect the performance of affordable housing projects. For cost financing they strongly agreed and for cost management it is strongly agreed to affect the performance of affordable housing projects. Respondents strongly agreed that cost controlling is a factor of affordable housing project.

The findings showed that risk management influences the performance of affordable housing project. The study found that respondents strongly agreed that quality planning, quality managing and quality control are factors of performance of affordable housing projects. This means that even quality of some affordable houses is not good, if it is planned, managed and controlled, it can influence the performance of affordable housing projects.

Even quality is influenced by the cost of building houses, the built houses must satisfy the needs of customers. That is why, companies involved in affordable housing construction have to create, implement, retain and constantly improve a quality management system, of those houses. In order to have a good quality, planning quality management, managing quality and controlling quality have to be applied.

6.0 Recommendations

The study recommended that investors and partners on affordable housing projects should think about the need and capacity of different beneficiaries while thinking about the type of building to construct. There should be housing for different categories of people and their status; if it is for single person, small family or large family. The City of Kigali should advocate for the benefit of beneficiaries to get access to finance from different financial institutions in order to

facilitate them getting those affordable houses. The cost of housing should be considered but without forgetting their quality.

The government has also to provide more incentives to investors and support them in order to reduce the total cost caused by the intention of increasing profit. The quota of imported construction materials has to be increased. VAT is another issue that must be considered because it is a significant barrier to affordability of many households wishing to purchase construction houses. Other research can be done by others by studying other factors that can influence the performance of affordable housing projects rather than project management knowledge areas. Difficulties faced by affordable housing projects during their implementation should be studied in the future.

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