

FACTORS MILITATING AGAINST EFFECTIVE BUILDING MATERIALS MANAGEMENT (EBMM) IN CONSTRUCTION PROJECTS

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Building construction projects are carried out using various material resources. These materials have to be managed to enhance value, minimize waste and ensure that time and cost related goals are attained. The research looked at the factors militating against effective building materials management (EBMM) in order to identify major factors leading to material wastage in construction project delivery in the FCT Abuja, Nigeria. The study adopted purposive sampling method to distribute 100 copies of survey questionnaire to some selected professionals from both consulting and contracting firms in the study area. 86 copies of questionnaire retrieved were analyzed to know the implication of these factors on the process and delivery of construction projects. 25 identified factors militating against EBMM were ranked using RII. The finding of the study revealed that lack of compliance to materials specification and standards (RII=0.81), little knowledge on materials specifications and standards (RII=0.80), poor communication system (RII=0.79), were the top factors militating against materials management. The findings further indicate that delay and abandonment of project (RII=0.82), cost overrun (RII=0.81) and ineffective allocation of materials (RII=0.79), were the three major implications these will have on EBMM. The study concluded that for the EBMM, professional involved in building production processes should understand the importance of specifications and standards to avoid disastrous effects on building materials usage and management in the construction projects delivery.

Keywords: Construction professionals, Materials wastage, Materials' specification, Ineffective allocation of material resource.

1 INTRODUCTION

Building projects are carried out using various material resources. Building materials (conventional and non-conventional) are gotten from different sources for various production processes on projects sites. As such, the pricing and availability of these materials are very vulnerable to the turbulences of the varying market conditions (Christopher 2011). Effective building materials management (EBMM) starts form the project inception. That is, before, during and after procurement of materials to ensure quality standard of projects are attained. This can expressly reduce the amount of time and material wasted in the whole production process, both of which often have harmful consequences on cost of production. Concerned authors' like Morris (2001); Patel and Vyas (2011); Kanimozhi and Latha (2014) maintained that material management involves process of planning, analyzing of the project for provision of specifications, coordinating, purchasing, transporting, storing, handling of materials to minimize waste. They also viewed materials management as methods for predicting, implementing and

coordinating both site activities and materials users in the place of work to ensure EBMM. This stressed the importance of EBMM in any construction projects because about 50 – 70 % of the total contract sum of any given projects are used for procurement of different materials (Patil and Pataskar 2013, Gulghane and Khandve 2015). The practices of EBMM needs to keep pace with the importance given to design. The study of Gulghane and Khandve (2015), Tunji-Olayeni *et al.* (2017) revealed that EBMM improves the productivity of the project and thus leads to successful projects delivery. As good as EBMM contribute majorly to the success of project management. The finding of Bossink and Brouwers (1996) showed there are factors militating against the EBMM which include: complications that arise in the process of placing materials order and errors in the documentation of materials ordered, meanwhile Formoso *et al.* (2002) noted that faulty and procurement of substandard materials. Furthermore, delays in the delivery of materials was noted in (Aibinu and Odeyinka 2006). Osmani *et al.* (2008) observed that factors that have to do with the transportation, handling and storage of materials. However, Patel and Vyas (2011) noted lack of compliance to materials specification and standards, little knowledge on materials specifications and standards, poor communication system among others. As noted in Enshassi *et al.* (2007), Sardroud (2012), Nagapan *et al.* (2012), Rahman *et al.* (2013) Ogundipe, *et al.* (2018a) the implication of ineffective material management has negative influence on project performance such as: schedule delay, cost overrun, substandard quality, loss of productivity, increase in waste generation and loss or reduction in profit (Kasim *et al.* 2005, Donyavi and Roger 2009) argued that researchers. Required focus have not been given to the area of materials supervision by Ogundipe *et al.* (2018b) noted that adequate supervision on application of materials and assemblage of building components helps to avoid errors that can escalated into major damages on sites. Therefore, EBMM tends to enhance value, minimize waste and ensure that time and cost related goals are attained for the intending owners/users. This research looked at the factors militating against effective building materials management (EBMM) in order to identify major factors leading to material wastage in construction project delivery in the study area.

2 RESEARCH METHODS

This study adopted some of the 25 variables highlighted in Patel and Vyas (2011) and other relevant articles in gathering needed information for this study. Since the study is purposive in nature, the population studied are construction professionals working in Government setup, Building Materials Supply (BMS), project consultants, contracting, Real Estate Firm (REF) and Design firm in assessing the meaningful information on EBMM practices in the FCT Abuja, Nigeria. 86 (86%) out of 100 copies of structured questionnaire administered were retrieved and analyzed for this study using SPSS v15.0 and Microsoft of Excel. The level of agreement of respondents are tested in 5 point Likert scale (1= Neutral, 2= strongly disagree, 3= disagree, 4= agree, 5= strongly agree). Relative Importance Index (RII) of the responses were ranked and presented in tables and figures.

3 RESULTS PRESENTATION

Figure 1 assessed respondents' years of experience which is a key factor to determine their level of knowledge about the aim of this study. It was noted that 23.26% (20), 17.44%, (15) 36.06% (31) and 23.26% (20) had working experience that ranges from 0-5 years, 6-10 years, 10-15 years and above 15 years' experience respectively. Therefore, 59.30% (51) of the respondents had 10 and above 15 years working experience.

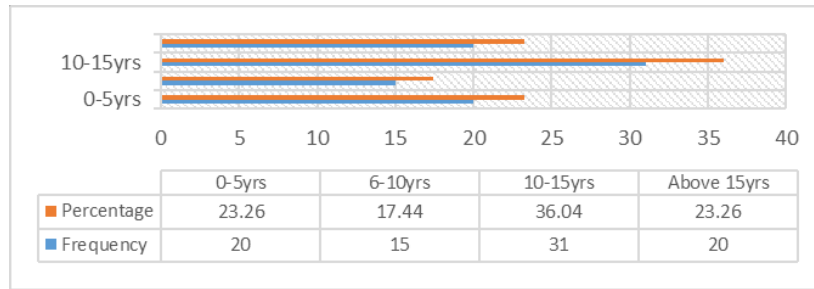


Figure 1. Respondents' years of experience.

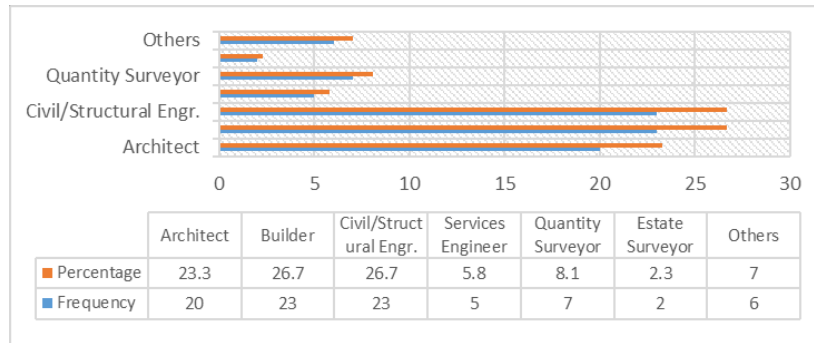


Figure 2. Profession of the respondents.

Figure 2 sought respondents' profession as key stakeholders in construction management. The result revealed that 23.30% (20) of the respondents were Architect, compared to 26.7% (23) of the respondent who are Builders' and the same percentage goes to Civil/Structural Engineers. Meanwhile, 5.80% (5) were Service Engineer, 8.1% (7) were Quantity Surveyor, and 2.30% (2) were Estate surveyor, while other respondents amounted to 7% (6).

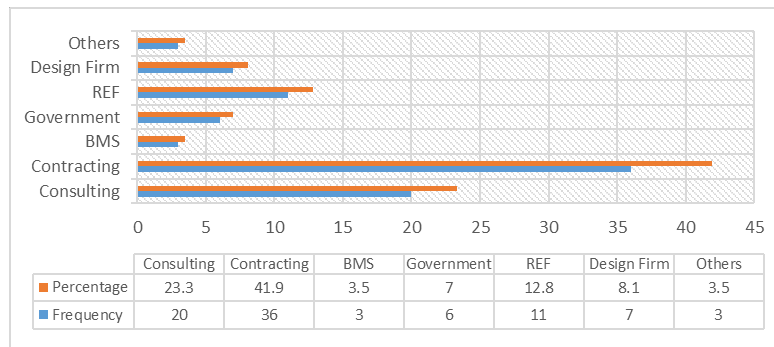


Figure 3. The category of organizations of the respondents.

Figure 3 showed category of organization of the respondent. 23.30% (20) are working in a consulting firm, 41.90% (36) are working in contracting firm, and 3.50% (3) are working for Building Material Supply (BMS). However, 7% (6) of those working in Government parastatal, 12.80% (11) of those working Real Estate firm, and 8.10% (7) of the respondent constitute professionals that work or practice with design firm.

Table 1. Factors militating against effective building material management (EBMM).

Factors	RII	Rank
Lack of compliance to specification and standard	0.81	1 st
Little knowledge on material specifications and standards	0.80	2 nd
Poor communication system	0.79	3 rd
Inadequate material schedule plan	0.78	4 th
Time taken to filter process between competent and non-competent vendors	0.76	5 th
Logistic delay	0.76	5 th
Incorrect specification of material delivered (type and size)	0.76	5 th
Inadequate knowledge of grades, trademarks and prevailing market prices	0.76	5 th
Non-availability of standard material to meet specification	0.76	5 th
Corruption on the side of procurement officer for personal gain	0.75	10 th
Time spent on investigating suitable vendors competence	0.75	10 th
Damage of material	0.74	12 th
Material stock/inventory management	0.74	12 th
Material insecurity	0.74	12 th
Re-handling of material	0.73	15 th
Late or incorrect purchase order	0.72	16 th
Possible damage of material during transportation	0.72	16 th
Inadequate detailed drawings	0.71	18 th
Incorrect quality of materials delivered	0.70	19 th
Loss of material	0.69	20 th
Matching price to competitors' price (Variation in prices)	0.69	20 st
Material delivery travel time	0.68	22 nd
Uncontrollable bid list	0.64	23 rd
Incomplete/ineffective project meetings	0.64	23 th
Storage of materials	0.64	23 th

Table 1 critically looked at the 25 identified factors militating against EBMM in the study area. The result revealed that lack of compliance to materials specification and standards (RII=0.81), little knowledge on materials specifications and standards (RII=0.80), poor communication system (RII=0.79), inadequate material schedule plan (RII=0.78) were the top four factors militating against effect building materials management. The next 5 factors that were ranked 5th (RII=0.76), they include: time taken to filter process between competent and non-competent vendors, logistic delay, incorrect specification of material delivered (type and size), inadequate knowledge of grades, trademarks and prevailing market prices and non-availability of standard material to meet specifications. Time spent on investigating suitable vendors and corruption on the side of procurement officer for personal gain were ranked 10th (RII=0.75).

Table 2. Implication of ineffective building materials management (IBMM).

Factors	Index	Rank
Delay and abandonment of project	0.82	1 st
Cost overrun	0.81	2 nd
Ineffective allocation of materials	0.79	3 rd
Low productivity	0.78	4 th
Wastage of materials	0.77	5 th
Problems with quality	0.76	6 th
Theft/pilfering of materials	0.76	6 th
Misuse of materials	0.71	8 th
Damage	0.70	9 th
Double-handling of materials	0.66	10 th

Table 2 examined the implication of factors militating against EBMM in the study area. Delay and abandonment of project (RII=0.82), cost overrun (RII=0.81) and ineffective allocation of materials (RII=0.79), were the three major implications these factors will have on EBMM. Meanwhile, other factors such as: low productivity (RII=0.78), Wastage of materials (RII=0.77), problems with quality (RII=0.76) and theft/pilfering of materials (RII=0.76) were ranked 4th, 5th, and 6th. These are tending to negatively impact the time and cost performance of the projects.

4 FINDINGS AND DISCUSSIONS

This research looked at the factors militating against EBMM in order to identify major factors leading to material wastage in construction project delivery. The result presented revealed that lack of compliance to materials specification and standards, little knowledge on materials specifications and standards, poor communication system, inadequate material schedule plan were the top four factors militating against effective building materials management. These top four ranked factors cut across planning, process/ scheduling and implementation of EBMM on any construction firms as noted in (Morris 2001, Patel and Vyas 2011, Kanimozhi and Latha 2014), for the purpose of materials resource management that will enhance value, minimize waste and ensure that time and cost related goals are attained for the intending owners/users. Other vital factors that predominantly militating against EBMM were ranked 5th- 10th, they include: time taken to filter process suitable vendors, non-availability of standard material to meet specifications, logistic delay, incorrect specification of material delivered, inadequate knowledge of grades, trademarks and prevailing market prices, time spent on investigating suitable vendors and corruption on the side of procurement officer for personal gain. All of these necessitate the needs for a construction firms to setup a unit in their organization that will see to planning, reviewing and implementation of EBMM once a particular project is secured. This will ensure that materials for the various stages are adequately planned, ordered and put to use. However, the rest of the factors are equally significant to EBMM but once the predominant first 10th ranked factors are addressed the rest will have little or no effect on EBMM. The findings of the study showed the implication of these predominant factors militating against EBMM in the study area. Delay and abandonment of project, cost overrun, ineffective allocation of materials resource, low productivity, wastage of materials, problems with quality and theft/pilfering of materials implications of ineffective building materials management. Because both conventional and non-conventional material used for construction activities are vulnerable to turbulences of the varying market conditions (Christopher 2011). Most of the convention materials are affected by exchange rate, duty, and importation policies, while the non-convention ones are determined by vendors' proximity to location of materials, materials availability and accessibility to construction site.

5 CONCLUSION AND RECOMMENDATION

The findings of this study revealed that lack of compliance to materials specification and standards, little knowledge on materials specifications and standards, poor communication system, inadequate material schedule plan were the major challenges confronted with by stakeholders in ensuring EBMM on sites. The study recommended that for the effective management of building materials, professional involved in building production process should understand the importance of specifications and standards of building materials to avoid disastrous implications on the projects' delivery. The study therefore concluded that it is appropriate for all the construction firms to setup a unit that will be responsible for planning, reviewing and implementation of EBMM for their construction projects. The findings of this study are applicable in the Nigeria and other developing nations.

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