

LOOKING BEYOND PROCESSES: HUMAN FACTORS IN TEAM INTEGRATION

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The Accelerating Change report in 2002 highlighted the importance of team integration. Much previous research focussed on providing an integrated process for improved project delivery performance through the transfer, use and application of successful integration techniques, models and tools from other sectors and industries. This approach has still not been able to comprehensively integrate construction project teams hence the recent calls for teams to integrate in order to achieve acceptable performance. The definitions of team, teamwork, integration and integrated team are clearly set out. Teams comprise people and issues dealing with how they can be integrated must be considered in any effort to have them work together. Team performance still face barriers from the organization and the team and continues to contribute to an unsatisfactory product delivery to the client. The impact of the human factors on the performance of the team and consequently their contributory factors to project success that have not received much attention in the past can therefore be thoroughly researched as a further means to integrating the team for improved project delivery performance to the client's satisfaction.

Keywords: human factors, integrated team, performance, product delivery, teamwork.

INTRODUCTION

The Rethinking Construction report by Egan (1998) remarked that the construction industry has low profitability and too little investments in research and development to keep abreast with technological and process innovations. Clients were consequently dissatisfied with the overall performance of the products delivered by the industry. The creation of a fully integrated service to deliver predictable results to client is therefore desirable and the construction industry is expected to become more successful by continuously improving its performance through the use of integrated teams. Processes and team integration is therefore a key driver of change needed to set the agenda for the industry. Presently, integrated teams deliver less than 10 per cent of projects in the UK. It is however, targeted that, by the end of 2004, 20 per cent of construction projects by value in the UK should be undertaken by integrated teams and supply chain, increasing to 50 per cent by 2007. (Egan 2002) Recent calls for change in general, and integration in particular, buttress the fact that there are still barriers that have prevented teams from working as a unit as expected or envisaged. Attempts at addressing the problem of fragmentation for improved performance have concentrated on processes rather than team integration. The result so far, is an establishment of appropriate structures for the integration of process in the construction industry (Evbuomwan and Anumba 1998, Anumba, Baugh and Khalfan 2002) The introduction of integration techniques from other industry has also achieved limited success (Ngowi 2000). Teams are still not comprehensively

integrated to derive the full claimed benefits necessary for increased efficient product delivery to satisfy the client. Research into integration must go beyond processes and look at how the people in the team can work together as a unit. This will help to further address integration comprehensively to enhance the survival of the industry in the present competitive environment.

Past researches on team integration are reviewed in this paper to identify the issues that have been addressed and highlight those that need further study. Conclusions are then drawn to highlight the need to look beyond process integration and consider human factors as a means of further integrating the team for improved project delivery performance to the satisfaction of the client.

DEFINITIONS

Team

A team is a group of people who must cooperate with each other to accomplish a given task. It is formed for the purpose of working together with complementary skills through a common approach to achieve what cannot be individually achieved effectively and efficiently (Ingram *et al.* 1997, Bragg 1999, Rosenthal 2001). A team therefore has specific objective or recognized goal to attain and requires co-ordinated activity among members (Larson and Lafasto 1989). There is also group accountability and mutual responsibility for achieving results. These are the fundamentals to achieving a high performance and effective team, which work on meaningful projects and not trivial matters (Bragg 1999, Nesan and Holt 1999). A team by its nature offer greater participation, challenges and feeling of accomplishment and therefore attracts and retains people of high capabilities in an organization within a given industry (Conti and Kleiner 1997). Organizational teams have become very useful in accomplishing a wide range of activities including cross-functional projects. Their centrality within the organization however presents two main conflicting goals: long-term renewal and short-term performance (Cunha and Louro 2000). In conclusion from the above, a team is “a group of individually skilled people formed for the purpose of working together in a supportive and complementary manner to achieve what cannot be efficiently or effectively achieved singly”. It must therefore possess an atmosphere of participation, cooperation, sharing and collective problems analysis and solution as well as group and individual responsibilities and accountability.

Teamwork

Teamwork is the co-operative and coordinated efforts by individuals working together in the interests of their common cause. It therefore requires the sharing of skills and leadership, the playing of multiple roles (Ingram *et al.* 1997). Teamwork enables effective tackling of complex problem by a pool of expertise with greater knowledge, skill and experience. It also provides opportunity for employees to learn more about their jobs through participation in problem solving and decision-making. Teamwork aids team and departmental interface problem resolution and improves the quality of decision-making (Nesan and Holt 1999). Teamwork is one of the most widely recommended tools for organizational transformation and must be supported by major changes in culture, structure and systems for success (Drew and Coulin-Thomas 1996). It has an impact on productivity and the quality of services or products produced by a work group. High quality teamwork stimulates on-going innovations and gains employee commitment. Productive and efficient teamwork provides an edge

by being a sustainable competitive company asset (Golestani and Van Zwanenberg 1996). Summarizing, teamwork is “the structured, cooperative and coordinated efforts by individuals or functional groups, working together in a balanced participatory manner, through the sharing of skill and information for their common interest and objectives”. It occurs at interfaces to improve problem solving and decision-making and must therefore be supported by major culture changes, organization structure and a working system.

Integration

In the construction industry, the word “integration” has been widely used to describe the concept of freely exchanging information between different participants in the construction process, though actual examples have been limited and localized (Vincent and Kirkpatrick 1995). In the opinion of Betts, Fischer and Koskela (1995) however, any concrete definition must address the “who, what, when and why” of integration to strengthen and give more meaning to the definition. Integration, according to Howell (1996) and Jaafari and Manivong (1999), is the merging of different disciplines with different goals, needs and culture into a cohesive and mutually supporting unit encouraged to undertake a single task. This leads to working together to achieve a common goal through the sharing of information. Davies (1995) viewed integration as merging individual and organizational goals into a single attainable project goal. It is also the alignment of various processes to conformity with each other (Dainty, Briscoe and Millet 2001). Integration, therefore, gives the opportunity to incorporate several projects into a single structure (Austin, Baldwin and Steele 2002). Others have used integration to mean working in a collaborative manner and continuously improving team cultures and attitudes from professional backgrounds (Austin, Baldwin and Steele 2002) and working in a coherent manner to overcome structurally or culturally determined interfaces (Moore and Dainty 1999). The definitions of integration can be summed up as “bringing together different requisite contributory functional disciplines to work in a continuous collaborative and cohesive manner to achieve a more efficient and informed desired collective objectives”. It involves the continuous alignment of the diverse disciplines towards the common goal through the thorough sharing of needed information by any discipline at any given stage in the process.

Integrated team

An integrated team comprises the client and those who are pivotal and involved in providing solutions that will meet the client’s requirements in the delivery process. The team requires members to harness the potential of the processes associated with delivery efficiency (Egan 2002). White (2002) highlights the existence of many different styles of integrated teams and the fact that there is no one right way of integrating a team. The most important issue is the vision of the team, which is working together with common goals and objectives. Integrated teams can be seen as “virtual companies” set up to maximize the opportunity of predictability and continued improvement. In conclusion, an integrated team is, “a team of individually distinct groups or teams with functional identities working together in a consciously complementary and continuous way to achieve a set objective or target through a system of unrestricted cross-sharing of information leading to more efficient and effective decision making under competent team leadership with the ability drive the overall optimum achievement of initial goals set for the team”. The team must consequently possess all the requisite skills, management ability and dynamism

needed for the attainment of the desired objective for the team. Following on from the above definitions, an integrated project team could be a team of teams or individuals with defined skills and professional roles working together to achieve common objective set out for a project within a given time frame. The level of independence makes working together a necessary requirement for success. In order to achieve a common goal, they must also share information and take optimum analytical and informed decisions.

APPROACHES TOWARDS TEAM INTEGRATION

The construction industry has approached integration from two main perspectives, namely project procurement and product delivery. An integrated procurement system, reducing the number of parties the client has to deal with to a single responsible party has been adopted. The product delivery process has also been integrated to reduce the number of distinctive parties to a single all-inclusive party. The several separate and phased processes involved have also been merged into a system capable of delivering the same product in a single process.

Procurement

The construction industry is generally perceived as a “team” industry as construction is a largely collectivist activity (Moore and Dainty 1999). Products can therefore be procured using team effort and techniques. Teams in construction have traditionally been formed along professional and functional lines and have remained separate, thus making the “team” industry a “teams” industry. Integrated forms of procurement have thus been introduced to merge the teams into one multi-professional and functional team. In the Modernizing Construction report by Bourn (2000), design and build, primes contracting, and public private partnership (particularly private finance initiative), were recommended as the main procurement approaches. These promote integration and management of all those involved in the construction process. Design and build procurement, according to the CIOB (1998) is where the client deals with the contractor for the complete design and construction of a facility giving a single point responsibility. In prime contracting, the Prime Contractor establishes a chain of suppliers of quality project inputs, which is integrated into the design process, co-ordinates and project manages all activities through design and construction period. Private finance initiative is where the supplier is contracted to construct the facility and also principally deliver the intended service for the facility (Bourn 2000).

Product delivery

The product delivery process has been addressed from the “hard” or process and “soft” or people perspectives. Concurrent engineering, information and computer technology (ICT) and process models have considerably been used as techniques and tools to integrate the process of product delivery. Much of the issues relating to people have also been addressed through client leadership and transparency proposals, creation of project culture and institutional training of professionals.

Process

Concurrent engineering has been used as an approach to overcoming the fragmented nature of the design and construction team. The technique is expected to achieve the full integration of the relevant processes and activities through the establishment of appropriate organization structures supported by communication tools and technologies (Evbomwan and Anumba 1998, Love and Gunasekaran 1998, Jaafari

and Manivong 1999, Ngowi 2000, Anumba, Baugh and Khalfan 2002). The construction process has however been integrated using ICT which is aimed at improving communication among project participants by increasing the level of information flow and share (Faniran *et al.* 2001). To enable the various functional disciplines within the project to become involved in the production process and to concentrate on the achievement of a common goal, the concept of setting out a model based on the project or product at the start of the project has been proposed by Jaafari and Manivong (1999). This concept, like others such as “FUSION” and “Building Down Barriers” emphasizes the adoption and application of business process as a means of addressing the fragmentation within the construction industry as pointed out by Evbuomwan and Anumba (1998).

People

Roles that individuals can play or offer in a team environment has been researched but in the context of existing process integration approaches. There has been for example, the finding that greater client leadership can successfully drive the process of inter-company integration that leads to the insistence on transparency and mutually beneficial processes for all parties (Dainty, Briscoe and Millet 2001). This could be tackled through joint sponsorship of demonstration projects, which enhances the implementation of approaches toward integration (Egan 1998). The formulation and collective agreement of project goals with team members is however, vital for teamwork success in a multi-disciplinary environment (Love and Gunasekaran 1998). There are still various professional disciplines in the integrated project delivery environment, each with its own cultural biasness. These cultures are often competing and make team interaction complicated and ineffective. The creation of single-focussed project culture has consequently been suggested by Moore and Dainty (1999) as a way of bringing the various professionals together. They have further concluded that project member consistency, physical proximity of project team members and early involvement of team players can help break down these cultural barriers. They argue that team relationships can be explored through recorded communication and behavioural patterns in response to change events. Austin *et al.* (2002) also emphasized the need for team to understand each other. In a design and construction environment for example, designers must improve their understanding of the construction process, together with their roles and responsibilities. Contractors must also be provided with an improved understanding of how design interfaces with construction. Other efforts that would go a long way to address issues relating to people in the integrated team include the conducting of short-term team-building exercises to encourage mutual respect for the skills of other team members. The need for professionals to work in an integrated manner can be started at the institutional level must be promoted as a compromise to forming new integrated professional bodies, which is likely to be resisted and thus make it unworkable. Joint accreditation of programmes by the various professional bodies can also be implemented to present the interdependent nature of the construction industry (Moore and Dainty 2001).

BENEFITS OF INTEGRATION

Integrated team should be an aspiration because it leads to efficiency of the delivery process, cost effectiveness through elimination of waste and increased profitability. This consequently enables firms to deliver value for money to the client’s satisfaction. In the long-tem, integration is crucial to the survival of the firm through better returns on investments in a competitive environment.

Efficiency of the delivery process

Egan (1998) highlighted the need for improved performance in the construction industry and emphasized that the most successful enterprises do not fragment their operations. Betts, Fischer and Koskela (1995) found out that, there are two basic activities of conversion and flow in any production system and both incur cost and time. Value is however added in conversion whilst flow activities such as inspection, waiting and moving add no value to the product. Integration improves the conversion process and at the same reduces or eliminates non-value-adding flow activities. Anumba and Evboumwan (1997) concluded that a more efficient system is where both activities are simultaneously undertaken removing segregation and isolation to shorten the overall product delivery process. Potential wastes from design errors are then reduced or eliminated. The process time is subsequently improved from getting it right the first time.

Cost effectiveness

Many researchers (Akintoye 1994, Stutz 2000, Opfer, Son and Korman 2002) have concluded that one of the reasons assigned to the popularity of integrated procurement approaches is greater price certainty. This, according to Ling and Khee (2000) and Ndekugri and Turner (1994) is achievable because the method leads to fewer disputes and consequently, future cost additions from variations. Project costs are therefore managed more effectively in an integrated environment. Duplication of work and errors resulting from decision made without due consultation that lead to cost increases are eliminated or reduced. In an integrated product delivery environment, all the necessary components of the process are able to contribute, leading to waste reduction, cost certainty and efficiency.

Long-term survival

The present state of the construction industry calls for the continued delivery of a satisfactory product to clients by an integrated team. This is critical for the future survival of a company and the industry as a whole (Egan 2002). Crane (2002), making a business case for integrating the team, pointed out that business organizations aim to achieve adequate returns on their investments and that can be achieved through the better use of scarce resources, i.e. the skills and availability of people through integrating the team. He further submitted that the cost of procurement of contracts amounts to 4.5 per cent of turnover for large companies but it has been proven that integrating the team can reduce this cost by 30 per cent. Companies can consequently increase margins and make better profits. Integrating the team can consequently be seen as a significant approach in ensuring the long-term survival of not only the firms that embrace the concept but the industry as a whole.

BARRIERS TO INTEGRATION

Team performance can face barriers from sources such as the organization, the leader, or the team members themselves (Myers 1999, Nichol 2000). Successful teams are however good for a company and its people as they integrate the individuals and the organization (Golestani and Van Zwanenberg 1996). Recent calls for change in general and integration in particular buttress the fact that there are still barriers that have prevented integrated teams from working as a unit as expected or envisaged.

Organization

Historically, the project delivery system has been a fragmented process and the nature of construction projects relationship has traditionally been contractual and adversarial. Firms in pursuit of profit due to their independent nature have often ended up with adversarial attitudes. This has led to an inherent degree of mistrust and existent of scepticisms (Ngowi 2000, Dainty, Briscoe and Millet 2001). Contractual packaging of works is traditionally according to trade or discipline and parties do not need to know each other in order to participate in a project. There is therefore less concern for interdependence (Ngowi 2000). Positions within the hierarchical structure of traditional construction process relationships, which are inequitable, have also resulted in high degree of inter-organizational conflict. Good working relationships have therefore been sacrificed for traditional adversarial professional boundaries (Moore and Dainty 1999). Anumba, Baugh and Khalfan (Anumba, Baugh and Khalfan 2002) also submitted that there is widespread resistance to the use or application of ICT, designed to specifically support organization structure and decision making in a concurrent engineering environment. This is further worsened by the intense competition and the project driven nature of the industry that make firms reluctant to invest in IT with no immediate and often guaranteed benefits. This strengthens Fischer's (1995) positions that IT is still treated as expenditure with immediate outcome rather than an investment, which yields returns over a period of time.

Team members

The presence of diverse functional teams in a complex team interaction results in competing cultures. Project objectives are therefore aligned with these cultures making a single focused objective very difficult to attain. There is work-group emphasis on reactive problem solving rather initiative-taking problem avoidance (Moore and Dainty 1999). Teams also exist with same main project goals but with different sub-goals. The alignment of these sub-goals usually presents a challenge that has to be overcome (Love and Gunasekaran 1998). Professional, communicative and attitudinal interfaces have also impeded the flow of information in an integrated team environment (Moore and Dainty 1999). Current practices allow only a fraction of the project participants to make decision, which has profound impacts on the entire project. Information is therefore not freely shared throughout the project process (Jaafari and manivong 1999).

Leadership

Roles and responsibilities within the team environment continue to be under traditional fragmented system along professional lines. Though these are not detrimental in themselves it leads to discontinuities and ineffective responses to changes in the delivery process. Strategic professional alliances are thus formed bounded by professional and cultural barriers resulting in work groups of individuals (Moore and Dainty 2001).

CONCLUSION AND KEY RESEARCH QUESTION

It can be concluded from the literature reviewed that approaches, techniques and tools all aimed at integrating the team have received attention. However, the level of project delivery in the UK construction industry by integrated teams is reportedly low and unacceptable. The creation of fully integrated teams, with benefits of process efficiency and long-term contribution to company survival, to deliver satisfactory product to clients is both an aspiration and desirable. Processes and team integration is

therefore a key driver of change if targets set by the industry are to be achieved. Past researchers have focussed more on process integration in the context of providing an integrated process for improved project performance. Considerable work has therefore been done on integrated procurement and product delivery process. There are however, still barriers that face the team and make it unable to perform to its best ability. What remains to be done is the integration of the team itself from the soft or people perspective. The establishment of definitions of team, teamwork, integration and integrated team gives the research its contextual basis. The basis for the direction of past researches has been that good team performance will lead to good project performance. Whilst this is true, it also ignores the impact of factors outside the team environment that can positively or negatively affect the project performance. This is consistent with the findings of Dainty and Moore (1999) that, expected project performance can be achieved when the teams are not necessarily working as they should. Anumba, Baugh and Khalfan (2002) also concluded that the continued usage of traditional performance measurement has also hidden the real issue of efficient team functioning of the team. The impact of the people issues on both the performance of the team and consequently their contributory factors to project success have therefore not been thoroughly researched. This research therefore aims to identify the soft issues that contribute to the successful integration of a team for improved project delivery to the satisfaction of the client. This will be carried out by isolating those variables that contributed to the success of well known and award winning projects through exploratory interviews. The variables will then be mapped with variables needed for high team performance the objective of an integrated team. Those issues that have a direct bearing on the performance of an integrated team can then be identified. A model of performance measurement of the team incorporating the identified soft issues that have not been given much consideration in past researches will then be developed and validated through a workshop.

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