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**ABSTRACT**

Almost unknown at the turn of the twenty-first century, the construction design manager role is an innovation that has been adopted rapidly by the large to medium sized contracting organisations in the UK. Despite this, literature relating specifically to the construction design manager is sparse. Thus, the aim of the research was to better understand the role of design managers. A longitudinal study captured insights from early career design managers and experienced design managers working for contracting organisations, primarily on design and build type contracts. Following a pilot study, 36 face-to-face interviews were conducted over a six-year period. Findings revealed original views, new insights and trends related to the evolving role of the construction design manager in a digital environment. These views both support and extend understanding as reported in two guides for design managers published towards the end of the research programme. This is a unique insight into how a new role in construction has evolved over a six-year period.

## Introduction

The UK construction sector has experienced the emergence and proliferation of a new role – the (construction) design manager. This innovation has been almost exclusively adopted, and one might argue promoted, by contractors in response to increasing complexity and changes in procurement routes. This reflects similar patterns reported in other countries such as Brazil (Grilo, Melhado, Silva, Edwards, & Hardcastle, 2007) and Finland (Rekola, Makelainen, & Hakkinen, 2012). Increased responsibility for design quality, combined with client expectations, has meant that contractors need to better manage design information and design decisions (Eynon, 2013). Currently, terms such as 'design manager', 'design integrator' and 'design coordinator' tend to be used interchangeably in the UK to describe someone who is responsible for coordinating and managing design information, and by extension design quality (see Emmitt & Ruikar, 2013; Eynon, 2013).

Although there is a body of literature relating to design management in industrial design and fashion (e.g. Archer, 1967; Best, 2006, 2010; Borja de Mozota, 2003; Cooper & Press, 1995; Farr, 1966; Oakley, 1984), in architecture, engineering and construction (AEC) the literature is sparse. What is available tends to be associated with architecture. In the 1960s, Brunton, Baden Hellard, and Boobyer (1964) established the basic tenants of the architectural management (the management of the design office and its design projects), which has been further developed by Nicholson (1992, 1995), Emmitt (1999), Emmitt, Prins, and Otter (2009) and Alharbi (2013). In this body of literature, the term design management tends to be used primarily to describe the management of design at the project level. In this sense, design management could be seen as a sub-set of architectural management, which is implicit in the work of Sinclair (2011) and explicit in the work of Alharbi (2013). However, the picture is a little confused because some authors also use the term design management

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more extensively to also include business aspects (e.g. Allinson, 1993, 1997; Emmitt, 2014). Although there are generic issues within this literature that may be applied to construction, it does not deal specifically with contractors or the 'construction' design manager.

In construction it was not until the 1990s that the literature started reporting interest in (building) design management, with early work by Gray, Hughes, and Bennett (1994) and Gray and Hughes (2001). In this work, design management is reported as an activity or task performed entirely at the project level (see, e.g. Gray & Hughes, 2001); essentially a sub-set of project management. Given the emergent role perhaps it came as little surprise that Bibby (2003) reported a need to improve design management techniques and Tzortzopoulos and Cooper (2007) found a number of shortcomings in contractors' knowledge and application of design management. More recent work has addressed specific areas related to design management, such as sustainable design (Mills & Glass, 2009; Novak, 2014; Rekola et al., 2012), information flow (Tribelsky & Sacks, 2011) and building information modelling (BIM) (Elmualim & Gilder, 2014). Although this modest body of literature provides advice and insights, it does not specifically deal with what construction design managers do in the workplace.

In reviewing the literature specific to construction design management, questions remain as to the role of the construction design manager and the value this new role adds to contractors and, by extension, construction clients. It was the author's direct experience of teaching design management to students in a previous employment that stimulated this research. Students undertook a four-year sandwich undergraduate degree programme, in which they spent the first two years at university, a year in industry working for contractors and a final year back at the university. Students returning from their industrial placements were reporting (and complaining of) a high degree of confusion about their job role within their employing organisations (contractors) and the wider construction sector. They felt that their job function was not particularly well defined by their employers, and they claimed that their fellow project contributors did not understand what a construction design manager did. The placement students also complained about the lack of literature written specifically for construction design managers. At the start of the research period in 2008, there was only *Building Design Management* by Gray and Hughes (2001) that was targeted at construction design managers and the students felt that this was outdated and no longer reflected what was happening in industry. They were also critical of the 'generic' literature that related to architects and industrial design because it was not addressing their specific job junction. Hence, there was a personal motivation behind the research to try and better understand what a construction design manager did in the workplace so that it could be conveyed to the students.

## Method

The aim of the research was to achieve a better understanding of this new role; therefore, a qualitative approach was adopted to gain insights into what the construction design managers perceived their role to be. Initially, the intention was to interview a number of returning placement students and experienced design managers to enrich the author's lecture material. However, the issues that arose from what became a pilot study stimulated a larger, longitudinal study, which lasted for six years. This allowed the researcher to identify a number of trends in industry that were not being reported in the literature at the time. Qualitative data were used to develop inductive organisational research, following in the tradition of Gioia and Chittipeddi (1991) and Gioia, Corley, and Hamilton (2012). In what is referred to as the Gioia Methodology is the basic assumption that the world is socially constructed *and* that the people constructing their realities are 'knowledgeable agents', that is, they know what they are doing and can explain their intentions, actions and thoughts (Gioia & Chittipeddi, 1991).

The quantitative research method comprised two steps. Step 1 comprised a pilot study conducted in the autumn of 2007. A facilitated group discussion was held with 15 returning placement students followed by three interviews with experienced construction design managers. In accordance with

Gioia et al. (2012), these individuals would be classed as knowledgeable agents. The students were studying on the only undergraduate programme in the UK for design managers, while the experienced design managers each had over 10 years experience in the role. The initial aim was to audio record the workshop and the interviews, however, a few of the students expressed concern about having their views recorded, as did the first design manager to be interviewed. To comply with the wishes of the participants hand written notes were made during the workshop and the interviews. These notes were then analysed via simple thematic analysis into themes/trends.

Step 2 comprised 30 face-to-face interviews with returning placement students and 6 experienced design managers. The rationale for selecting interviewees was partly driven by ease of access to individuals and companies and partly by the individuals' knowledge of design management. Step 2 data collection ran from the start of the 2008/2009 academic year until the start of 2013/2014, capturing the opinions of 6 cohorts of placement students (30 in total) and supplemented with the views of 6 experienced construction design managers. Consistent with Step 1, the interviews were not audio recorded since the intention was to get a feel for trends rather than to capture episodes of speech. Instead, notes were made by the researcher to capture the main aspects of the discussion. Two books were published towards the end of the data collection period that related specifically to the construction design manager role. This provided the opportunity to discuss the findings of the research in relation to the views expressed in the books.

All of the placement students and all of the experienced design managers were employed by large to medium sized contracting organisations in the UK. The contract types were all design and build or design, build, operate; thus, the contractor was responsible for design quality.

## The pilot study

The aim was to see how the students responded to being asked about their experiences on placement and to see how their views aligned with those of more experienced design managers. Students were asked at the end of a lecture if they would be willing to discuss their experiences as a group, which they were. A group discussion facilitated by the author and lasting 30 minutes was then programmed into the lecture held one week later. This gave the students time to think about issues prior to the group discussion, which resulted in an informed discussion. Students were simply asked to describe what their placement job entailed and how they viewed their role. The group discussion in which 15 students participated resulted in a group consensus on the issues. The only differences reported were from students who had spent their placement working overseas, where standards and understandings of the design manager role appeared to be much less developed than those in the UK. This was instrumental in confirming the need to concentrate this research entirely on the UK.

Informal discussions were then held with three senior design managers, each working for one of three major contracting organisations. As with the students, they were simply asked to describe what their job entailed and how they viewed the role. The intention was to put the views of the placement students to them; however, this was not necessary as the issues brought up by the students were also raised in the discussions with the experienced design managers. The views of the student design managers and the experienced design managers can be summarised via four headings: job role, status, education and technologies. These headings emerged from analysis of the group discussion data and the three interviews.

(1) *Job role*. Although this was reported as primarily coordinating design information, the participants noted that their job descriptions were rather vague. Terms such as design integrator, design coordinator and technical coordinator were mentioned as labels that covered much the same task. Anything to do with design was delegated to the design manager, including costs relating to change management requests. This, they felt, made the job both challenging and interesting. All claimed that the role was evolving rapidly, partly in response to new technologies and legislation, and partly because it was a new role within the construction sector.

(2) *Status*. The student design managers felt that they did not have the status of a project manager; indeed, they felt that their role was not valued as highly as it should be by their colleagues. This was supported by the experienced design managers who expressed it as a problem in terms of standing within the project team. The experienced design managers were, however, convinced that this was a temporary problem and would resolve itself as contractors started to employ and appreciate the value of design managers.

(3) *Education*. Students noted that they had not encountered any design managers in the industry with a design management qualification, which helped to emphasise the uniqueness of their undergraduate programme. A point confirmed by the experienced design managers, none of whom held any qualifications in design management or project management, claiming to have picked up the skills over the course of their careers. Although the senior design managers expressed a desire to see training packages in design management delivered by their employers and/or by universities, they were at pains to point out the need for broad practical experience of design and construction before moving into the role.

(4) *Technologies*. Concern was expressed as to how new technologies, such as project extranets, were likely to impact on the design managers' role. The overall consensus was that the way (design) information was being managed would change as technologies were adopted, although there were no real pointers as to what these changes would entail.

Uncertainty surrounding the construction design manager role was not unexpected for an emergent role and was consistent with the literature at the time (e.g. Tzortzopoulos & Cooper, 2007). However, the consistency of views between the students and the experienced design managers was not anticipated and it was this that stimulated the decision to carry out the longitudinal study.

## Interviews with design management placement students

Five placement students from each returning cohort were interviewed; a total of 30 over a six-year period. The placement students were returning to university after a period of 12–15 months on placement with contractors based in the UK, working as trainee design managers. They had studied design management in years one and two of their programme and were ideally placed to reflect on what they had been taught and what they had experienced during their industrial placement. The students were also highly motivated to understand their role within the industry and were keen to share their views. The author taught the students in their final year and so there was an opportunity during the first week of lectures for students to discuss their placement experiences and for the researcher to ask for volunteers to take part in the interviews. Hence, this sample was self-selecting and comprised both males and females. Of the 30 students interviewed over the six-year period, 9 were female and 21were male. They were working on a mix of large, complex projects drawn from commercial, industrial and housing sectors. The common feature was that all of the projects were 'contractor led' in that they were design and build or design, build, operate contracts. There was no obvious difference in views between the two sexes or the type and size of project they had been working on.

In line with the method adopted, two questions were put to each interviewee. The first question was designed to stimulate a discussion about the construction design manager's job role and status (What does your job entail?). The second question was designed to address the value of the role to the industry as a whole (What difference does your role make to the construction industry?).

### Trends relating to the questions asked

(1) *Job role*. The primary role of the trainee design managers related to the coordination of design information. This role was described as akin to a 'post-box' where all consultants posted their

information for it then to be checked and coordinated by the construction design managers prior to being delivered to the site personnel. The information was supplied to site in a variety of formats, both digital and analogue (paper). All of the design managers undertook this task during the construction phase and were primarily based on the construction site. A small number of the design managers also spent time in the contractors' regional or head-office, where they were involved in company training schemes and tasked with activities relating to tendering and bid management (pre-construction activities). Over the monitoring period, there was a trend to the trainee design managers being more involved with environmental compliance (discussed later) and more involved with pre-construction tasks. A constant theme was complaints about the quality of information received from architects and engineers and the lack of coordination of information prior to it being issued to the contractor. This was consistent across contract and project types, despite considerable improvements in information communication technologies (ICTs and BIM) during the research period. In the later cohorts, there was a clear move towards a more positive approach to managing design information, with reports of management initiatives implemented by the contractors to bring about a more pro-active approach to information management. The trend was to direct the design team and explain when and why information was required, with specific document management systems and supporting software being mentioned.

(2) *Status*. The trainee design managers expressed concern about their status within the contracting team. This appeared to stem from their earliest interactions with contractors/employer and being interviewed for graduate training positions that were designed for engineers and construction managers. Once appointed for their placement year they found themselves on training schemes that were also designed for engineers or construction managers, and in two examples, contracting quantity surveyors. This did not change during the research period, perceived by the students as undermining their status with the construction team. At the start of the research, interviewees were asking why the professional bodies were not promoting or supporting design managers, although this changed during the research period with the Chartered Institute of Builders (CIOB) recognising the design manager as a distinct career path for CIOB membership.

(3) *Education*. According to the interviewees, there were a number of disparities between what was being taught and what employers required. In particular, the lack of project management teaching and the lack of 'training' in reading drawings. In the later cohorts, there was also concern that BIM was not part of the taught curricula, although the majority had taught themselves BIM software during their placement year.

(4) *Technologies – ICTs and BIM*. In the first two years, there were very few comments about digital technologies. There were some specific complaints about colleagues' inability to use a specific ICT software package correctly, but that was the extent of the comments. In the third year this changed, with student design managers starting to question their education and in particular why they had not been taught BIM. This concern was markedly stronger in the fourth and fifth years of the survey. At the time of the interviews half of the sample claimed to be working with aspects of BIM, although when this issue was discussed in further detail it appeared that most of the systems being used were extensions of 3D CAD. However, this emphasised the growing awareness of BIM and also a shift in the technologies being used by the contractors and their design consultants, especially ICTs and document (information) management.

## Unprompted theme

A theme that emerged during the course of the interviews was the growing importance of environmental compliance. With a couple of exceptions from the first cohort, all of the students were involved in coordinating and managing the environmental compliance responsibilities of the contractor during the construction phase. Typical responsibilities related to completing information

and audits for BREEAM compliance. This was closely related to ensuring building codes and regulations were complied with, especially Approved Document Part L.

## Interviews with experienced design managers

Interviews were conducted with one experienced senior design manager per year; a total of six interviews. The students' views were put to the design managers in addition to posing the same questions as those put to the students. This was done in part to validate the views of the trainee design managers and also to see if the more experienced design managers held different views to the trainees. Interviews lasted between 35 and 45 minutes. The design managers all worked for large contracting organisations and were known to the author. All had a minimum of 10 years experience working as a construction design manager; four were from an architectural background, one from engineering and one from surveying. All were male. Differences in qualifications and professional background were not evident in the interviews, with all of the interviewees being passionate about the design management role. Similar to the placement students, this sample was mostly experienced in large, complex, commercial and industrial projects.

### Trends relating to the questions asked

(1) *Job role*. Interviewees talked about their role in relation to other construction professionals. All saw themselves as the link between the project manager(s) and the construction manager(s) at the project level and claimed to be an essential part of the delivery team. Five of the six design managers described themselves as facilitators or integrators, emphasising the importance of the role in resolving uncertainty during the construction phase of projects. The other design manager described himself as a coordinator of design information and 'defender' of the design. In one case, a design manager talked about the challenge and apparent conflict in roles within the contracting organisation. He claimed to be constantly battling with the contractor's contracts managers and quantity surveyors who were employed to 'identify value' in the contract documentation. This translated to finding errors and areas where the contractor could change the design to its (financial) benefit. He claimed that pressure was sometimes put on him to try and get the design consultants to change the design, which was something he felt uncomfortable with (as an architect). Similar to the trainees, there was a reported trend to be more pro-active in managing the production and receipt of design information. The design managers reported this as a maturing of the role and a better appreciation by contractors of the value of timely, accurate design information. One of the design managers was at pains to point out the need for better information management and better awareness of this amongst graduates of architecture and engineering.

(2) *Status*. The issue of status did not feature particularly strongly with the industrial sample, with design managers noting that they had a specific role to do and tasks to complete. They had all chosen to become design managers and were more concerned with doing their job well than worrying about status, which was a contrast to the views expressed during the pilot study. This also differed from the views of the placement students and reflects a maturity and confidence that was not present in the student sample. In the last two interviews, there was excitement surrounding the potential rise in status of the design manager in the future if they took ownership of BIM; a role seen as a natural development of the design manager role and one that would elevate the status of the design manager.

(3) *Education*. There was recognition that few construction design managers had any qualifications or training in design management and that it was a skill that was picked up through experience as designers and engineers. Although there was a desire expressed for specific training packages, via continuing professional development, the design managers emphasised the importance of

experience. Two of the interviewees discussed the importance of understanding business economics, claiming that this was the most important driver for a construction design manager, underlying every decision. The other four were a little less commercial in their thinking, but all of them claimed that the graduates coming into design management, especially from architecture, lacked commercial awareness and business skills. Something, they felt, that needed to be addressed in the education of (construction) design managers.

(4) *Technologies*. The trend over the research period was for the issue of BIM to come to dominate the discussion. As noted above, the later interviewees expressed interest in BIM and saw it as a part of the design manager's tool kit, although they also reported that it was not yet fully integrated across their organisations or projects. There was discussion about the future role of the construction design manager in a digital environment; and in particular the desire and hope that the role would become more pro-active (less time spent on checking information) as BIM became more widely adopted.

(5) In response to the returning placement student's pre-occupation with environmental compliance the senior design managers tended to play this down. Although they noted the importance of environmental compliance they were keen to point out that this was just one aspect of the job role; and it was not uncommon to delegate this task to the more junior members of the construction design management team to help them understand the importance of information and get an overview of the entire project. This may help to explain the trainee design managers' perceived importance of the task.

### Unprompted theme

One issue emerged that was not anticipated at the outset of the research related to the perceived decline in the quality of design information. The trainee design managers commented on the poor quality of the information, but they had insufficient experience to discuss this in any depth. In every interview the experienced construction design managers brought up the issue of the quality of the information provided to them by the design consultants (architects, structural engineers and services engineers). They claimed that the quality of information had been decreasing year on year, suggesting that this was a result of clients reducing the fees paid to consultants, and hence information production was being compromised. They claimed that ICTs and BIMs had not yet helped to reverse the trend. Their response had been to develop a more positive approach to trying to manage the production and receipt of design information. One of the design managers reported that his employer, a large contractor, had stopped using some of their regular consultants because the information that they were supplying was deemed to be too poor to use.

### Discussion

Before discussing the findings, it is necessary to comment on the prospect of bias within the research. The researcher had taught the students design management prior to their industrial placement and so there is the possibility that the returning placement students were reporting what they thought the researcher expected to hear, rather than what they had experienced. Bias was addressed to a certain extent by interviewing experienced practitioners and putting the student views to them. In every year of the study, the students' views matched closely with those of their more experienced industry colleagues. Thus, although bias cannot be ruled out, it would appear that the views expressed were not unrepresentative of the situation within the industry at the time of the interviews.

### Trends

Within the literature, there was a very narrow interpretation of what a construction design manager does. This narrow interpretation was confirmed in the interviews, with the majority of interviewees

**Table 1.** Comparison of findings with two recent books on design management.

| Theme | Key research findings (2007–2014) | The design manager's handbook (Eynon, 2013) | Collaborative design management (Emmitt & Ruikar, 2013) |
|---|---|---|---|
| Job role | Main role discussed was 'construction', although 'pre-construction' role noted. | Focus on tasks. Two main roles described; 'pre-construction design manager' and 'delivery design manager' (site based), together with the 'strategic design manager.' Strategic role not revealed in the research findings. | Three main roles described; pre-construction, construction (site based) and post-construction. Post-construction role not revealed in the research findings. |
| | Primary role and tasks related to coordination of design information, managing design changes and responding to requests for information. More extensive description of the role provided by the experienced design managers compared to the trainee design managers. | Tasks described within the book. Greater level of detail and greater range of tasks and responsibilities proposed compared to the research findings. | Roles and responsibilities explicitly described within the book and supported with case studies from graduate design managers and experienced design managers. Greater level of detail and greater range of tasks and responsibilities are proposed compared to the research findings. |
| Status | Concerns expressed by trainees that status was lower than other participants. Not shared by experienced design managers. | Status not addressed. | Status not addressed, although plea for greater understanding of the role by other participants mentioned in concluding chapter. |
| | Perception was that the professional institutions were not promoting DM, a point shared by all. | This guide was endorsed by the Chartered Institute of Builders (CIOB), but published towards the end of the research period. None of the interviewees had read the book, which may explain the differences. | CIOB cited as being 'very active' in promoting the design management role. |
| Education | Perception was that the majority of construction design managers did not hold any qualifications or formal training in design management but had learned 'on the job.' Experienced design managers expressed a desire for training programmes. | Training and education discussed. Learning 'on the job' viewed as the way to learn to be a design manager. | Argument is for more and better education of design managers. |
| | Perceived disparity between what was being taught and what the role entailed (especially lack of BIM training in later cohorts of trainee design managers). | Not addressed. | Disparity briefly highlighted in concluding chapter. |
| Technologies (ICT/BIM) | Increasing emphasis on BIM over course of the research. | BIM identified as key to future development of the design manager role. | Emphasis on ICTs and BIM as being central to the design manager role. |
| | Uncertainty as to exactly how ICTs/BIM will influence design manager role, but recognition that role and tasks will change to a more pro-active role. | Future role of design manager as a BIM manager speculated. | Some speculation as to the future role (also written by Eynon). |
| Environmental compliance | Trainee design managers highlighted growing emphasis on the design manager taking responsibility for environmental compliance on the construction site. | Mentioned briefly under chapter on 'tools'. | Highlighted by way of discussion on sustainability. |

**Table 1.** Continued.

| Theme | Key research findings (2007–2014) | The design manager's handbook (Eynon, 2013) | Collaborative design management (Emmitt & Ruikar, 2013) |
|---|---|---|---|
| Quality of information | Constant theme was the poor quality of information received from design consultants. | Not addressed. | Not addressed. |
| | Experienced design managers claimed quality of information was declining, despite the increased use of ICTs and BIMs. | Not addressed. | Not addressed. |

reporting that the design manager's role was largely concerned with the processing and coordination of design information. In particular, the design managers were somewhat self-depreciating, claiming that they were the 'post-box' where all information was sent. And they were not too impressed with the quality of the information received from the design team. These interviews were conducted in a period of economic turmoil and the senior design managers claimed that it was inevitable that the quality of information would suffer because the consultants had reduced their staffing levels. On a more positive note, the interviewees were very proud in seeing themselves as protectors and promoters of design quality, something they believed few others in the contracting fraternity were concerned about (their motivation being profit, not necessarily design quality). The trend towards a more pro-active stance in managing design information was starting to come through in the later interviews, and tends to align with the work on information flows in design management (see Tribelsky & Sacks, 2011). The focus on environmental compliance also tends to give additional importance to design information, which is evident in the work of Rekola et al. (2012) and Novak (2014).

In terms of impact of the construction design manager on the construction industry, the interviews revealed a positive trend. Those interviewed during the last two years of the research saw BIM as a tool that would help them to do their job more efficiently, and help them move from a reactive role (dealing with clash detection and requests for information) to a more pro-active role. The views on BIM were entirely positive, reflecting the sentiments to be found in the two recent books discussed below; they did not reflect some of the challenges of BIM implementation identified by Elmualim and Gilder (2014).

### Contribution of the findings in the light of recent publications

Two books were published after the majority of the interviews were complete. Both books have addressed the role of construction design managers and both go some way to addressing the needs of those interviewed. The design manager's handbook (Eynon, 2013) is aimed at industry professionals and is endorsed by the Chartered Institute of Builders (CIOB). The focus is entirely on the (construction) design manager and contractors. Collaborative design management (Emmitt & Ruikar, 2013) is targeted at students of design management. Similar to Eynon's book, the work is focused on construction design managers. Both books are concerned with explaining and promoting the design management discipline, thus both have a positive (uncritical) bias. Although both books were available to the final cohort of placement students and practitioners, none claimed to have read them. The main findings of this research are compared to the contents of both books in Table 1.

With specific reference to job roles, Eynon makes the point that activities are more important than roles. However, he does provide some guidance on roles, separating the contractor's design management role into 'pre-construction design manager – opening up' and 'delivery design manager – closing down' (Eynon, 2013, p. 27). There are also some glimpses into different roles in the case studies, such as the 'architectural design manager', the 'design-team design manager' and the 'client design manager'. Similarly, Emmitt and Ruikar (2013) separate functions into 'pre-construction'

(opening-up), 'construction' (delivery and closing down) and 'post-construction'. Approximately half the interview sample claimed to have had some involvement in pre-construction activities, but none had any involvement post-construction.

## Conclusion

The findings offer a unique insight into the evolving role of the construction design manager, largely supported by books published at the end of the research period. The role is an innovation in AEC that has been rapidly adopted, but one that is also evolving in response to new technologies and experience gained in the role. Although the findings could be seen as merely a historical record of how the construction design management role has developed, there is also evident a clear glimpse to the future. The trend is towards a more pro-active stance to the management of design information and an attempt to manage those charged with producing that information, as argued by Eynon (2013). The prospect of widespread use of BIM appears to be a vehicle to help in this regard. This could be interpreted as a further maturing of the role and a greater confidence within contracting organisations about the value of design information.

### *Areas for further research*

Although the research findings are drawn on a relatively small, but informed sample, it is possible to tentatively suggest some areas for further research. These could relate to the education and training of design managers; the impact of BIM on the design management role; and the commercial awareness of design managers. One of the problems with interviews is that the data is based on what the individual claims to do, and this may not necessarily reflect the reality of daily life as some tasks are quickly forgotten, and other events are not reported because they seem to be irrelevant to the interviewee. Ethnographic research to monitor the activities of construction design managers as they go about their daily tasks may help to shed additional light on the role. More specifically, these research findings provide a basis for:

- a more comprehensive survey targeted at construction design managers working in the UK;
- a survey to understand the different perceptions regarding the role of construction design managers outside the UK to establish an international perspective;
- a survey targeted at different construction participants, e.g. construction clients, architects, project managers and construction managers, to explore their perceptions of the construction design manager role.

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