

The extent of team integration within construction projects

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Abstract

This paper investigates the extent of integration achieved by construction project teams managed by award-winning construction managers within successfully completed projects. The research findings reveal that construction project teams exist as individual competent units within their organisationally defined boundaries. They exhibit varying degrees of integration, which are determined by the team practices adopted and their congruence with the procurement approach. The findings of this research do not, however, support the argument espoused by many construction industry authorities, that seamless operation is a fundamental requirement of integrated team performance. It is concluded that either fully integrated teams are not necessary for effective project delivery within the industry, or that the sector must overcome existing organisational and behavioural barriers if further improvements in project performance are to be fully realised in the future.

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1. Introduction

The construction industry has been widely criticised for its fragmented approach to project delivery and its failure to form effective teams. This has resulted in reduced project delivery efficiency [1–3]. Poor performance has been attributed to the continued use of procurement practices that do not encourage integration of the parties involved [4]. However, over the past decade the industry has sought to improve the performance of its delivered products by introducing various improvement tools and techniques. Previous reports by Latham [5], Bourn [6] and Egan [1,2] have all challenged the industry to move away from its traditional *modus operandi* towards more collaborative and integrated approaches. The most recent of these, Accelerating Change [2], challenged the UK construction industry to create a fully

integrated service capable of delivering predictable results to clients. The report suggested process and team integration as a key driver of change necessary for the industry to become more successful [2]. Following on from the report, an ‘Integration Toolkit’ was developed to engender an integrated approach by replacing the prevailing fragmented and contractual relations with collaborative forms of working [7].

Attempts at team integration in the construction industry have been largely focused on improving project procurement and product delivery processes [8]. Design and construct strategies and partnering arrangements aimed at encouraging team formation, collaborative working and retention of workforce have been used to attempt to integrate the construction project delivery team [4,9]. Integrated forms of procurement, such as design and build, that bring together the design and construction phases of projects, have also been introduced [6,10]. However, although well intentioned, many of these attempts have not fully achieved the expected success, probably because they are frequently superimposed onto

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environments where adversarial cultures and attitudes still exist [11,12]. Tangible examples of where true integration has been achieved in the industry are limited [13,14].

This paper investigates the extent to which award-winning building and construction managers were able to integrate project delivery teams. It explores the practices within teams that lead to full integration, partial integration, or fragmented working. These practices are viewed within the context of the individual procurement systems used, which themselves have a bearing on team practices. The aim is to identify the effective practices of such managers in integrating their teams and moreover, to identify whether integrated working, as espoused by the industry's improvement forums, has been fully realised within the industry's best performing projects. The changes and improvements required to achieve fully integrated teams are also discussed.

2. Fragmentation within the construction industry

The *Rethinking Construction* report [1] and the *Accelerating Change* report [2] both highlighted that the performance of product delivery by the construction industry is variable. Time and cost overruns are commonplace and far too many resources are used to rectify defects. This poor performance has been partially attributed to the inability of project participants to work together effectively [3]. The design phase has traditionally been treated as a separate activity to the construction phase [9], consequently, many of the teams involved work towards individually defined objectives that are often in conflict with one another. Success is often defined in terms of the achievement of individual organisational metrics rather than the collective project outcomes [15]. Thus, the construction industry has not fully benefited from the increased productivity and product quality that can result from teamwork [16–18].

A typical construction project is a collaborative venture that involves a number of different organisations brought together to form “the construction project team”. This team is responsible for the design and construction of the project [19]. Consequently, the construction industry is organised around specific trades and functions, with the project team members being selected on the basis of the technical and financial soundness of design and the competitiveness of the tender sum [15]. Selection processes have thus focussed on organisations' individual professional capability rather than their collective ability to integrate and work together effectively. This has resulted in the fragmentation of the different participants in the construction project and consequently the separation of design and construction data. Excessive design changes and unnecessary liability claims have thus increased making true project life-cycle analysis difficult to achieve. [20–22].

This fragmented approach to project procurement and product delivery processes frequently lead to project teams being characterised by adversarial relationships, a lack of transparency and mistrust. This, in turn, often results in a ‘blame culture’ whereby the various team members seek to minimise their level of exposure to poor performance, rather than working together in a spirit of trust, cooperation and collaboration. As most construction project teams comprise participants from different organisations that come together to form temporary organisations aimed at achieving the common objective of delivering a project [23], the process of integrating pre-existing company based individual workgroups is critical if the various teams in a construction project are to work together effectively. Any strategy or system that brings together the various project parties, drawing upon the collective strength of all the teams, has the potential to contribute to the success of the product that the team delivers [21,24,25].

3. Integration of construction teams

Integration can be considered as the merging of different disciplines or organisations with different goals, needs and cultures into a cohesive and mutually supporting unit [26,27]. Integrated approaches demand 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 [24,28].

In construction, 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 [7,14,29]. It promotes a working environment where information is freely exchanged between the different participants. The term “*integrated construction project team*” has been used in this paper to 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 [20,21,30].

The delivery team in a construction project can be described as ‘fully integrated’ when it:

- has a single focus and objectives for the project [3,4,7–9,20];
- operates without boundaries among the various organization members [7,14,31,32];

Table 1
Literature based analysis of dimensions of team integration

Dimensions of integration	Literature source									
	Vyse [14]	Love and Gunasekaran [4]	Strategic forum for construction [7]	Dainty et al. [28]	Evbuomwan and Anumba [3]	Moore and Dainty [11]	Bromley et al. [31]	Baiden et al. [8]	Cornick and Mather [15]	Anumba et al. [9]
Single team focus and objectives	✓	✓	✓			✓	✓	✓	✓	
Seamless operation with no organisational defined boundaries	✓		✓							
Mutually beneficial outcomes	✓	✓	✓	✓				✓	✓	✓
Increased time and cost predictability					✓					
Unrestricted cross-sharing of information	✓				✓	✓		✓	✓	
Team flexibility and responsiveness to change					✓			✓		✓
Creation of single and co-located team			✓				✓			
Equal opportunity for project inputs		✓				✓	✓			
Equitable team relationships and respect for all	✓			✓		✓				
“No blame” culture	✓		✓	✓	✓		✓			

- works towards mutually beneficial outcomes by ensuring that all the members support each other and achievements are shared throughout the team [4,7,8,14,28];
- is able to predict more accurately, time and cost estimates by fully utilising the collective skills and expertise of all parties [3,8,9,15];
- shares information freely among its members such that access is not restricted to specific professions and organisational units within the team [3,12,14,15,31];
- has a flexible member composition and therefore able to respond to change over the duration of the project [3,8,9];
- has a new identity and is co-located, usually in a given common space [7,31];
- offers its members equal opportunities to contribute to the delivery process [4,8,12,31];
- operates in an atmosphere where relationships are equitable and members are respected [12,14,28]; and
- has a “no blame” culture [3,7,14,28,31].

These dimensions of team integration, as drawn from key research studies, have been summarised in Table 1. By reconciling team operations against the features contained within the table, the extent to which a team can be described as integrated can be ascertained.

Practices within a team can be assessed in line with the dimensions to give an overall picture of the degree of integration or fragmentation that exist. This paper attempts to explore if construction teams that were managed to the industry’s highest standards, actually work in an integrated manner. This will enable further discussions and recommendations on how the industry can move towards the realisation of integration, which has been suggested as a means of improving project team performance.

4. Methodology

The definition of a ‘successful project’ continues to generate considerable debate and controversy. Traditionally, practitioners have tended to associate project success with time, cost and quality outcomes [27]. There are, however, many variables outside the control of the project team that impact directly on their overall performance. Consequently, traditional success criteria have been argued as being too simplistic in the context of today’s complex construction project environment [33]. For this reason, it was decided to explore the team integration processes used by managers who have been acknowledged to have excelled in the management of project teams measured against a wide range of assessment criteria.

The *Construction Manager of the Year Awards* (formerly *Building Manager of the Awards*) provided an objective way of identifying excellent construction project managers. The award is for managers with overall responsibility for delivery of construction projects. Between 2000 and 2003, eleven individuals have received awards in the “large projects” category (currently those over £45 million) for their key roles in the management of completed projects. Nine of the eleven Project Managers responsible for these projects agreed to take part in the research, details of which have been summarised in Table 2.

The projects covered in the interviews included new works and refurbishment projects with contract sums up to £200m. Though the projects were executed in the UK, the companies involved have worldwide construction and professional expertise and experience. Projects 1–5 were managed by a professional construction and project management company that works predominantly in the property and construction sectors with a turnover of £180million (in 2004) and 1500 employees. Projects 6 and 7 were managed by a multinational project and construction management company with over 7500 employees and a turnover of £1.6 billion (in 2004). Projects 8 and 9 were managed by an international construction group with a turnover of £3.2 billion (in 2004) and over 16,000 employees worldwide, including 9000 within the UK.

In-depth interviews were conducted with the award-winning managers, transcribed verbatim and analysed using an adapted form of “framework analysis”. This is an inductive matrix-based method of qualitative data analysis used for ordering and synthesising data under conceptual headings emerging from the field of enquiry [34]. The method helps to define concepts, create typologies, find associations, and seek explanations for the emerging phenomena. It also allows the sifting, charting and sorting of data into key issues and themes and enables rapid comparison of research findings across the cases investigated [35]. As alluded to above, previous research was used to identify ten key dimensions necessary for team integration, which were then mapped against practices identified from the interviews. This enabled the extent of team integration to be determined (see column 1 of Table 3). This method allowed for both in-case and cross-case assessments of the dimensions necessary for integration, as well as providing an overview of whether the project teams were fragmented, partially or fully integrated. The results are presented below under headings derived from the analysis.

5. Research findings

Practices that indicated full, partial or absence of integration are presented in Table 3 to illustrate the

Table 2
Projects overview

Project ID	Selected projects								
	1	2	3	4	5	6	7	8	9
Procurement	Const. Mgt	Const. Mgt	Const. Mgt	Const. Mgt	Const. Mgt	JCT Mgt Contracting	Design and build	JCT ^a	JCT 80
Brief description of project	Residential apartment building	Demolition and extension of a public building	16 storey office and ancillary space	60,000 m ² office space and refurbishment of adjacent listed buildings	Landmark building for a 600 staff local authority	Landmark millennium project for the visual and performing arts	Rebuilding of a 25,000 m ² retail shop	10,000 seat arena, leisure centre and associated facilities	Town centre redevelopment of 5 storey construction and 3000 space car park
Duration (months)	22	24	36	36	22	36	36	31	37
Location	London	London	London	London	London	Salford	Manchester	Nottingham	Basingstoke
Approx. value (£m)	28	78	210	180	50	67	92	35	131

^a Local Authority with Contractor design portions and maximum guaranteed price.

Table 3
Evidence of integration practices

Examples			Full achievement (✓)	Partial achievement (O)	No achievement (X)
Dimensions of integration	A	Single team focus and objectives	All members have the same focus and work together towards team objectives	Members pursue individual objectives but in line with the overall project objectives	Individually pursued objectives by members without regard or in isolation to others and project objectives.
	B	Seamless operation with no organisational defined boundaries	Members form a new single project team with no individual member identity or boundaries	Members operate as individuals but make efforts to collaborate with others on the project	Continued alignment and affiliation to individual organisations that make up the project team
	C	Mutually beneficial outcomes	Pursuance and attainment of project goals that benefits all members	Attainment of project goals in conjunction with other members whose involvement are necessary	Individually defined project objectives without compromise or consideration to others needs
	D	Increased time and cost predictability	Openly accessible design and construction cost information gathering and management	Systematic follow up of design and construction cost information	Disjointed design and construction costs information gathering and application
	E	Unrestricted cross-sharing of information	Availability and access to all project information to all parties involved in the project	Access to project information by a section or sections of the project team	Project information only available to members with responsibility for the section of work
	F	Team flexibility and responsiveness to change	Requisite personnel join and leave the project team as their skills are no longer required or are needed	Retention of members no longer required and trained to adopt new requirements	Use of the same project team members even when they had outlived their effectiveness
	G	Creation of single and co-located team	A single project team with all members located together in a common office	Individually operated sub-teams but co-located within a single office environment	Individually located and operated teams
	H	Equal opportunity for project inputs	Consultation of members for contribution at all phases of project before decisions are made	Contributions are welcomed but not explicitly invited from members in making decision on the project	Little attempt to consult members in key project decision-making processes
	J	Equitable team relationships and respect for all	All members are treated as having equal and significant professional capability needed on the project	Recognition of professional competence, but mainly in their respective field of expertise	Team members contribution restricted to their functional project role
	K	No blame culture	Collective identification and resolution of problems. Collective responsibility for all project outcomes	Cooperation of team members in resolving problems, but with ultimate responsibility resting with a single party	Individual members are singled out for problems that occur on the project and for undertaking corrective measures

practical manifestation of how they aligned with key dimensions of team integration as identified from past research (see Table 1). A summary of the interview results has been presented in Table 4 which presents the practices, which appeared to facilitate team integration, and uncovers the challenges inherent to improving collaborative working. The practices within the team highlight issues such as professional alignment, attitudes and relationships, all of which were highlighted by Evbuomwan and Anumba [3] and Moore and Dainty [12] as those that contribute to the successful integration of teams. The discussion of the results focuses on how practices within the construction project team helped to integrate the activities of the various participants. These practices took place within the context of the procurement approach used for the projects. The influences of these approaches on practices towards integration are also discussed.

5.1. Team practices

Table 4 reveals that all of the teams achieved a degree of flexibility that enabled them to respond well to changes in personnel requirements on the project. According to the managers interviewed, they were able to bring in more members as the project progressed. Members whose roles and functions had been completed were relocated and new members brought in to maintain both efficiency and progress. This conformed to the organisational structure requirements outlined by Evbuomwan and Anumba [3] and Anumba et al. [9], who all argued that for an integrated team to fully utilise the diverse expertise that is available, its composition should be such that new members with requisite knowledge can be brought in and redundant ones leave (see Table 3). The flexibility characteristic is also consistent with the general drive within the construction industry to improve team effectiveness through planned and efficient use of human resources (see Accelerating Change report [2]).

All the project teams were unable to operate seamlessly due to the continued operation of their members within their boundaries of organisational identity or affiliation (see Table 4). The only attempts at seamless project team operations were in Projects 5 and 7. In these two projects, the various teams made significant efforts at collaborating with each other. This is indicative of the industry struggling to overcome cultural attitudes even when they are negatively impacting on its performance. Vyse [14] and the Strategic Forum [7] both pointed out that for effective integration to be fully realised, individual team identities must give way to a new single “integrated” team in which defined organisational boundaries do not exist. However, given that all of the projects were deemed to be

successful, the extent to which seamless operation is a necessary condition for project success appears questionable.

All of the interviewed construction managers expressed their ambitions towards developing more continuity of work and long-term relationships with key clients in order to maintain a competitive advantage. This supports the key principles of the “Integration Toolkit” [7], which is to sustain long-term working relationships within the industry. Six out of the nine project teams were formed very early and focused on continued work with the client that contributed significantly to the equal respect for all the teams involved in the projects. The organisational structures were flat as recommended by Anumba et al. [9] and allowed direct lines of communication across organisational boundaries. Inputs from the various professions were easily recognised because they were not issued through a long chain of command. This helped to improve the level of professional recognition for all teams. The resulting impact was that the teams looked for solutions to problems rather than trying to blame one another (see Table 4). Adversarial relationships were subsequently replaced with co-operation and early detection, avoidance or joint resolution of problems. This approach reflects the principles of “Fusion”, a collaborative working tool [14].

With the exception of project 7, all the Project teams were not able to form a new single team although they operated within a single office location. They remained as individual sub-teams within their confined work spaces but co-located with others. Most of the project teams (six out of nine) also struggled to achieve an agreed single focus and set of objectives, an espoused requirement for team integration [4,7,8,11,14,15,31]. Though the need for consensus was acknowledged in the six projects, the members often felt constrained by their own professional and organisational expectations. This is consistent with the findings of Moore and Dainty [12] on the need to develop a homogeneous project culture to overcome professional segregation. For teams to be effectively integrated, project information should be available and accessible to all parties to allow informed decision-making [3,11,14,15,31]. In Projects 1, 5, 7 and 8 for example, design drawings were made available to the construction team for comments on buildability. These comments were then taken into account by the commercial team during deliberations in relation to cost issues. Other specialist teams were also given the opportunity to provide advice at the early stage of the project, but very rarely were all specialist functions brought together to consider issues concurrently with each other.

In Projects 2, 5 and 7, the managers operated an open and transparent system with easy access to information. The project teams consequently had an improved ability

Table 4
Project team practices

Project ID			Selected project								
			1 Private developer	2 Public institution	3 Private company	4 Private company	5 Local authority	6 Public institution	7 Private retailer	8 Local authority	9 Private developer
Dimensions of integration	a	Single team focus and objectives	O	O	O	O	✓	✓	✓	O	O
	b	Seamless operation with no organisational defined boundaries	X	X	X	X	O	X	O	X	X
	c	Mutually beneficial outcomes	O	✓	O	O	O	X	O	X	O
	d	Increased time and cost predictability	O	✓	O	O	✓	O	✓	O	O
	e	Unrestricted cross-sharing of information	O	O	X	O	✓	O	✓	O	O
	f	Team flexibility and responsiveness to change	✓	✓	✓	✓	✓	✓	✓	✓	✓
	g	Creation of single and co- located team	O	O	O	O	O	O	✓	O	O
	h	Equal opportunity for project inputs	✓	O	O	O	✓	O	✓	✓	O
	j	Equitable team relationships and respect for all	✓	✓	✓	O	✓	O	✓	✓	O
	k	No blame culture	✓	✓	O	✓	✓	O	✓	O	O

✓, fully achieved; O, partially achieved; X, not achieved (absent).

to predict time and cost estimates more accurately (see Table 4). The clients were more certain of time and cost expectations, resulting in increased trust in the project team's ability to deliver. Cost increases and time extensions were therefore not disputed or unduly contested by the clients. The projects were subsequently completed within the expected time and cost limits, which is consistent with previous findings [3,8,9,15]. These levels of satisfaction were expressed in feedback obtained from the clients and their representatives. To summarise, the project teams surveyed:

- were flexible and possessed the necessary dynamics for the successful executions of the projects;
- did not operate seamlessly and members continued to work disjointedly within their individual organisations;
- were not able to form a new single team that was co-located;
- had equitable relationships and 'no blame' cultures and thus tended to work towards the joint resolution of problems;
- formed good relationships at the early stages of the project, which led to high levels of trust and removal of adversarial attitudes; and
- created a project culture where all participants worked towards a common project goal.

The results show that none of the project teams were totally fragmented or integrated. The various members of the project team were not able to operate seamlessly as a single team. They all showed varying levels of partial integration. Teams on Projects 7 and 5 exhibited the highest degree of integration in relations to the dimensions explored. A moderate level was found in Project 2. The remainder of the project teams exhibited practices that indicated they were partially integrated. These findings do not necessarily undermine the importance of integrated teams, but indicate that even the very best examples in the industry still fall short of the integration expectations set out in the "*Accelerating Change*" report [2].

5.2. The influence of procurement approach

As shown in Table 4, the results of the interviews confirm that the team in Project 7, which was procured through the Design and Build approach, had the highest level of integration. The team did not, however, provide totally seamless project delivery operations with a complete absence of professional and organisational boundaries. Additional effort would have been required to fully break down professional and organisational barriers. A lack of integration was also evident in the team's inability to deliver mutual benefits to all members. This was demonstrated by the focus of individual

teams on the goals of their parent organisations. Common project goals and objectives were still resolutely viewed from organisational perspectives, rather than from collective mutually beneficial standpoints. Combining expertise from different companies to form a new organisation remained a challenge on the project because traditional attitudes and professional procedures prevailed, as highlighted by Jefferies, Chen and Mead [23]. Thus, the results confirm earlier findings by Moore and Dainty [12], that the achievement of expected results by Design and Build project teams can hide the actual attainment of integration and the performance of a project team.

The team in Project 5, procured through Construction Management, displayed many characteristics of integration. This was attributed to the method of procurement, which enabled the Construction Manager to become the focal point of construction activities. This brought together the Design and the Construction Teams in the product delivery process and the Client Team in the management of the product, which according to Alshawi and Faraj [19] is a primary benefit of integration. The complicated nature of Project 5 was such that lack of cooperation from any of the project team members would have had a profound negative impact on the success of the endeavour. There were, therefore, consultations, crosschecking and the provision of advice on buildability and cost on every aspect of the construction work. This encouraged the project team together to work in an integrated manner as possible. The design and construction teams on the project were co-located, which increased collaboration through an improved information flow. The teams, however, maintained their organisational identities and boundaries. This was due to the fact that the procurement approach did not necessarily call for the creation of a single co-located team although collective working was encouraged on the project (see Table 3).

The teams in Projects 8 and 9 had both been procured through the traditional procurement route, which has traditionally led to fragmentation of the parties involved. They were not fully fragmented but showed some low level of integration (see Evbuomwan and Anumba [3], Vyse [14] and Anumba et al. [9]). Project 8, for example, had elements of the works designed and built by the Contractor thus providing an avenue for integrated team efforts. In Project 9, the Construction Team was involved in the initial planning of the works and had the opportunity to contribute to certain elements of the design process. The access to the Client and Design Team was crucial to bringing all the teams together. The complicated nature and the numerous components of Project 8 encouraged the parties to work in a collaborative and constructive way.

Analysis of the influence of procurement route on integration practices demonstrated that Design and Build arrangements provide the best opportunities and more conducive environments for project teams to work together effectively. More emphasis is placed on the formation of a single team with the dual responsibilities for design and construction. On the projects adopting Construction Management approach, the project delivery teams were able to work together better because the pivotal role of the Construction Management contractor was fully exploited. Integration was also enhanced where the various parties were involved at an early stage of the project. In traditional procurement arrangements, teamwork was better achieved through repeated work. Modifications, such as contractor-designed portions helped to improve the level of teamwork among the client, design and construction teams. Thus using the contractor as a professional advisor rather than the party that merely takes instructions from the design team also contributed to improve project team relationships and led to better teamwork.

6. Discussion: challenges in achieving team integration

Construction project teams attempting to integrate face considerable challenges. An attempt has been made in this paper to highlight the sources and nature of these challenges. Although overcoming them does not automatically deliver the desired results, it may go some way to helping teams work in a more integrated manner. The team integration challenges faced by the case study project teams are explored below.

6.1. Traditional drivers for project success

The traditional project success criteria are cost, time and quality, which are rather crude and overly simplistic measures of performance [33], however, the construction industry has continued to dwell on these outturn measures, even though the industry that draws on the contribution of a range of professionals coming together to complement each other's efforts and skills. In order for the industry to fully benefit from the diverse expertise present in project teams, such traditional drivers must be replaced with other measures of performance.

The behaviour of people needs to be changed in order to create an appropriate project culture for successful project delivery. A key challenge, therefore, is to replace traditional project drivers with outcomes related to behavioural and cultural improvement. In this way, the behavioural changes required to generate more suitable project cultures will help project teams to meet a project's quality requirements at the right cost and on time.

6.2. Project culture

The relatively short duration of most construction projects and the temporary nature of many project teams form significant barriers to the realisation of such a suitable project culture. Another key factor that compounds this issue is the changing composition of project teams over the project life. Partnering therefore offers a climate where the appropriate culture can be nurtured over a number of projects. Results from the interviews (project 2, Integration Dimension "j" in Table 4) show that if some time is allowed before the commencement of the project to enable the participants to work together on the initial design phase of the project, individuals will have the opportunity to get to know each other and form mutually agreed goals before work actually begins on site.

6.3. Behavioural change

Behaviour is the term given to things that people do that can directly be observed by others [35]. Thus, behavioural change must be recognisable by others. Moore and Dainty [12] suggest that professionals need to see themselves as a member of a project team rather than as members of their individual disciplines. Accordingly, the various parties that come together to deliver a project need to reorient themselves by treating each member as an equal stakeholder and an important player in the project team. These are significant ways in which individual contributions both at the personal and organisational level can be exploited.

6.4. Measurement of integration

If continuous improvement in project delivery is to be achieved through the use of teams in the construction, then there needs to be a system or means of measuring how well integrated a team is and importantly, how this changes over time. The challenge for the construction project team is to establish a measurement system that provides a reliable assessment of how well team members are working together. By continually measuring team integration against such a tool, performance can then be managed in a proactive way, rather than having to rectify poor performance after it has occurred.

7. Conclusion and future research

The UK construction industry has been widely criticised for its fragmented product delivery processes. Team integration has been suggested as a way of addressing this inefficiency by breaking down barriers

to effective collaborative working. This research has investigated the level of integration achieved in nine projects teams managed by award winning project managers. It has revealed that the level of integration is affected by the team practices adopted, set within the context of the procurement approach. Most of the teams operated as individually competent workgroups within their organisationally defined boundaries, but had the aspiration to work collaboratively with other teams operating within the project environments. None of the project teams were completely fragmented (which would have been surprising given their award-winning status), neither did any of them exhibit the full range of criteria espoused as signifying truly integrated operation. This infers either that fully integrated teams are not necessary for effective team operations within the industry, or that the sector must overcome significant organisational and behavioural barriers if the benefits of integration are to be fully realised in the future.

It is recommended that future research explores further projects procured under the design and build system to ascertain how effectively teams can be integrated where structural organisational barriers to collaborative working are mitigated. Such studies would help to isolate the key issues that must be put in place for the various teams to work effectively together. A further study should also be conducted to explore integrated working from the perspective of other members of the project delivery team. This would reveal other factors which can impact on team integration and could show the influence of the client's team on the efficacy of collaborative work practices.

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