

Evaluation of site managers' hindrances towards optimal utilisation of construction resources

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Abstract

Purpose – The purpose of this paper is to delineate different types of site manager attributes that significantly contribute to construction project management efficiency and evaluate the factors that hinder the site manager during construction production processes. Towards efficient resources utilisation, site managers require various qualities and potentials.

Design/methodology/approach – To achieve valid result, the research study was triangulated by exploring literature, which was augmented with both quantitative questionnaire and qualitative interview research methods. The research data were collected in the UK building industry.

Findings – It was found that the barriers that often affect efficient utilisation of construction resources in the industry are poor communication, disagreement, misunderstandings, bad weather, union strikes and construction participants' personality conflicts. This research study presents severity of site manager's hindrances, factors that affect site manager's efficient solutions to minimise the hindrances on site manager's efficient performance and factors that should be constant towards site managers' efficient performance. Among these solutions found evident that will enhance site managers' performance and minimise the effect of the hindrances are an enhanced planning and adequate programming of construction resources before and during project execution, rational team building and an efficient construction team for project, in addition to adequate information dissemination and transfer of knowledge.

Originality/value – The adequate implementation of the solutions presented in this paper will not only enhance the performance of site managers on resources utilisation but will also augment client satisfactions.

Keywords Construction management, Construction production processes, Project management, Resources utilisation, Site managers' attributes, Site managers' performance

Paper type Research paper

1. Introduction

Because there is no universal definition of the effective manager, the manager's characteristics must be matched to the context and situation to be effective, while there is need to realise that understanding the context of the organisation is extremely vital to determine the characteristics and traits of a good manager. This paper delineates different types of site manager attributes that contribute to construction project manager's efficient and intensively evaluates the relevancies of these qualities, potentials and skills during production processes. The restraints on efficient construction resources utilisation and global responsiveness to the significance of construction resources management are also evaluated. This research was triangulated by carrying out both interview and structured questionnaires research surveys. The Scientific Package for the Social Sciences (SPSS)

software was used for quantitative data analysis, while the emergence facts from interview survey were coded and collated using NVivo statistics software. These facts were presented in logical order to enhance understanding and applications. The paper presents the factors that will improve the site manager's performance on resources utilisation and clients' satisfaction, if adequately implemented.

2. Towards site managers' optimal construction resources utilisation

As stressed in much literature, including Association of Project Management, [APM \(2006\)](#), Project Management Institute, [PMI \(2005\)](#) and [Haughey \(2009\)](#), site managers need to possess various skills and qualities, to achieve optimal utilisation of construction resources, during the production process. These skills and qualities include good leadership traits, effective human management, eloquent communication skill, negotiation power, articulate planning skill, contract management and administration skills, problem solving and conflict resolution ability and creative thinking.

The barriers that often affect efficient utilisation of construction resources in the industry are: poor communication, disagreement, misunderstandings, bad weather, union strikes and construction participants' personality conflicts, ([Haughey, 2009](#)). Therefore, to achieve the predetermined project success, the site managers need to have control over four principal variables: time, cost, quality and scope, and this is possible through integration of different management techniques. Thus, site managers need to possess authoritative and absolute control on the following factors: planning technique, staffing and recruitment, training and manpower development scheduling, ordering and procurements, storage of materials, equipments and facilities, security of assets, materials and facilities, hoarding and pilferage and health and safety.

[Griffith and Watson \(2004\)](#) and [Haughey \(2009\)](#) state five distinguished stages which the construction site managers need to possess during construction production processes, and in logical sequence of importance, the stages are: project initiation, planning, production, monitoring and completion (that is, final product(s) delivery). However, during the management of these stages, some possible rules that often lead to project failures as explained by [Haughey \(2009\)](#) are summarised thus:

- *Maintaining a focus on delivery at all times:* Project manager focusing on delivering results, ignoring extraneous things like quality assurance, testing, communication, team management and little touch of humanity, assuming that these distract from the main objective for delivering.
- *Assuming that planning is time wasting:* Assuming that there is no need for adequate administrative, financial and control planning of project, with the presumption that these have been done by the smart system architect or business consultants who have previously produced excellent e-business designs.
- *Stressing the construction team beyond the aptitude of efficiency performance:* The project manager believing that the secret to delivering a successful project is to overwork the team participants and be careless about the workers' well-being, at the same time, not carrying the workers along hoping that he has an overwhelming talent to perform all management functions without the contribution of others.
- *Underestimating the importance of communication and feedback:* Believing that there is no strong need for effective communication system and any directive can be given anyhow.

- *Avoidance of stage implementation and iterative cycles on project execution:* Believing that operational sequences waste time and add unnecessary administrative overheads. This means pushing the team participants relentlessly, and this often generates deliverables without having any moment to consider the actual performance, while hoping that any error committed could be corrected later.
- *Believing in common sense rules:* When a manager refuses to adjust to new innovation and new techniques in delivering a project, believing that the old system works better and fanatically adapted to an aged technology, never bothers to train in new techniques.
- *Believing in satisfying clients at all costs:* Taking all necessary steps to satisfy clients not viewing nor weighing the consequence to the project success. That is, when the project manager refocuses resources to suit clients, reassigns the workforce, no matter how illogical or the extent to which the project will be delayed.

Towards efficient resources utilisation, site managers require some qualities and potentials as indicated by [Haughey \(2009\)](#) and [Newcombe et al. \(1993\)](#) and in the [APM \(2006\)](#) and [PMI \(2005\)](#). Among these potentials and qualities are: inspiration of a shared vision, good communication, integrity, enthusiasm, empathy, competency and the ability to delegate tasks, being cool under pressure and team-building and problem-solving skills as evaluated and presented by [Fapohunda et al. \(2007\)](#). These factors are as follows:

- *Shared vision:* An effective project leader is often described as someone who has a sense of direction and the ability to express it. Although every leader has different intrinsic leadership styles ([Blair, 1993](#)), a good leader should possess vision, thrive on change and be able to extend boundaries. Visionary leaders enable other people to feel that they possess a real stake in the successful outcome of the project. The leader empowers people, to express the vision on their own, offers people opportunities to create their own vision, to explore what the vision will mean to their jobs and their lives and also to envision their future as part of the vision for the organisation ([Haughey, 2009](#)).
- *Good communication:* [Griffith and Watson \(2004\)](#) remarked that the ability to communicate with people at all levels is ranked as the most important skill that all team leaders should possess. Project leadership calls for clear communication about goals, responsibility, performance, expectations and feedback ([PMI, 2005](#); [APM, 2006](#)). Often the project leader is a mediator between various organisations and within construction project participants. Therefore, a good leader should possess the ability to negotiate effectively and use persuasion when necessary to ensure project success, ([Newcombe et al., 1993](#)).
- *Integrity:* One of the most important attributes a project manager must acquire is his or her actions, not mere words. Good leadership demands commitment to, and demonstration of, ethical practices. It is the responsibility of project leaders to create standards for ethical behaviour and to live by the standards, as well as rewarding those who exemplify these practices. [Cunningham \(2002\)](#) affi that integrity depends on respect for self, respect for others and responsibility for all actions taken.
- *Enthusiasm:* Construction workers want leaders with high enthusiasm, confi and with an optimistic attitude; workers often dislike leaders who are negative. The

workers are more motivated when they have the conviction that they are part of a stimulating journey, feel alive and keen to follow a leader with a “can-do” attitude, not those who have many objectives and goals, while few or nothing can be achieved (Haughey, 2009).

- *Sympathy and empathy*: There is usually appreciation by the subordinate when the leader acknowledges them with an apparent and distinct vision that they have a life outside of work. Thus, good leaders need to adopt differing leadership styles with different people, or with the same people, but at different times towards achieving their needs (The Teal Trust, 2007). Sympathy is an emotional affinity in which whatever affects one correspondingly affects the other, which is synonymous with compassion, while empathy is the ability to recognise, perceive and envisage the emotional feelings of others. Therefore, good project leaders should be able to blend different types of leadership traits towards achieving construction resources utilisation efficiency and effectiveness.
- *Competence*: To involve oneself in another’s cause of action during project execution, workers must be made to believe that the leader knows what he or she is doing. Leadership competence does not, however, necessarily refer to the project leader’s technical abilities in the core technology of the business, but as project management continues to be recognised as a field, and of itself, project leaders’ need should have the ability to successfully lead others (Allen, 1998). It is noteworthy that expertise in leadership skills is only a dimension in competency, and in APM (2006), it was affirmed that having a preceding winning track record is another way of considering leadership competency.
- *Delegation of tasks*: Trust is an essential element in the relationship of a project leader and the project team. A good leader needs to demonstrate trust in others through actions and delegation of duties. Delegation is the downward transfer of formal authority from superior to subordinate. These could be measured through how the leader checks, controls the subordinate’s work, delegates authority and allows people to participate freely in any decisions taken. Individuals who are unable to trust other people often fail as leaders and could remain as micro-managers or possibly continually doing all of the works unaided.
- *Handling pressure*: In a perfect project condition, the project will be delivered on time, as budgeted and with no problems or obstacles to overcome. However, there has never been a perfect project. Thus, a manager with a hardy attitude will always take problems in his/her stride. When a good manager encounters a stressful event, the manager needs to consider it as interesting and take it as a challenge or an adventure towards discovering new techniques. Thus, a good manager needs to view any problem encountered as an opportunity to be creative. It is noteworthy that, out of uncertainty and chaos, changes and innovation emerges, which often leads to creative thinking and enhanced skills eventually.
- *Team-building*: A team builder can best be defined as a strong person who provides the substance that holds the team together in a common purpose towards the right objectives. For a team to progress from a group of strangers to a single cohesive unit, the leader must understand the process and dynamic requirements for these transformations. Thus, a team leader needs to know the appropriate leadership styles to be employed at every stage of team development. Leaders must also have an

understanding of the different team players' styles and how to capitalise on transferable knowledge of each team member at the appropriate time to resolve peculiar problems.

- *Problem solving*: Although an effective leader is said to share knowledge, employ joint problem-solving and responsibilities within a team, nonetheless, many subordinates expect a leader to have excellent and in-built problem-solving skills. In respect that some subordinates may have high creative ability, often subordinates do expect the leader to make a proactive and positive move in problem solving and brain storming.

Dinsmore (1990) emphasised that system integration is required to propel a project in meeting speculated objectives of cost, time and quality through people. Also, Bratton and Gold (1994) comment that the main objective of the site manager is getting things done through people. These imply that an effective project management depends on systems and people. System integration is required to propel a project in meeting speculated objectives of cost, time and quality through people. In all indications, the main objective of the site manager is getting things done through people. Therefore, for a project to be successful, there is a need for people to work as a team. This phenomenon indicated that the human factor is a vital resource in any project management system. By and large, team building, conflict management and communication skills are human-oriented factors.

In summary, the required potentials and skills for the site managers to be efficient in project execution are social skills, proficiency in decision-making, ability to handle any problem as it arises, ability to recognise and take advantage of available opportunities for efficiency and the manager needs to be able to manage change. In addition, for managers to be efficient the following issues are paramount: achievement of quality at the first attempt, responsibly acceptance, good decision-making skills, ability to handle stress and being knowledgeable in design information interpretation. Also, good record keeping, the ability to achieve a safe working environment, efficient resources utilisation skills, accuracy in judgement, organisational ability and technical knowledge are equally essential.

Irrespective of much quality that site managers possess towards adequate performance of duties, in addition to the awareness of some possible rules that often lead to project failures, there are still several intrinsic factors that often oppose the managers and constrain the effective implementation of the management traits. Thus, this research evaluates these hindrances and indicates how the constraints could be minimised to enhance the site manager's efficient performance.

The subsequent Section 3 thus presents the approach explored towards obtaining valid and reliable solutions that will minimise the effects of the site managers' constraints and hindrances.

3. Research methodology and data collection

This research work was carried out using the triangulation method. The rationale for the triangulation method is to enhance the validity and reliability of the research findings. The advantages a research method were improved by the other, and disadvantages of a method were negated by the other. Information and data were gathered using the fact from literature, augmented with structured questionnaires and interview.

Questionnaires were distributed to the construction personnel: Project Managers, Site managers and Quantity Surveyors. To enhance the quality of the response, the questions are framed on open-, closed- and attitude-based. The responses to part of

the questions are enquired using a 5-point Likert scale: to enable the respondent choose one option that best align its opinion, which could lead to consistence answer. The dimensional scale which will enhance summation of the values is rated from 1 to 5 that ranged from “strongly disagree (1)” to “strongly agree (5)” and “very low (1)” to “very high (5)”. Some questions were to be responded with YES or NO, while others are open and opinion-seeking questions. A total of 102 questionnaires were collected and analysed by using an SPSS, version 13, and the findings are presented in Section 3.1.

For validity and reliability purposes, oral interview with structured questionnaire were administered. The respondents were solicited to comment on each question. Eight construction personnel were interviewed, while the comments were tape recorded, transcribed and thereafter correlated together. The interview information and emergence themes and facts were collated by means of NVivo, version 8, statistical tool and the deduced facts, presented in Section 3.2.

Data collected through quantitative means by using summation rating scale were sum-up; the percentage were calculated and the results interpreted. The information and data generated through qualitative interview survey were interpreted through thematic analysis. This is a proactive approach for analysing data to develop a grounded theory. [Punch \(1998\)](#) affirmed that a grounded theory is a research strategy whose purpose is to generate theory from data, while the grounded theory analysis aims directly at generating the abstract theory to explain what is central in the data. Also, the process of collecting data to be analysed for generating inferences based on the data and an attempt to develop theory is analytic induction ([Frankfort-Nachmias and Nachmias, 1996](#)). The sequence of the grounded theory is from induction to deduction, then to verifi In this research, the researcher believed that it is important to remain fl in the course of data collection and analysis to gain adequate insight into the research problems. Thus, this research adopts the grounded theory approach which allows fl by taking an iterative approach in which the data collection is processed.

However, the views of [Clough and Nutbrown \(2002\)](#), [Bryman \(2004\)](#), [Field \(2005\)](#), [Bryman and Cramer \(2005\)](#) helped in the questionnaires administration and [Silverman \(2005\)](#), [Creswell \(2008\)](#) and [Trochim \(2006\)](#) aided the interview data collection, analysis and interpretation.

3.1 Quantitative research survey study

3.1.1 Demography of questionnaires' survey respondents. This section presents the demography of the respondents that returned complete questionnaires and the analysed data are illustrated in [Tables I and II](#) and [Figures 2 and 3](#).

3.1.2 Managerial status of the participants and the years of experience. [Table I](#) shows that representatives from nine distinct construction managerial levels participated in the questionnaires survey. As presented in [Figure 1](#), the total respondents that had more than fi years' managerial experience in the construction industry are 84 per cent; of these, 57 per cent have 15 years' managerial work experience and 27 per cent have between 5 and 15 years' work experience. Only 16 per cent have 5 years' managerial experience, though this does not indicate their unawareness in the problems is associated with resources utilisation in the industry. [Table I](#) and [Figure 1](#) illustrate that the percentage of project site managers/senior site managers in the respondents is 40 per cent, the site managers and contract managers/senior contract mangers are 29 per cent and 10 per cent, respectively. All the

project directors, planning managers, design managers and senior building managers in the survey have not less than 15 years' managerial experience in the construction industry.

These results indicate that the respondents are significantly experienced and rationally have wide knowledge in the construction industry.

3.1.3 *Geographical zones covered and the number of employees in the respondents' organisations:*

- *Coverage:* Table II indicates the geographical zones which the respondents' organisations operate in the UK. Of the total, 84 per cent of the organisations are in 8 or more geographical zones. The majority of the organisations are in 10-11 geographical zones, 66 per cent (28-38 per cent), while only 16 per cent have construction sites in 8 geographical zones. Table II results indicate that the majority of the respondents' organisations operate on wide coverage in the UK and are multinational organisation. The respondent must have acquired wider experience within the UK and the contribution will be significant and reliable.
- *Numbers of employees:* Based on the results obtained, as shown in Table V., 2, 85 per cent of the respondents' organisations have > 400 employees, while only 15 per cent have < 400 employees. These results in Table II show that the respondents are representation of several organisations in different geographical zones in the UK and the majority of the construction organisations had > 400 permanent employees (Figure 2).

4. Quantitative survey data analysis and discussion of findings

This section presents and ascertains the Site Managers' hindrances towards achievement of effective utilisation of construction resources and establishes possible solutions that will minimise the effects. Thus this section:

Table I. Respondents' "Site management positions"; on the "Years of experience of the respondents as a manager" in the construction industry

Site management position of the respondents	Years of experience as a manager in construction industry				Total	(%)	Cumulative (%)
	5	5-10	11-15	15			
Project managers/senior project managers	0	6	8	27	41	40	40
Site managers	12	2	7	9	30	29	69
Contract managers/senior contract managers	0	2	0	8	10	10	79
Quantity surveyors/senior quantity surveyors	2	2	0	2	6	6	85
Project directors	0	0	0	5	5	5	90
Planning managers	0	0	0	4	4	4	94
Section managers	2	0	0	0	2	2	96
Design managers	0	0	0	2	2	2	98
Senior building managers	0	0	0	2	2	2	100
Total	16	12	15	59	102	100	
(%)	16	12	15	57	100		
Cumulative (%)	16	28	43	100			
	16%		84%				

Number of employees in the organisation presently in UK	Geographical zones of which the respondents organisation are located in UK										Total number	Total (%)	Cumulative (%)
	Four	Five	Six	Seven	Eight	Nine	Ten	Eleven	Twelve	Thirteen			
101-150	0	0	0	0	0	2	0	0	0	0	2	2	2
151-200	0	0	0	0	2	0	0	0	0	0	2	2	4
201-250	0	0	0	0	0	0	2	0	0	0	2	2	6
251-300	0	0	0	3	2	2	0	0	0	0	7	7	13
350-400	0	0	0	0	0	0	2	0	0	0	2	2	15
Over 400	1	3	2	7	1	0	25	39	5	4	87	85	100
Total	1	3	2	10	5	4	29	39	5	4	102	100	
(%)	1	3	2	10	5	4	28	38	5	4	100		
Cumulative (%)	1	4	6	16	21	25	53	91	96	100			
		16%					84%						

Table II.
Geographical zones which
the respondents'
organisations operate in
the UK

- ranks the factors that hinders site managers in order of significance;
- assesses and evaluates factors that pose “threat” on waste reduction;
- determines areas on which managers need to place more attention to avoid construction operational “threat”; and
- ascertains and presents factors that will enhance the efficiency of construction site manager.

4.1 Severity of site managers’ hindrances

Based on the results obtained, the frequencies of several site managers’ hindrances on Optimal Utilisation of Construction Resources are presented in Figure 1.

The majority of these factors hinder Site Managers’ efficiency. The factors that often cause significant “threat” on site managers’ efficient performances are “time lapse to approve changes due to specification inadequacies”, “sub contractors and suppliers’ performance”, “materials availability” and “skilled labour availability”. Other factors’ effects followed as rated and are shown in Table III and Figure 3. It was found that “unskilled labour availability” and “skilled plant operators’ availability” create less threat to Site Managers’ efficiency and resources utilisation.

4.1.1 Reliability and validity tests’ statistics on “Accomplishment of the Site Managers’ Propositions”. Reliability and validity tests’ statistics show that the samples collected are reliable and significantly valid (Table IV). For clarity, the member of the design team were analysed separately under “Communication with Design Team”, also different production information were analysed separately under the main factor “Production Information Clarity”. The value of the entire items “Total Cronbach’s Alpha Coefficient” is greater than the individual “Corrected Item Total Correlation”. Also, the ANOVA and chi-square values are both > 0.05 , the standard significant level.

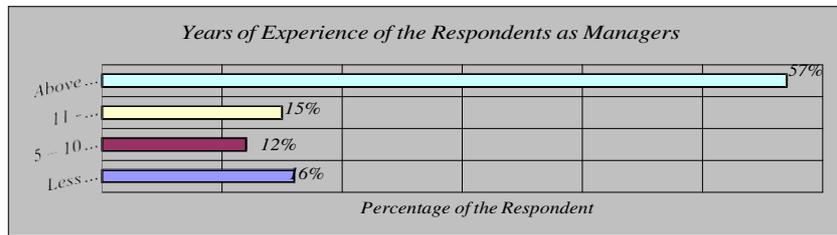


Figure 1. Years of experience of the respondents as managers in the construction sector

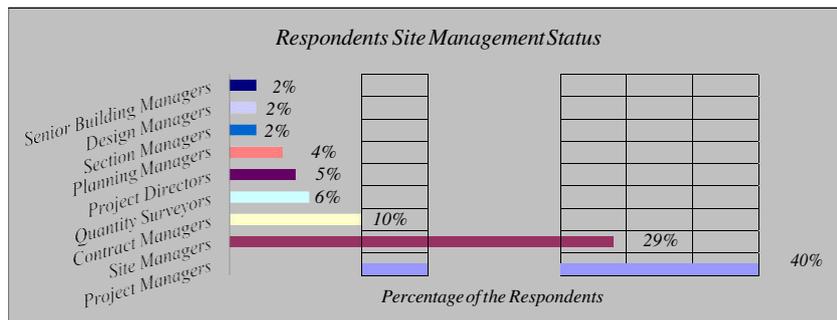


Figure 2. Respondents’ site management status

4.2 Interview reports on site managers' hindrances

The questions posed to the respondents during the interview on the issue of hindrance are:

- Kindly comment on factors that affect site managers in optimum utilisation of construction resources.
- Some factors hinder site managers in efficient performance of their duties and resources utilisation. How can these be avoided or minimised?

The following deductions are extracted from the information obtained during the interview.

4.2.1 Factors that affect site managers' efficiencies. From the interview conducted, the identifiable problems that hinder Site Managers' efficiency are:

- *Contract duration and urgency of the job to commence:* These factors often resulted in insufficient time to plan a project properly at inception, and these have considerable affect on construction operation. Often, site managers are constrained to deliver a project on time and thus are overly concerned with the timely delivery of the project.

1.	Time Lapse in Approval of Change due to error in Specifications	(Time Lapse)
2.	Sub-Contractor Efficiency and Performance	(Sub-Contr. Eff)
3.	Nominated Suppliers Efficiency Performance	(Nom Sup Eff.)
4.	Material availability	(Mat Avail)
5.	Skilled Labour availability	(Skill Mp)
6.	Project Complexity Subject To Clarification	(Pro Compl)
7.	Modification Response To Effect Change	(Mod Resp)
8.	Alteration Response To Effects Change	(Alter Resp)
9.	Design Team Drawing and/or Specification clarity	(D Team Clarity)
10.	Working/Operation Space And Congestion	(Space/Congestion)
11.	Communication With Design Team	(Com. Dt)
12.	Skill Plant Workers Availability	(Skilled Me Workers)
13.	Unskilled Labour availability	(Unskilled Mp)

Table III.
Site managers' hindrance
in descending order and
the factors abbreviations
as shown in Figure 1



Figure 3.
Factors that hinder Site
Managers' efficient
performances

Factors considered	Corrected item-total correlation	Cronbach's alpha if item deleted	Total Cronbach's alpha coefficient	Chi-Square (Signature)	ANOVA F-test (Signature)
Communication with Design Team					
Architects	0.802	0.952		0.001	
Structural Engineer	0.860	0.951		0.001	
Mechanical Engineer	0.766	0.952		0.001	
Electrical Engineer	0.712	0.953		0.001	
Estimator	0.639	0.954		0.001	
Quantity Surveyor	0.553	0.955		0.001	
Project Manager	0.682	0.953		0.001	
Client	0.428	0.956		0.001	
Alteration Response To Effects Change	0.546	0.955		0.001	
Modification Response To Effect Change	0.522	0.955		0.001	
Time Lapse in Approval of Change Due to Spec. error	0.488	0.955		0.001	
Material availability	0.693	0.953		0.001	
Skilled Labour availability	0.635	0.954		0.001	
Unskilled Labour availability	0.723	0.953		0.001	
Project Complexity Subject To Clarification	0.713	0.953		0.001	
Working/Operation Space And Congestion	0.631	0.954		0.001	
Skill Plant availability	0.580	0.954		0.001	
Production Information Clarity				0.001	
Architects	0.757	0.953		0.001	
Structural Engineer	0.839	0.951		0.001	
Mechanical Engineer	0.765	0.952		0.001	
Electrical Engineer	0.817	0.952		0.001	
Estimator	0.789	0.952		0.001	
Sub-Contractor Performance	0.713	0.953		0.001	
Nominated Suppliers Performance	0.570	0.954	0.955	0.001	0.001

Table IV.
Reliability and validity
statistic tests result of all
the variables-site
managers' hindrances

- *Weather conditions:* Another major constraint is weather. This affects the efficient use of some equipment and machines. A typical example is that a tower crane cannot work efficiently or effectively during high winds; in many occasions, weather significantly affects construction operation.
- *Lack of skilled and experience workers:* The major problem facing the industry nowadays is the lack of skilled and experienced workers. These resulted in a waste of construction resources: labour, materials, plant and equipment, and sometimes, reworking was required.
- *Lack of experience and knowledge of site manager gained from similar projects in achieving efficient resources procurement and integration of construction resources.*

- *Lack of absolute control over nominated sub-contractors and suppliers:* In several projects, site managers do not often possess absolute control over nominated contractors and suppliers, while this often hinders the site managers in efficiently controlling the contractors and the suppliers.
- *Design team rigidity:* The production information produced by the design team was expected to be adhered to during project execution. In respect of this, the managers are often confronted with several challenges in attempts to minimise or avoid these conspicuous resources inefficiency (conscious or unconscious wastes), in-built in the design package, and among the probable reasons are design aesthetics esteem and cost of modification.
- *Labour short training period:* In the past, trades were learned between 4 and 5 years, but currently, workers undergo training for about 12 months. Within the short period of training, the apprentices learn the trades frame, not really efficiently intricacies. When organisations provide training, on several occasions, they do not often achieve the full benefit of providing the training, the workers leave the organisation providing the training, which often results in training, recruitment cost and time loss.

4.2.2 *Solutions to minimise the hindrances on site managers' efficient performance.* The identified solutions that will minimise the hindrance of Site Manager efficiencies are:

- An enhanced planning and adequate programming of construction resources before and during project execution. Theoretically, all resources utilisation needs to be carefully forecast, programmed and planned and needs to be practically followed as far as possible.
- The need for an adequate labour market forecast before the commencement of the project to avoid using semi-skilled labour during construction. Significantly this will enhance labour selection and utilisation that could lead to efficient resources utilisation.
- There is need to identify, employ and engage workers that are competent. Experience of site participants often counts on efficient resources utilisation.
- Rational team building and an efficient construction team for project.
- Adequate information dissemination and transfer of knowledge. To clearly disseminate and explain the duties to be carried out, especially the semi-skilled and unskilled labour.

4.2.3 *Discussion of findings and factors that should be constant towards site managers' efficient performance.* From the interview conducted, the identified factors that need to be constant towards site manager efficient utilisation of construction resources are:

- *Regular training:* Construction organisations and the government need to invest more in training. More so, efficient implementation of the Construction Industry Certificate Scheme is required – the “No Card No Work” system needs to be enforced and implemented. Construction workers need to know the organisation goals, objectives and policies; what is expected from the employees need to be clearly identified, ascertained and the level of the efficiency to be attained need to be clarified during the training and induction.

- *Healthy and secure environment*: Safe environments motivate workers, and workers have the tendency to work more efficiently in a secured and accident-free environment.
- *Effective resources market testing and management*: [Dinsmore \(1990\)](#) emphasised that system integration is required to propel a project in meeting speculated objectives of cost, time and quality through people. Also, [Bratton and Gold \(1994\)](#) comment that the main objective of the site manager is getting things done through people. For efficient project execution, effective management is paramount, achievable through forecasting, market testing and adequate management of the available resources, (materials, manpower, machinery and financial). Therefore, a good leader should possess the ability to negotiate effectively and use persuasion when necessary to ensure project success ([Newcombe et al., 1993](#)).
- *Effective information and communication dissemination systems*: Project leadership calls for clear communication about goals, responsibility, performance, expectations and feedback ([PMI, 2005](#); [APM, 2006](#)). Thus, adequacy of information transfer enhances project execution. Construction information and communication systems need to be effective, to enable every worker to be aware of what is to be done, when, why and how to perform the task efficiently. Moreover, there is a need for an appropriate person to explain or disseminate the construction concept as the project progresses. However, the site manager needs to be familiar and acquainted with different types of information dissemination systems that will be effective for different project procurement methods and the intricacies required for efficient execution. Also, the communication “gap” between the design team and the construction team has to be minimised (bridged). Effective communication throughout the project and creation of appropriate methods and avenues of obtaining feedback, that is proper communication and information flow are significantly paramount for efficient resources utilisation during the construction product process ([Table V](#)).
- *Adequate and effective planning and forecasting*: [Haughey \(2009\)](#) asserts that effective planning at inception and as the project proceeds, should never be assumed as time wasting. Adequate planning before the project commences and during project execution is essential for project success. Also, effective monitoring is paramount towards achieving organisation’s and project’s set target. There is a need to plan ahead through effective forecasting of resources requirements and conditions that could hinder efficient resources utilisation. Effective planning of every construction activity, resources procurement and utilisation significantly avoids or minimises construction resources wastes.

5. Conclusion and recommendations

This study “the Site Manager’s Attributes and Constraints towards Optimal Utilisation of Construction Resources” presents severity of site manager’s hindrances, factors that affect site manager’s efficiencies, solutions to minimise the hindrances on site manager’s efficient performance and factors that should be constant towards site managers’ efficient performance. To achieve a viable result, the research study was triangulated by exploring mixed methods, (quantitative questionnaire and interview survey). Among the problems identified are contract duration and urgency of the job to commence, weather conditions. Other major constraints are unpredictable weather condition, lack of skilled and experience workers and design-team rigidity. The possible solutions

Factors that Affect Site Managers' Efficiencies	Solutions to Minimise the Hindrances on Site Managers' Efficient Performance	Factors that should be Constant towards Site Managers' Efficient Performance
Contract Duration and Urgency of the Job to Commence	Enhanced planning and adequate programming of construction resources before and during project execution	Regular Training
Weather Conditions: Another major constraint is weather	Adequate labour market forecast before the commencement of the project	Healthy and Secure Environment
Lack of Skilled and Experience Workers	Engagement of competent workers	Effective and regular Resources Market Testing and Management
Lack of experience and knowledge of site manager gained from similar projects	Rational team building and an efficient construction team	Effective Information and Communication Dissemination Systems
Lack of absolute control over nominated sub-contractors and suppliers	Adequate information dissemination and transfer of knowledge	Adequate and Effective Planning and Forecasting
Design Team Rigidity		
Labour Short Training Period:		

Table V.
Summary of qualitative
survey findings

towards minimising hindrances on site manager's efficient performance and optimal resources utilisation are an enhanced planning and adequate programming of construction resources before and during project execution, rational team building and an efficient construction team for project, in addition to adequate information dissemination and transfer of knowledge.

The adequate implementation of the solutions presented in this paper will not only enhance the performance of site managers on resources utilisation but will also augment client satisfactions.