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Performance Determinants of Force Account method of Contracting (The Case Of public Infrastructure Rehabilitation and Remodeling)

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ABSTRACT: Attaining value for money in construction projects is not an easy task as it involves many contributing variables that needs to be properly analyzed and reduced from the huge identified to attain the most essentially needed. Through questionnaire survey and factor analysis, this study describes the identified performance determinants of Force Account Method (FAM)including training, committed project committee, supply chain management and government support. The study has identified FAMto have a positive significant effect in increasing the project competitiveness to Local Less Construction Firm (LLCF)as a result of lowering thedomestic market working opportunity.

KEYWORDS: Force account Practice; Performance determinants of LLCF,Competitiveness, Community Infrastructure Development.

I. INTRODUCTION

The effectiveness and efficiency of the construction method(s) in the Construction Industry (CI) is assessed from its capability in attaining the projects' objectives. This involves finishing the project within the specified time (schedule) and cost (budget) while attaining value for money (VFM).Despite the ineffective practice and performance of the CI in Tanzania, the use of the force account method of contracting has to a large extent proved the significance practice, better performance and value for money in almost all public infrastructure rehabilitation and remodeling projects undertaken.

Tanzania among Least Developing Countries(LDC) with less and un-industrialized economy has established the long term plan to attain the middle income level by 2025 [1].The country has emphasized and invested in the development of the infrastructure and social services for social-economic development as the most important ingredient and catalyst towards attaining the vision. Ever since the new government under His Excellence Dr. John Pombe Joseph Magufuli took over in 2015, his government decision has always been using force account method of contracting in most of the public infrastructure development. The positive effects of the method has been witnessed not only through attaining the project's objectives, empowering economically to local "fund" as personal local builder as well as the public institutions which acts as consultants but also satisfying the client and society stakeholders through construction of quality social-economic infrastructures[2]. Despite the above, the method has reduced the working opportunity for local (private) and foreign firms hence facilitating the increased construction market opportunity competition. However, this study intends to analyze the determinants of FAM in attaining value for money and its effects in project competitiveness. Moreover, lack of literatures has necessitated undertaking this study for knowledge contribution.

II.LITERATURE SURVEY

(A) FORCE ACCOUNT METHOD PRACTICE

Despite its importance, very few studies have been undertaken to describe the concept and the importance of force account method of contracting in CI. This has resulted to a synonym such as agency work method, labor base work method and direct labor method. The Tanzania Public Procurement (Goods, Works, Non-Consultant Services and Disposal of Public Assets by Tender in clause *73. -(1)* states that, "*Force account is construction by the use of public or*

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semi-public agencies or departments concerned, where the public or semi-public agency has its own personnel and equipment". [3]noted force account as one of the construction method used in undertaking the procuring entity's work by the use of public or semi-public agencies together with entity's personnel and equipment owned.

Different LDC has been using FAM under different situations. While the Public Procurement Act (PPA,2004) of Sierra Leone introduced the force account method as a means of conducting procurement works by any of the procuring entities with self-supervision, while utilizing its own resources, the Public Procurement and Disposal of Public Assets Authority (PPDA,2003) of Uganda itemized force account as a mechanism and or a method of executing the work of procuring and disposing the equipment and personnel owned by the same entity or of any other entity but wherever no contractor is willing to undertake the works.

The justification of using force account method has been stated in the acts as in clause *(2) (a), (b) and (c) of* Tanzania Public Procurement (Goods, Works, Non-Consultant Services and Disposal of Public Assets by Tender that states that, *"the use of force account or direct labor may be justified where:" "(a) required works are small and scattered or in remote locations for which qualified construction firms are unlikely to tender at reasonable prices; (b) work is required to be carried out without disrupting ongoing operations; (c) risks of unavoidable work interruption are better borne by a procuring entity or public authority than by a contractor; or (d) there are emergencies needing prompt attention*".

Despite the above, there is still no justified and stated magnitude and quantity of the work to be identified as small, area extent and distance for remote location from peri-urban or urban which account for use of force account method.

Since 2015, Tanzanian government has been setting aside and providing funds for public infrastructure rehabilitation, remodeling and development of schools, hospitals, colleges, universities and public offices through FAM. As reported by ministry of education, the undertaken public infrastructures projects involving new construction, renovation and re-modelling of secondary schools, teachers training colleges as well as folk development colleges has proved to not only attaining value for money through quality social-economic infrastructure but also creating employment opportunities to local technical executors famously known as local "fundi" or builder and consultant.

The governments always use the technical engineering colleges and universities through their consultancy unit as the work consultant or supervisors. This has increasedincome to the institutions through the profit gained. Moreover, the procuring entity who acts as the client and project beneficiary involves in materials procurement through the quotation method. However, the method is adopted as it meets the objectives of not disrupting ongoing operations like studying, treatments for sick people and other office operations proceedings.Most of the public infrastructures including schools, colleges, hospitals, offices and many more in Tanzania were most built in 1960's while very few were increased in the past twenty years. The lack of periodic maintenance has resulted into dilapidation and hence creating the difficulty working environment to users

The commencement practice of either rehabilitation & renovation or development of new structure through force account method always originate from the government social-economic infrastructure development plan or as a result of request from beneficiary as a government institute upon financial availability from government or grants from donors. The framework below describes the force account working method processes. After the government sourcing the fund from its financial sources, the first step is to identify the prominent, capable and competent consultants in which by experience are the consultant units from the public colleges and or universities who negotiate and engage in conditional survey of the infrastructures to be rehabilitated.

Reports are submitted showing the nature of dilapidation accompanied with photo, the technical drawing for the proposed rehabilitation/remodeling/new construction to be done as well as the estimated budget showing the quantities and cost as per current market price. After cost analysis, the government negotiates with the consultant on consultation fee including all overhead costs to be incurred. Upon agreement the government together with consultant prepares, undertakes and supervises the training which is attended by members from: client (government), consultant and procuring entity (beneficiary or user of the project) of the intended projects

Supply chain normally starts after project team formation which consists of three committees to facilitate the following:

(a) Procurement: This deals with materials procurement through quotation method. Each item price is considered separately from the supply. This assists to obtain cheap materials from different supplies. i.e the supplier only supplies the agreed item at the reasonable market price.

(b) Receiving: The receiving committee plays a significant role of receiving and use the store receiving voucher (SRV) to keep the record, quantity verification, storing and uses the store issue voucher (SIV) for issuing the materials. However, the committee involves in keeping the stock and performing inventory whenever the need arises.

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(c) Construction: The construction committee acts as the in-charge of all committee involved in supervising all undertakings at the construction site. The consultant representatives are engaged in every committee so as to supervise, regulate, give directions, verify the proper procedure follow up, quality of the resources as well as general site management.

(B) Performance Determinants of Local Less Construction Firm

Local Less Construction Firm has attained low level of progress because of unsuccessfulperformancethat has resulted into poor quality of finished projects as compared to foreign firm performance[1].This situation has resulted into low market share of LLCF to domestic construction industry (CI) [2]. However,[3]noted the continuation of the foreign firms in attaining the competitive advantages over local firms as a result of dominating the domestic market. The same dominance has been suggested by (Edward and Miles, 1984) that "the large international construction firms have attained maximum performance dominance in LDC.

Different effort has been done to raise the CI performance that may increase their market share. Among the strategic efforts made includes establishment of different government agencies related to road and building construction, establishment and review of Public Procurement Act (PPA) with its regulations, establishment of Construction Industry Policy(CIP) of 2003(currently under review), expansion of training and contractors assistance fund(CAF), formation of government ministry concerned with construction [4] [8] [9]. Despite the efforts imposed, still there are prevailing challenges hindering the smooth performance of the CI [8]. The challenges includes: poverty, inadequate resources, poor use of available resources, inadequate capital, lack of competent human resource, lack of management skills, unsupportive government strategic policy and support [10].However,[1]pointed out that, the challenges facing LLCFalways causes the poor performance in terms of increase in project's cost with low value for money, extension of project time as well as attaining poor project quality.

Performance has been discussed under different heading including its measurement, efficiency, factors affecting, effective improvements as well as the determinants analysis of the firm performance. This paper considers the last mentioned heading as the basis of the study direction.

Any firm's management needs to thoroughly undertake its performanceassessment basing on its efficiency, productivity, and profitearned, employee as well as society and stakeholder's satisfaction in terms of goods and services produced. Despite the above, [11] noted that, the performance of the firm behaves as a complex phenomenon which needs many criteria set in order to characterize it.Generally, the good firm performance can be justified upon meeting the objectives set which intends to effectively and efficiently satisfy customers as compared to counterpart competitor [12]. The same was cemented by [13] that, the performance of the firms is attained through efficiency and effectiveness of the general undertakings.

Economical and organizational determinants have emerged as the most considerable determinants of the LLCF in LDC. While organization determinants are subjected to core competence, capability and knowledge and skills possessed by the human resource, organizational structure, strategic planning of the firm, motivation to employee, information management system[14]; the economic determinants always focuses on productivity and profitability, market share, size of the firm which include capital intensity and the total asset of the firm.[15][16].

(C) Competitiveness

The concept of competitiveness has not been understood by many of the construction industry practitioners despite its acceptable importance to them. [9][17] [18]Many researches have been undertaken and many publications have been done to find the comprehensive definition of competitiveness ever since it gained popularity both in business and in research, consequently making it as one of the hottest topic for researchers.

The global definition of competitiveness is "an aggressive willingness to compete or it is a degree to which an enterprise or a firm can, undertake free and fair market conditions, produces good and services which meet the test of international market while simultaneously maintaining and expanding real incomes over the long period of time [19]. This definition of competitiveness is economically related as it is much concerned with profitability of the firm as related to production in the industry rather than performance. This is supported by [20] that; competitiveness is considered as a management or economies concepts that is superior to economic indicators such as profitability, productivity or market shares which in reality does not support continuous performance improvements. [21]described the definition through the characteristics of competitiveness as a process that can be described as multi-defined, multi-

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measured, multi-layered, dependent, relative and dynamic.In attaining the definition to be adopted for this research, some of considerations in the definition need to be highlighted. While reflecting competitiveness basing on force account method, the companies as consultant will need to get sufficient profit on their technical investment, employees will need to experience high earning satisfaction while the clients will need to attain value for money through quality work for the sustainable social-economic development of the project.

Recently, Tanzanian government has put much attention to undertake its social-economic infrastructure project through force account method. The situation has reduced to a great extent the construction working opportunity. Many construction firms depended much entirely on public construction projects for their survivor. However, the use of force account has created undefined situation as quoted from one of the firm holder: "We have claimed for quite longer on the effects of this method, despite the employment it provides for local builder and its economic increment to them, still the government has decided to fully return the profit within itself through its institutes that act as consultants when using this force account method".[2]noted the method has given power to those who used to be powerless or have no control economically. Local builders who invested much of their energy but paid little by the contractors are currently having economic power control through direct negotiation with consultant with easy and prompt payment after work execution complete and satisfying value for money. Despite that, the method is believed to cause severe effects in projects competitiveness to local less construction firms.

III. METHODOLOGY

This study intends to use inductive approach as a result of lacking literatures, very little theory and very few studies conducted. The study will therefore be conducted from specific observations through tentative hypothesis to broader generalization. Fifteen (15) experienced construction industry practitioners were involved in identifying a set of performance determinant variables of force account method. Thereafter, the questionnaire survey method was used to present a full list covering all variables. A total of (150) questionnaires were distributed using purposive technique of non-probability sampling to study participants which involved government as client (20); consultant (30), Skilled labor (15), Project beneficiary (20); contractors (60) and other construction industry stake-holders (5). The respondents included the Engineer, Architects, Quantity surveyor, Estate managers, Doctors, Head of schools and Colleges/universities and Procurement officers. The first part of the questionnaire introduced the nature of the study and requested the respondents' demographic information. The second part comprised of listed variables in five point Likert scale (Strongly Disagree to Strongly Agree) intending the respondents to rank them in extent of their importance and effectiveness of performance determinants of force account in attaining value for money. The third part involved the effects of force account method to private firm's competitiveness in working market opportunity. The returned questionnaires comprised of (67.3%) equal to (101) questionnaire from government as clients (13), consultant (16), Local builder or labor (12), Projects beneficiary (14), contractors (41) and other construction industry stake-holders (5) were retuned. After data screening, nine (14) questionnaires were not clearly filled hence neglected, hence only87 questionnaires were used for data analysis. The responses from the data collected supported [22][23]that; viability data for analysis should attain at least 20% respondent of the distributed questionnaire. During data analysis, while frequency and percentage demonstrated the respondents' number, the mean portrayed the respondent's responses as per questionnaire.Partial list square structural equation modelling PLS-SEM) was used for checking the reliability and validity of data together with producing structural modelling that indicates the correlation between variables used.

Table 3 below shows respondents' demographic information. Frequency and percentage was used to show the response distribution. From the data collected, the statistics indicate that many respondents (83.9%) has more than ten years of experience in construction industry, more than 50% are university graduates from different universities while 35.6% are diploma holders working within the industry for many years with tangible experience. However, all respondent involved in this study have participated in theirrelevant position in exercising force account method of contracting. Generally, the characteristics of the respondents including education level, work experience, project beneficiary, and profession as well as being qualified stakeholders of the construction industry supported the correctness of data used in this study.

(A) Data Analysis Procedure

The first procedure involved identification of performance determinant variables from the group of 28 listed variables. After computing the mean and standard deviation, only variables whose mean were above 4 (while considering the position of number 4(as it represents agree on Likert scale), variables above 4 value were considered as the prominent performance determinant variables (as listed in Table 4 below).

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Table 3: Respondent's Distribution

Item	*Frequency*	*Percentage (%)*
Working Experience		
0-10	*14*	*16.1*
11-20	*34*	*39.1*
21-30	*26*	*29.9*
Above 30	*13*	*14.9*
Education Qualification		
Secondary Level	*12*	*13.8*
Diploma Level	*31*	*35.6*
Degree Level	*26*	*29.9*
Masters Level	*12*	*13.8*
PhD Level	*6*	*6.9*
Respondents Position		
Client(Financier)	*11*	*12.6*
Consultant	*12*	*13.8*
Contractor	*38*	*43.7*
Local builder(Labor)	*09*	*10.3*
Project Beneficiary	*12*	*13.8*
Other CI stakeholder	*5*	*5.8*

Table 4: Description of Patent Variables

Patent Variables	**Code**	**Description of Determinant Variables**
Training	TRA1	Training on resource management (finance, labor, time &materials)
	TRA2	To facilitate strategic planning and management of the site
	TRA3	To facilitate integration of supply chain
	TRA4	Training to facilitate project management(contract, safety, procurement)
Government Support	GS1	Provide finance and good cash flow
	GS2	Facilitate training to force account method stakeholders
	GS3	Provide frequently supervision and follow up
	GS4	Play role in conflict resolution for smooth site construction
Supply Chain Management	SC1	Streamline ordering process to avoid materials over-ordering
	SC2	Enable faster orderly from supplier to avoid order lead time
	SC3	Facilitate cheap price using multiple supplier using cost per item principle
	SC4	Support better flow of materials/services for economical use to reduce waste
Project Committee	PC1	Enable and regulate good exchange of information and communication
	PC2	Facilitate to oversee better activities flow as per schedule
	PC3	Plan, strategize, manage and control the overall site for smooth construction
	PC4	Assists to maximum utilization of resources

Before testing the influence of the variables (constructs); training, supply chain, project committee and government support to force account method performance, the second procedure involved testing the internal consistency and reliability of the variables based on the interrelationship on the observed (construct) using Cronbach's Alpha (□) test. The most agreeable limit value of Cronbach's alpha is 0.7. This reliability test indicated that all the constructs had Cronbach's α of above 0.7. However, composite reliability (CR) and average variance extracted was computed to

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measure the level of correlation of different indicators of the same variable if are in agreement. noted that the higher value of CR (above 0.7 and close to 1) indicates higher reliability and AVE greater than 0.5 justifies the convergent validity (Table 5).

Table 5: Construct Reliability and Validity

Latent Variables	***Cronbach Alpha***	***Composite Reliability(CR) Value***	***AVE***
GS	*0.902*	*0.938*	*0.835*
DET	*0.865*	*0.919*	*0.746*
PC	*0.816*	*0.906*	*0.739*
SCM	*0.886*	*0.876*	*0.643*
TRA	*0.882*	*0.922*	*0.707*

The third procedure involved measurement of the degree of differences between the given overlapping variables. The result indicates that, factor loading values are high on their respective constructs as each factor loading has greater value than the cut-off value of 0.70 [25][24].The data justify that the reliability of each item was good and gives strength to the allocation for each item on the specified latent construct (Refer Table 6).

Discriminant validity (Fornel-Lacker Criterion) was applied to compare the square root of AVE in relation to correlation of the latent variables (Table 6). [24]stated that, the diagonal is the square root of the average variance extracted of the latent variables and indicates the highest in any column or row than the correlation s within other latent variables.

Table 6: Discriminant Validity (Fornell and Larcker Criterion)

Latent variables	***GS***	***DET***	***PC***	***SCM***	***TRA***
GS	***0.914***				
DET	*0.688*	***0.860***			
PC	*0.365*	*0.490*	***0.841***		
SCM	*0.497*	*0.557*	*0.45*	***0.802***	
TRA	*0.705*	*0.633*	*0.336*	*0.497*	***0.865***

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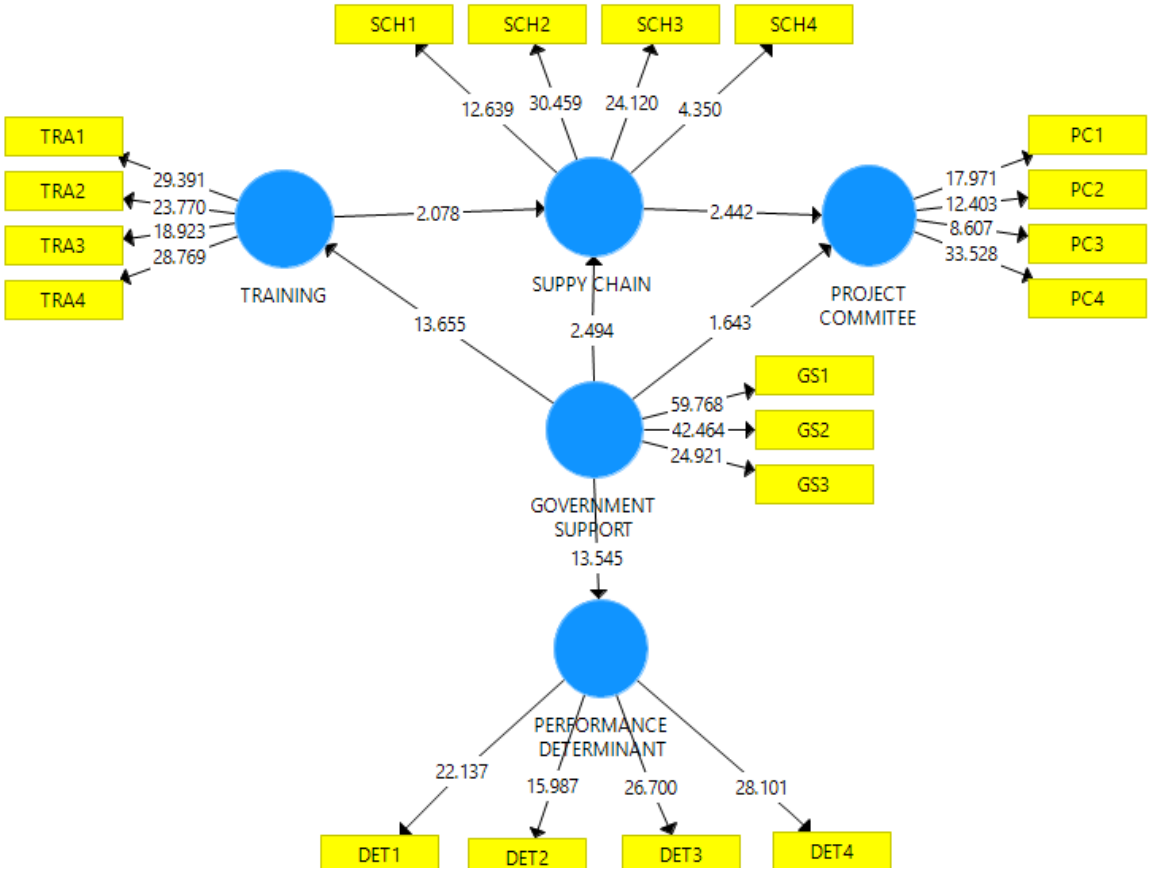
Figure 5: Structural Modelling of the FAM Performance Determinant.



HYPOTHESIS ASSESSMENT

Table 8: Hypothesis Path Assessment

Hypothesis Path		***T-Statistics Value***	***P-Value***	***Decision***
H1	*GS → DET*	*13.545*	*0.000*	*Supported*
H2	*GS → PC*	*1.643*	*0.001*	*Supported*
H3	*GS → SCM*	*2.494*	*0.013*	*Supported*
H4	*GS → TRA*	*13.655*	*0.000*	*Supported*
H5	*SCM → PC*	*2.442*	*0.015*	*Supported*
H6	*TRA → SCM*	*2.078*	*0.038*	*Supported*

Looking at computed T-statistic values above 1.96 extracted from the structural modelling (Figure 5) together with P-values (Table 8 above), indicates a positively significant correlation between constructs.

IV. FINDINGS AND DISCUSSION

From data collected and analysis, four determinants variable have been proved to have a positive significantly correlation with FAM performance as explained hereunder:

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A. Training

Was identified as one of the crucial determinants of performance as it entails imparting knowledge and skills to employee [32][33]. As noted from (figure 3), training prepared by the client before project commencement has always to a great extent facilitated the smooth running of the project done by FAM method. All participants have been equipped with knowledge related to setting and implementing the objects in attaining the intended goals, strategic planning and management, team work building, monitoring work progress, project planning and management, supply chain integration and management, contract management as well as human and resources management etc. Therefore, knowledge has facilitated completion of the project timely with value for money.Different studies havementioned the effect of training in relation to enlightening the understanding, abilities and competences of the employee for their better performance of the firm [34] [35].

B. Supply chain Management (SCM)

It involves all features of distributing the product and services to the intended customer. Moreover, SCM encompasses various multidisciplinary issues including purchasing, logistics and transportation networking, information and communication system management, management of different operations, assemblies of asset, and resource management in order to deliver the quality production and services required[36]for better performance. In FAM, supply chain management has been identified as among the effective determinants that comprise many undertakings of which when joined can result to better firm performance. SCM in FAM involves sourcing of materials under quotation comparing method that facilitated cheap price, supplying them timely to avoid lead time, proper storage, issuing and or allocation to avoid waste and inventory to avoid over-ordering and enable better flow of materials which facilitate the smooth run of the project.

C. Project committee (PC)

PC is among the crucial determinant of FAM performance formed from group of project participants or stakeholders involving consultant (supervisor), client (financier), labors who acts as contractors and project beneficiary. Three committees are always formed from the project participants including receiving committee(concerning with materials receiving and issuing through stores receiving and issue voucher respectively ,inventory analysis) to determine material's flow and maximize their uses; procurement committee (concerning with contract management and administration, other procurement processes and supply chain and management)as well as construction or rehabilitation committee (involves consultant as an overall supervisor and advisor as well as labor/builder who works as a contractor).These committees depend on each other towards completion of the project. On-site meetings are conducted always to enhance exchange of information, evaluate the project progress and find the solution to resolve the problems hindering the project.Different stakeholders involved in construction projects have been noted [37] with their importance and established relationship between them[38] [39]. Thus, some of stakeholders can be more important in a given project at a given particular time than others with their corresponding difference influence at different level [39][40].However, In FAM all stakeholders are needed during the entire lifecycle of the particular projects.

D. Government support (GS)

As a financier of the project, GS has a significant determinant contribution to FAM performance. The government as a source of FAM facilitates availability of projects for any intended purposes. However, if no government, nothing can be implemented.[41] noted that, government has a major role in CI as it enables a continuous flow of work, facilitate access to finance, enable skills formation and access to training and assisting in strategy and policy formation. Tanzanian government as a main financier has played significantly in attaining the performance of FAM through provision of fund, provision of working guide like Public Procurement Act (PPA), facilitation of training to projects participants, conflict resolution etc. This has proved its importance in determining the performance of FAM.

V. CONCLUSION

Despite its effects which hinder the growth of firms in CI, FAM has generally been observed to be directly depending entirely on training, supply chain, project committee and government support as its performance determinants factors which have proved to depend on each other for its good performance. From the analysis, it has been noted that, FAM has been used extensively to save the direct cost forecasted despite its stated condition that "required works are small

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and scattered or in remote locations for which qualified construction firms are unlikely to tender at reasonable prices". LDC are advised to use FAM for small and scattered work basically on remote areas as a way of expanding social service at reasonable cost with value for money while empowering participant's from government to gain practical experience. This study suggests to government and policy makers on the proper way of using FAM as it affects the growth of LLCF and hence CI as a whole. However, it gives the contribution on the forgotten contracting concept of FAM and its applicability whenever applied as per stated conditions.

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