

Evaluation of Integrated Teamworking Approach in Project Management: A Case Study of Heathrow Terminal 5 Project

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Abstract - This paper aims to evaluate the effectiveness of Integrated Team-working Approach (ITA) in the management of the Heathrow Terminal Five (T5) project. Attention was given to the management of risk, change, communication in the T5 project. The deployment of questionnaire with comment box enabled the collection of both quantitative and qualitative data with the objectives to (i) determine the level of ITA awareness in project management, (ii) determine if ITA can successfully deliver all types of projects, (iii) determine if ITA is dependent on contract type, and (iv) to assess the influence of ITA application on communication, risk and change management.

Evidences from this study reveal the need for more awareness around ITA. It was also established that ITA application leads to successful delivery of any type of project especially, within the engineering and construction industry. Even though ITA does not depend on the type of project contract entered into, it is highly recommended that contractors with fixed-cost contract should recognize that ITA enables changes and should accommodate changes within their budgets. Furthermore, it was confirmed that ITA positively influence communication, risk and change management as a result of it open and collaborative features.

Keywords—Integrated Teamworking Approach, Project Management, Heathrow Terminal 5, Communication, Risk Management, Change Management

1. INTRODUCTION

Decisions have substantial effect on the timings, cost and outcome of the projects [1]. Team building is one of the important decisions with significant long time project outcomes. As put by Abosede et al. [2], teamwork is the sine qua non (an essential condition) to the project success of construction and the entire built environment. A team is more than individuals working in a group as they are mutually responsible and accountable for their achievements or failures. Teams have complementary skills, common purpose and with all the members being mutually supportive in working together towards goals [3].

As posited by Chatterjee et al. [4], construction projects involve many participants, such as the client, designers, consultants, contractors, subcontractors and vendors, who may bring with them risk of inexperience to the project. Hence, to achieve a common business objective, these parties

should all be involved in the process, and share objectives, interests and ideas for improving performance by means of teamwork [3]. Thus, selecting suitable teams and working in an integrated way has been recognised as critical to the success of any construction project [5]. OGC [6] states that “client and suppliers working together as a team can enhance whole-life value while reducing total cost, improve quality, innovate and deliver a project far more effectively than in a traditional fragmented relationship that is often adversarial. Collaborative working should be a core requirement for each element of every project.”

The construction industry has been widely criticised for its fragmented approach to project delivery and its failure to form effective teams [7]. Increased specialisation and decentralisation have led to the fragmented project team culture in this industry [8]. Poor performance in the construction industry has been attributed to the continued use of these fragmented teams without proper integration of all the parties involved [9]. Noteworthy is that the nature of teams depends on the type of contracting approach adopted in the construction project [10].

Adopting a suitable contract sets the stage for a positive and productive working relationship between the contractor and the client. There are variations of contract but the two widely used for construction projects are: Fixed-price and Cost-plus contracts [11]. Both contract types differ in pricing approach and allocation of risk. In Fixed-Price contracts most risk associated with the project are transferred to the contractor. The contractor is expected to procure the project based on its estimates in terms of forecasted project cost taking into consideration its assessment of the project risk. In accurate estimates could lead to cost overrun which has to be absorbed by the contractor. In contrast, Cost-plus contract allocates the project risk to the client. The client absorbs all project cost and pays profit to the contractor based on agreed terms. Complex projects usually create problems for contractors in contract pricing and usually results in tension in the relationship between client and contractor. Moreover, these contracts coupled with traditional team approach result in segregated teams, short-term focus and poor performance levels [11]. However, these approaches based on fragmented teams have been described as unproductive because benefits of specialisation overwhelmed by the problems of co-ordinating inputs and integrating outputs [12].

As a result of all these drawbacks, the widespread need for appropriately integrated teams has been confirmed in many

construction industries and a large part of the industries low performance has been blamed on fragmented teams [7], [8] in the United Kingdom over the last few decades. There has been a significant shift from fixed price contracts based on fragmented teams to incorporating non-price criteria in selecting contractors and supply chain based on integrated working. The Relational contracting based on integrated team approach, joint risk management, sustainable relationships and a longer-term focus has been adopted by the construction industry [13]. Mossman et al. [14] stated the successful adoption of the relational contracting approach in the T5 project.

Integrated team approach emphasises on merging of different disciplines or organisations with different goals into a cohesive and mutually supporting unit [9]. Integrated team approach demands that individuals from various organisations work together to achieve common attainable project goals through the sharing of information. This means that different company processes and organisational cultures have to be aligned in a collaborative manner. Integration is often recognised as a continuous process with the objective of improving team culture and professional attitudes. In construction, according to Baiden et al. [10], integration is used to describe the introduction of working practices, methods and behaviours that create a culture of efficient and effective collaboration by individuals and organisations. It promotes a working environment where information is freely exchanged between the different participants. The term “Integrated construction project team” characterise a highly effective and efficient collaborative team responsible for the design and construction of a project. The team brings together various skills and knowledge, and removes the traditional barriers between those with responsibility for design and construction in a way which improves the effective and efficient delivery of the project. Integrated teams in construction projects have the following features:

- A single focus and objectives for the project
- Fully utilize the collective skills and expertise of all parties to estimate time and cost estimates.
- Share information among all the parties involved in the project.
- Has a “no blame” culture.
- Joint quality responsibility
- Joint problem-solving responsibility [10].

2. CASE STUDY

For the purpose of this paper, we reviewed the management of The Heathrow Terminal Five (T5) project, which adopted the Integrated Team Approach (ITA) and this contributed to the successful outcome of the project. T5 was Europe’s largest and most complex project. The project started in September 2002 with an estimated investment of £4.2 Billion and was completed in March 2008. The project consisted of 16 major projects and 147 subprojects. British Airport Authority (BAA) was the project management organisation responsible for the design, construction and managing the supply chain of the project. The goal of the project was to increase the airport’s annual capacity of 65,000 passengers to 90,000 passengers. The project was completed on time, within budget and is one of the most successful complex projects in modern construction history of United Kingdom [15].

“The examination of historic data from previous, similar projects helps to utilise corporate knowledge” [16]. BAA carried out an in-depth study of every major construction and international airport project in UK and considered some likely aftermaths such as risks, change, industrial relations, multiple suppliers, cutting of interface and resource control that helped in better planning for the project [17]. However, lack of collaboration between client and supply chain and reluctance of client’s responsibility in risk taking were identified as the main reasons behind the past project’s failure that led to serious problems with expected cost and time. Thus, following were the major challenges in front of BAA:

- Ensuring that teams from different disciplines and companies involved in the project have shared goals and a collective vision that enables them to respond creatively to changing requirements.
- Managing the needs of over 50 stakeholders, including government, local communities, regulatory bodies and public interest groups, making sure that their requirements are represented and satisfied in order to get approval for the project [18].

In order to cope with the challenges BAA established a T5 Agreement based on the following two principles:

- The client always bears the risk: BAA took the responsibility of all the project risk and decided to bear the risk and pay for the risk on the project.
- Integrated Team Approach: BAA developed an integrated project team approach to ensure that the project met the cost, time, safety and environment constraints.

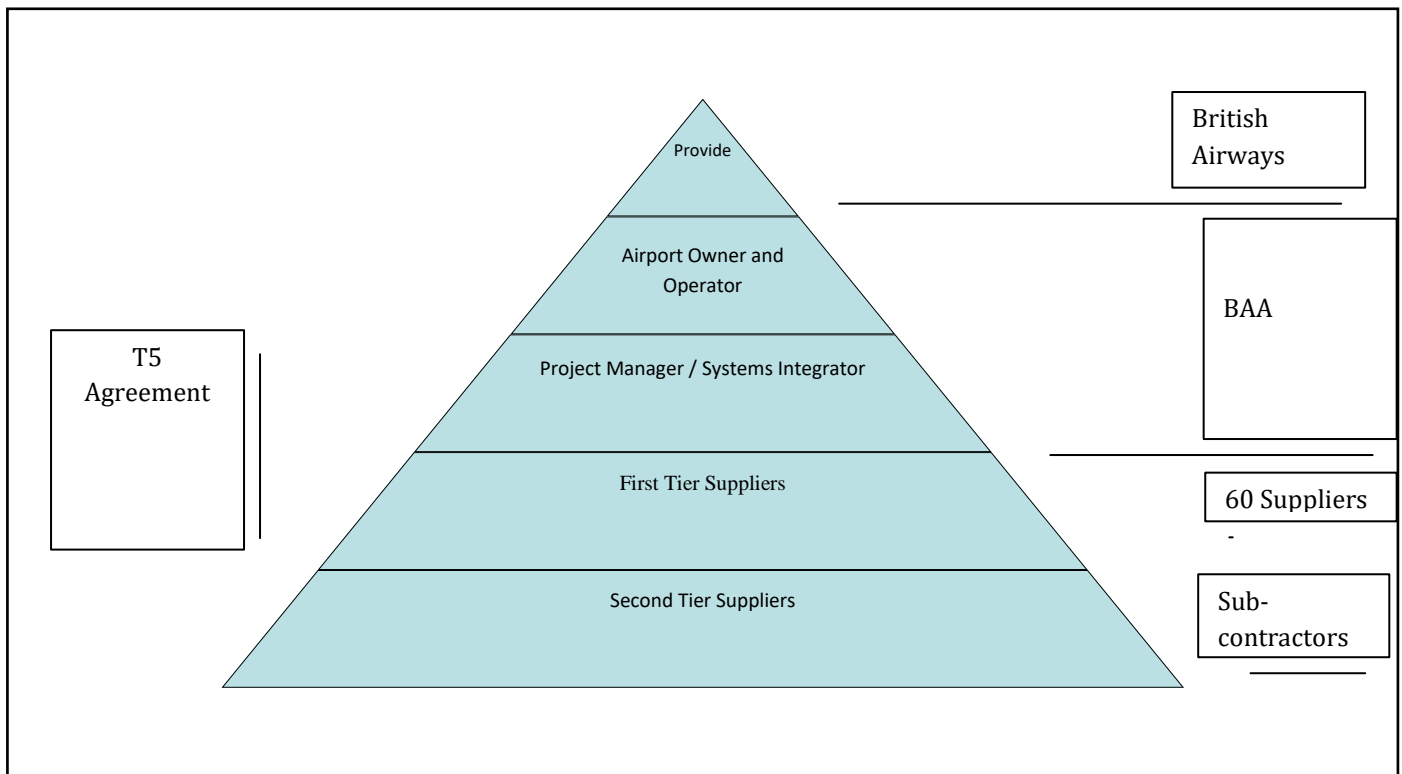


Figure 1: T5 Project Supply Chain [17]

BAA worked in an integrated team with the 60 first-tier suppliers covering diverse areas such as construction (e.g. LOR Civil Engineering Ltd. and Balfour Beatty), Design (e.g. Arup), Technical consultancy (e.g. Mott MacDonald), IT (e.g. Alca-tel Telecom), and transportation systems (e.g. ThyssenKrupp Airport Systems). BAA played multiple roles in the T5 project: Project sponsor and client, integrated project team member and system integrator. BAA also had a direct contractual relationship with the first-tier suppliers who had separate contractual relationships with their own subcontractors but were expected to work with them within the spirit of the T5 Agreement [19]. BAA worked as an integrated team member with the suppliers as partners in co-located teams, rather than traditional arms-length relationships [17]. The following were the key parties that

worked as an integrated team for the Heathrow Terminal Five Project:

The Integrated Team Approach governed by the T5 Agreement was based on simplicity, leadership and openness and created co-located and fully integrated team with client, principal architect and the principal contractor and formed a Pavement Team [15]. The Pavement Team provided many benefits including cost predictability, joint quality control system, improved conditions of site workers, higher level of safety [20]. BAA was highly effective in handling the project due to its high level of expertise, good partnership, and continuous assessment through constant involvement in the project.

Party	Role
BAA	Client, supervision and assembled the team into integrated team
Mott Macdonald	Rail assurance safely management, engineering design of waste water, foundation and tunnelling advice
Laing O' Rourke	Temporary model, steel reinforcement fabrication. They are the lead contractor in the civil phase
Rogers and partners principal architectural	Design of T5 departure, check in and self-service design and air traffic control tower
Arup Group (Engineering)	Project management and people movement
MACE	Principal contractor, construction management

Watson steel – a subsidiary to sever field - Rowen HOK	Steel manufacture Production Architect
Fagioli PSC	Transportation and lifting contractor and lift supervision (Lifting specialist)
Balfour Beatty Plc	Delivery of rail system element of T5

Table 1: Key Parties to T5 Integrated Team [21]

2.2 Role of Integrated Team working in achieving Project Success

2.2.1 Risk Management:

“Partnering is characterised by a greater degree of openness, communication, mutual trust and sharing information” [22]. Within partnerships a risk identification and assessment strategy is necessary to ensure partners share their assessments of risks. A joint risk register provides a good basis for this, giving the opportunity to come to agreed judgements, allocate responsibility for action and managing of risks, and communication of Risk. One example of an innovative and well-regarded approach to handling risk in a partnership is that of the BAA-led project to build Terminal 5 at Heathrow Airport [20], [23]. Under the T5 Agreement they developed a novel approach to risk sharing between client and suppliers. The principle of the agreement was focused on success, with all parties having aligned objectives and using risk management as a tool that helped decision making, enhancing workforce safety, and eliminating unforeseen events. BAA assumed responsibility for all the project risks and was involved in solving problems that was encountered during the project. This made the entire supply chain more dedicated towards work, as they were not worried about handling the risks alone [15].

BAA adopted a radical approach to the management of risk, including earlier risk mitigation via which they were able to manage the cause and not the aftermath effects of the risk [23]. Key messages include: “working on T5 means everyone anticipating, managing and reducing the risks associated with what we’re doing”. Central to rethinking project management in T5 was the idea of implementing a co-operative approach between the developer and customer that could be sustained throughout the years needed to design and deliver the terminal. BAA involved the T5’s customer (British Airways, BA) early on in the design process. The T5 team recognising customers need to refine requirements during the project, kept the schematic design for some elements fluid by adopting a design postponement strategy similar to that outlined in accounts of product development at Toyota [24].

Its aim was to fix progressively the schematic design, with the various design elements being frozen at the ‘last

responsible moment’ (LRM). The T5 team set the LRMs, and communicated them to customers as the dates by which selected works had to start to avoid disruptive ‘knock-on’ impacts on the overall project costs and/or schedule [25]. These plans were approved in D- day reviews prior to funding. The T5 Agreement between BAA and its suppliers also facilitated great flexibility in their relationship than a commercially aggressive contract [26]. These conditions are significant and constitute a limitation. However, the accounts of BAA and BA to the House of Commons Transport Committee [27] suggest that the bungled opening of T5 was caused by the simultaneous realisation of two main groups of risks: 1. inadequate familiarization and insufficient training of airline staff. Software problems and unserviceable facilities, including lifts, escalators, and toilets (which BAA framed as ‘no more than teething troubles’). It seems that co-operation between the two companies deteriorated towards the end of the project. Assuming the insights from managing co-design apply to project handover, this deterioration may have stymied exchanges of information essential to manage the hand-over stage, creating instead new and additional risks. With the developer’s attention fully focused on delivering T5 on time and within schedule, these risks may well have been overlooked. In exploring this logic, Zerjav et al. [28] berated this execution-focused mind-set, where the smooth project handover and operational delivery is seen as less of a core activity for project teams or not planned within the holistic project management strategies.

2.3.2 Change Management:

Prajapati [29] acknowledged that change to the design to satisfy the client’s evolving requirement is very crucial to the project as it is capable of triggering cost overruns and delay in the scheduled completion of the project. BAA carried out in-depth study of past projects in the conception phase of the project and found that one of the reasons behind the failures was the constant changes in the design because of the non-involvement of the client in managing the change [17]. Central to project management in T5 was the idea of implementing the Integrated Team approach between the developer and client’s that could be sustained throughout the many years needed to design and deliver the terminal. Thus, BAA adopted a ‘Customer-focused attitude’ to consider the requirements of the key client’s and worked in an integrated team with its clients early in the design phase [15]. In order to

the take the requirements of the client, BAA project team collocated itself on the project site and worked with the key project teams for the clients to identify and document the changes associated with the project. BAA adopted a progressive design fixity approach and worked as an integrated team with the client to manage the design changes associated with the project using flexible design via modular architecture [30]. This approach made the design fluid to incorporate the client requirements and offered range of design options to the client within the scope of the project. The design option that best fit as per client's requirements as well as within the tolerances set by the T5 project management team was frozen at the Last Responsible Moment (LRM), that specified the date by which to start the selected design work. BAA project management team was responsible for communicating the frozen design option set at the LRM to the client team in order to minimize rework and avoid any delay [22]. In our opinion integrated team working between BAA and key clients in the early design phase of the project helped to identify, manage and document the changes as well minimized the degree of the changes in the design.

2.3.3 Communication:

From investigating past projects BAA discovered that inefficient supply chain was a major cause of failure in megaprojects [17]. To overcome that BAA decided to engage the entire supply chain via Integrated Team Working [23]. Under T5 agreement they established Integrated Team Working Approach in which BAA had the dominant central role within the procurement and management process and acted as a lead contractor manager in collaboration with a core team of consultants and contractors. See Figure 2.

Integrated Team Working Approach helped BAA to form long-term relationships with the supply chain as they worked closely with them. It also helped improve communication and reporting within the project team. Individual contractor had its own system for reporting [30]. Thus, to ensure a seamless flow of information amongst contractors, Denicol [19] revealed that a common base for information dissemination had to be adopted. This led to the creation of the T5-3D modelling with a single model environment (SME). BAA and its project partners created a 3D computer model that enabled the design build and maintenance of the terminal building through a single solution of collaboration by all framework partners [30]. This enabled T5 to achieve its target project cost reduction of 5%. The T5 project management philosophy developed over a period of 10years through continuous trials, reviews and reflections and incremental improvements by the BAA project team.

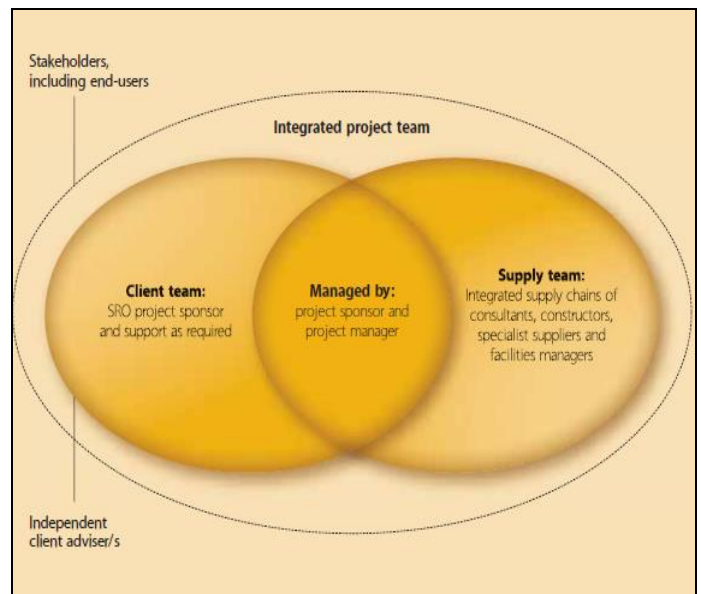


Figure 2: Integrated Project Team (OGC, 2005)

BAA produced a set of guidelines to 'ensure a consistent approach to projects across the group which meets business needs through the optimum business solutions' known as the Continuous Improvement of the Business Process (CIPP). In 1999 a second look at the CIPP forced BAA to shift from construction to an approach towards assembly and design for manufacture to manage T5 project. This approach reflected a 'more predictable design manufacture and assembly process' [31]. The new process included the development of an integrated team approach, mapping the supply chain, developing the supply chain management, introducing component-based design and developing the process for productivity improvement [32].

Between 1993-4 and 2002, BAA begun and developed Framework Agreements to partner with a number of preferred suppliers on an on-going basis (10yr period). Suppliers worked with BAA in an integrated project team to cultivate close corporation, to leverage the right expertise needed for specific projects and also to reduce costs [15].

T5 project also pioneered the concept of a buy club (T5 Mechanical and Electrical trades) created openness and collaboration [17]. It pooled the expertise and buying power of three 1st tier M&E contractors and sourced each of thirteen specialisations from one supplier who was then responsible for supplying all sixteen projects at T5. T5-3D modelling with a single model environment (SME). BAA and its project partners created a 3D computer model that enabled the design build and maintenance of the terminal building through a single solution of collaboration by all framework partners [30].

3. METHODOLOGY

For the purpose of this research, we designed and circulated a questionnaire for the collection of evidence. Questions were structured along the line of a formal survey. This situation aided in production of quantitative data as part of the evidence of our research. It also served as means of qualitative data collection as opinion comment boxes were attached to the questions asked. This survey followed all the sampling procedures and instruments used in regular survey-questionnaire. This approach helped us to focus our questions directly on the research topic. Secondly it provided brief but quality explanations and perceived causal inference. But the process was weakened, due to poorly structured questions. Some were bored by the similarities in structure of some of the questions, while others did not provide useful information [33]. 60 questionnaires were produced and distributed to Project managers of the AMP Group Ltd., and project management teams in construction and IT companies, out of which 51 were returned. This provided a response rate of 85%. Reliability test and tests for normality were carried out to ensure good quality of research instrument and the normality of data. The research method consists of the following steps:

- Development of structured questionnaires to acquire information regarding the adoption of Integrated Team Approach in project management.
- Conducting survey through questionnaires using “closed ended” questions for quantitative analysis and using comment boxes for qualitative analysis.
- Assessment and analysis of feedback from questionnaires survey based on the variables for effective adoption of Integrated Team Working Approach in project management.

4. RESULTS AND DISCUSSION

Use the key in table 4 track the questions and answers with percentages in tables 2 and 3.

Table 2: AB – Level of Awareness of ITA in Project Management

Variab le	V	%	M	%	Q	%	D	%	Mea n	Std. Dev	%
AB	2	1	7	5	1	8	3	2	2.62	1.04	65.5
		5		4				3		4	5

Note. VE = 4, ME = 3, QE = 2, DK = 1

Table 3: Survey Questions and Results

Variable	Yes	%	No	%	DK	%	Mean	Std. Dev	%
CD	11	85	2	15	-	-	1.69	0.751	84.5
EF	2	15	7	54	4	31	0.62	0.768	31
GH	12	92	-	-	1	8	1.92	0.277	96

Note. 2 Yes, 1 DK, 0 No

ABBRV	DESCRIPTION
AB	Level of awareness of ITA in project management
CD	Can ITA deliver successful project in all fields?
EF	Is ITA dependent on contract type?
GH	Can ITA influence communication, reporting, change and risk management?
VE	Very extensive
ME	Moderately extensive
QE	Quite extensive
DK	Don't know
%	Response in Percentage

Table 4: Key

4.1 Reliability

Prior to the data analysis, the normality of data was first confirmed using the Shapiro-wilk test ($p < 0.05$), followed by an examination of the QQ plots. This was followed by a test of the reliability of the data. It was carried out using the Cronbach's Alpha approach, which is the most widely used method for determining the reliability of data. With a Cronbach Alpha value of 0.717, the reliability analysis revealed an adequate level of internal consistency of the survey instrument.

4.2 Awareness of ITA in Project Management.

From the outcome of our survey, as shown in the table 2 and 3, 54% of our respondents believe that the awareness of ITA is moderate, 15% agreed the awareness is very extensive, 8% believed the awareness is quite small, while 23% have no idea. With an overall mean of 2.62 and rating 65.5%, it is seen that respondents appraised the level of awareness of ITA in project management to be moderately extensive (See Figure 3: Graphical representation in Appendix). Some of the respondents who believe that ITA is very and moderately extensive in project management also added that “The Association for Project Management APM which they belong to, agree with government's usage of ITA and emphasized that ITA is not successfully adopted across private sector of construction industries”. According to this respondent, ITA is a government position which APM champions and that it is not that popular in the private sector industries.

To support the position of the first comment, another respondent from Private IT background wrote “I haven't come across this term or phrase (ITA) before...” and to boast the unpopularity of ITA in some quarters, John Thorpe commented “This is not a subject that I have personally seen a lot of publicity for”. Another contribution from another anonymous APM member who believes that “APM is very varied with some quite traditional approaches from e.g. construction, and some involved in much more progressive

style of working.” ITA for this respondent is popular in APM but he also agreed that the popularity in APM does mean there are no other traditional approaches and much more progressive style of working.

The implication of this result is that awareness of ITA which by the application by BAA on Heathrow Terminal 5 project is a successful teamworking approach at least within the engineering and construction industry is still not extensive even within the United Kingdom.

4.3 Can ITA deliver successful projects in all disciplines?

85% of respondents believe that ITA can deliver successfully in all types of projects, while 15% believe it cannot be successfully applied to all project types (Figure 4: Graphical representation in Appendix). These respondents who are of the view that ITA can be successfully deployed to manage all project types of projects stated the following:

“Any project / programme depends on the delivery of multiple work streams and or contractors who take responsibility for their delivery. The principals of openness, shared risk profiling and a no-blame can all add to the chances of success if implemented correctly. Success will depend upon strong management over the duration to ensure that 100% commitment to the aim is maintained by all the parties otherwise it could fall apart very easily. The approach could be adopted in any sector with tweaking to meet any special criteria. The management and sharing of risk should be identified early in the process and tested during any procurement exercise when partners (sub-contractors) are being chosen. If there is no commitment up front it could be impossible to execute. The main partner would also need to have a very clear vision and objective” John Thorpe (Arrass People).

Respondents believe the logic of teams working together rather than unilaterally has applicability across all business function. Support for this suggestion was based on experience from working on varying project types in both public and private sectors. It was particularly suggested by a respondent that the evidence of the success of ITA is substantial in engineering and construction although the industry is traditionally fragmented and confrontational. The implication to stakeholders in the industry is that ITA should be encouraged in all projects. In contrast however, 15% of respondents suggested that ITA could not be applied to all projects especially IT projects. This was bolstered by the statement submitted by a respondent:

“The smallest IT project is more complex than the largest scale construction project you can imagine. The more you try to integrate an IT project team the more they fall apart. Thus, ITA can work in other disciplines except IT” David Connor (IT Project Manager).

4.4 Is ITA dependent on contract Type?

From our findings, 54% of respondents believed the adoption ITA was not contract dependent, 15% believed ITA was contract dependent, while 31% did not know about the dependency of ITA on contracts (see Figure 5: Graphical representation in Appendix). The respondents who were aware of the dependency were unanimous on the effective adoption of ITA in a cost-plus contract, however issues were raised with regards to the practicality of ITA in a fixed cost contract. From the opinion of respondents, the dependency of the application of ITA on contract type was found to hinge on fixed cost contracts where 15% of respondents believe ITA cannot be adopted. They suggested that ITA cannot be successfully adopted in a fixed price contract because this contract type cannot accommodate much change or project upgrade, unlike with cost-plus, where changes that will arise from the inputs of all teams will be properly shouldered. The 54% of respondents who believe ITA application bears no dependency on contract type were cautious to point out that the initial pricing of risk in fixed cost contract was vital to the successful adoption of ITA.

“In a fixed cost scenario, the management of risk is always a higher priority (and should be priced into the job). If it were to be implemented the customer would have to ensure that they are not doubling their risk and that the contractors clearly understood the process when pricing. You would also need to ensure that there was a suitable change management system in place to fairly manage any changes to specification” John Thorpe (Arrass People).

While 54% of respondents believe that ITA is not contract dependent, it is imperative to highlight that 31% do not know, while 15% said it is contract dependent, it is important to note that 31% and 15% are significant and thus in a fixed cost contract, as suggested by John Thorpe, contractors should be made to understand that ITA could force changes that is capable of influencing their budget.

4.5 Can ITA influence Project Management Processes?

From our findings, 92% of respondents believed that ITA can positively influence communication and reporting, change and risk management while 8% of the respondents did not know.

It was generally agreed among respondents that risk management was one of the primary reasons for adopting ITA. It was suggested by a respondent that the ability to identify where risk lies and how it can be best managed should be one of the top three ITA tasks. Without a very high level of collaboration between clients, principal contractors and subcontractors risk will not be managed successfully. Thus, ITA would increase communication and openness will improve the quality of risk management and delivery.

In terms of change management, the consensus was that project participants naturally retreat into their silos when change happens in order to protect commercial positions (fight / flight response). However, adopting ITA helps get the team working together before the proverbial hits the fan, so they are used to this way of working and makes it harder to withdraw. This was generally suggested as a key area in ITA application. Managing requirements baselines and client/customer expectations requires a tightly controlled change management process agreed at all levels within the project that is fully supported by the ITA.

5. CONCLUSIONS

The operations of the engineering and construction industry is heavily reliant on teamwork. A team is supportive and complementarily skilled individuals working together with common purpose to attend a defined goal. As construction is a fragmented industry, with teams with different objectives, interest, ideas. For effective project management processes of communication, risk, change, it is imperative to get project teams working in integration. ITA help manage project cost, improve quality, creativity and innovation and delivers a project far more effectively than in a traditional fragmented relationship that is often adversarial as attestable from the ITA application by BAA in Heathrow Terminal 5 Project.

While ITA has been around for decades now, evidence from this study reveal the need for more awareness around its application. It was also ascertained that ITA application can lead to successful delivery of any type of project especially in engineering and construction industry. Although ITA application does not depend upon the type of project contract entered into, it is highly recommended that contractors with fixed-cost contract should recognize that ITA enables changes and should accommodate such changes within their budgets. Furthermore, it was confirmed that ITA positively influence communication, risk and change management as a result of it open and collaborative features.

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7. APPENDIX

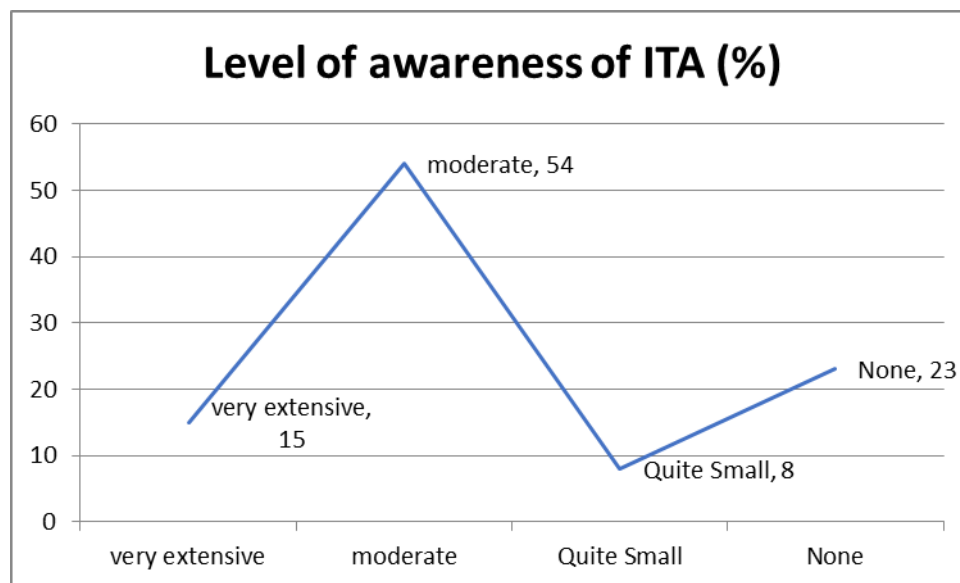


Figure 3: Awareness of ITA in Project Management.

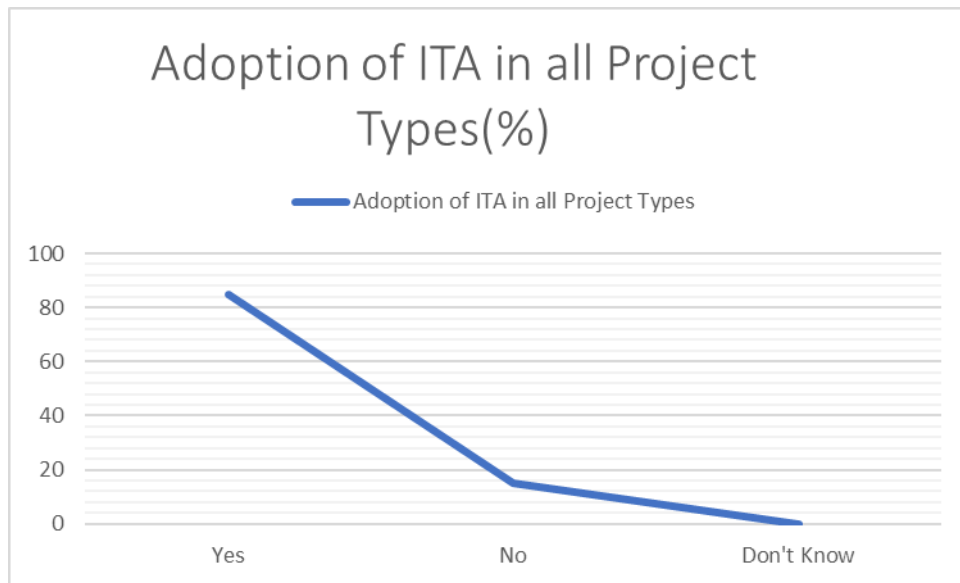


Figure 4: Adoption of ITA in all Project Types

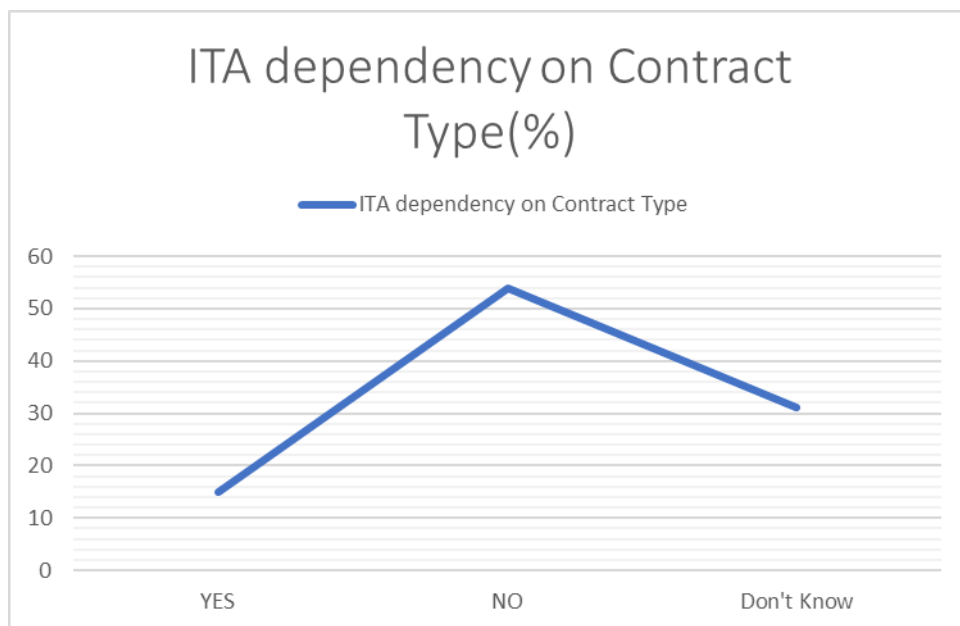


Figure 5: ITA dependency on Contract Type

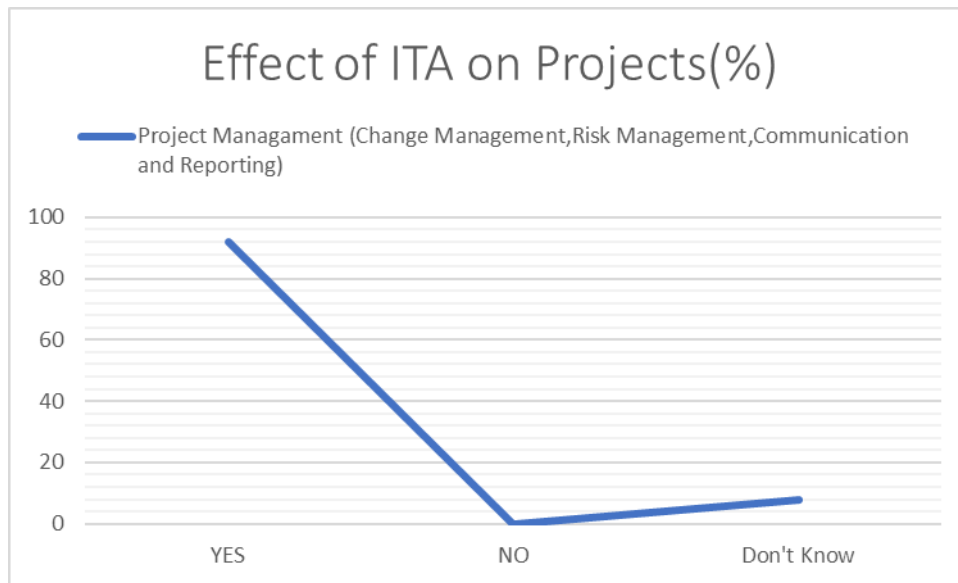


Figure 6: ITA influence on Communication and Reporting, Change and Risk Management