

INSTITUTIONAL PRESSURES AND DECOUPLING IN CONSTRUCTION PROJECTS: AN ANALYSIS OF BUILDING INFORMATION MODELLING IMPLEMENTATION

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Most existing research on built environment policy has focused on the independent variable - policy formulation - and assumed that the prescriptions that follow are readily accepted by a multitude of stakeholders. Less focus has been placed on the dependent variable - the projects where those policies are applied. Studies on practical implementation of new policies, such as Building Information Modelling (BIM) mandates, however, have suggested that implementation has not happened as envisaged. In this paper, by drawing on institutional theory, specifically the concept of decoupling, we adopt the perspective of the implementers of built environment policy approaches to explore how projects respond to the environmental pressure of a BIM mandate and the implications of such responses to the wider transformation of the sector. Through an inductive research design and by conducting multiple case studies on BIM Level 2 projects in the United Kingdom, we observed that two variances of a decoupling phenomenon are happening across projects - policy - practice decoupling and means-end decoupling. Our findings revealed that the decoupling phenomenon manifested in the responses employed by projects when implementing the 'new working practices' part of the policy mandate. Those responses included non-implementation of practices, violation of implementation and assimilation of the practices but not their meaning. Underlying reasons for such responses were also identified. By adopting an implementers' perspective on built environment policy design and implementation, we contribute to the construction management literature by providing new insights on the slow transformation of the sector, differing from what is generally envisaged by built environment policies. Our findings call attention to the consideration of implementers' prior knowledge, by institutional designers, when designing policy.

Keywords: BIM, institutional theory, policy implementation

INTRODUCTION

Reform of the architecture, engineering and construction (AEC) industry has been an ongoing concern for governments (Smiley *et al.*, 2014). In recent years, the implementation of Building Information Modelling (BIM), for example, has been widely acknowledged for its potential to improve productivity and to transform

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construction practice (Dainty *et al.*, 2017; Papadonikolaki 2018). In the last decade, several governments have established plans for the mandatory use of BIM as an attempt to drive transformation in the construction industry (Aksenova *et al.*, 2019). The adoption of BIM has been mandated in the US and a range of European countries such as the UK and some of the Nordic countries (Papadonikolaki 2018). In the UK, BIM is central in both the government's construction strategy and its industrial strategy. The construction strategy, published in 2011, defined a number of objectives; in particular, the achievement of BIM Level 2 maturity on all public sector asset procurement with equal applicability to private sector buildings (BSI 2013).

Despite the overemphasis on the potential of BIM policies to transform the AEC industry, scholars have started to acknowledge that there is still a need for more critical perspectives addressing the diverse implications of BIM policy approaches (Dainty *et al.*, 2017; Aksenova *et al.*, 2019). In fact, some recent research has shown that national BIM approaches have not led to a systemic change as envisioned; for example, the case of Finland as investigated by Aksenova *et al.* (2019). In the UK, surveys of industry practitioners have revealed that, despite an increase in BIM awareness and adoption, the implementation of the standards, which is a central aspect of the BIM Level 2 policy approach, has not increased to the same level (NBS 2019).

Indeed, diffusion in and of itself does not equal legitimization of practices (Scott 2014). Institutional scholars have acknowledged that, in actual practice, organisations mediate the impact of coercive pressures such as mandates and construct the meaning of compliance (Suchman and Edelman 1996). Organisations within an industry can be similar in their formal structure (adoption) but show much diversity in actual practice or implementation (Meyer and Rowan 1977). Some previous studies have already acknowledged that the organisational context has an important influence on BIM adoption and implementation (Dainty *et al.*, 2017). Previous research, however, has not extensively explored how organisations and projects mediate the implementation as envisaged. In fact, most existing research has assumed that the BIM discourse and the prescriptions that follow it are readily accepted by a multitude of stakeholders (Smiley *et al.*, 2014).

The gaps between the formulation, implementation and outcomes of built environment policies, however, are not a new phenomenon (Muller 2016). Built environment policymaking can be 'messy', especially because there is a disconnection between those situated in government organisations who make policies and those 'on the ground' who are expected to implement them (Foxell and Cooper 2015). Extant literature on built environment policy, however, focuses mostly on policy design or the independent variable, with less attention to elaborating the dependent variable—the projects and organisations that implement those policies. Most existing research has focused on the ways in which policy problems are framed, as opposed to how policy is used (Simmons 2015). However, organisations and construction projects are not passive receptors of imposed practices, and an understanding of what happens within projects when new practices are adopted as part of those policies is in a nascent state. Thus, by drawing on institutional theory (Meyer and Rowan 1977; Bromley and Powell 2012), in this paper we explore how projects respond to the environmental pressures of a BIM mandate, the differences in how implementation occurs and the reasons for such differences. How organisations respond to environmental pressures has been of interest to institutional scholars for many years but remains an under-theorised phenomenon in construction management literature.

By investigating institutional responses to the BIM policy approach in the UK through the lens of institutional theory, this study aims to contribute to extant literature in different ways. First, extant literature on the changes driven by BIM has mostly adopted a deterministic approach (Dowsett and Harty 2019). The deterministic change agendas that have permeated the industry, however, often fail to account for the structural challenges which await such prescriptions, and there is still a limited number of studies exploring the 'real world' implementation of BIM in organisations and projects (Dainty *et al.*, 2017). The technological merits of BIM are still perceived as being central to industry transformation, and it remains necessary to analyse the diverse implications of BIM policy approaches (Aksenova *et al.*, 2019). Thus, in alignment with recent research challenging the perceptions of BIM enactment as a linear process (Dainty *et al.*, 2017), our findings suggest new insights on the complex conception of a mandate's impact. Moreover, scholars have called attention to the need to understand the relationship between the making of built environment policy and its intended or unintended consequences (Foxell and Cooper 2015). Our findings also provide insights on why the proclaimed benefits of BIM policies have not always been realised as an outcome of a 'symbolic' implementation of the policy approach.

Second, while previous studies on the spread of innovation in construction and changes caused by BIM have used multiple perspectives, including innovation diffusion models, institutional research calls attention to the need for traditional diffusion models to be modified to recognise the agency of individual organisation adopters and the importance of distinguishing between formal adoption and actual implementation (Scott 2014). By looking at real implementation, our findings suggest that the environmental pressures of a BIM mandate influence project practices in a process that is framed by project stakeholders' pre-existing beliefs and practices.

Finally, project management scholars have acknowledged that institutional theory can enrich project management thinking (Bresnen 2016). Thus, by drawing on the concept of decoupling, a central concept of institutional theory (Meyer and Rowan 1977; Bromley and Powell 2012), we provide a new perspective on the transformation of the sector as shaped by implementers' responses.

The remainder of this paper is structured as follows. The next section provides a brief overview of the literature on built environment policy and the conceptual background of organisational responses to institutional pressures, which lays out the foundations for the research design. The research method is then presented, followed by a discussion of the results—a proposed categorisation of responses adopted in projects and identified underlying causes of such responses. The paper ends with a brief discussion of the findings and the main contributions.

Policy Innovation Within the AEC Industry

Built environment policies are usually seen as 'hero stories' and the sector is endowed with the imagined capacity to 'save society' (Janda and Topouzi 2015). Scholars have started to acknowledge, however, that the realistic limits of policy objectives need to be recognised and that the gaps between policymaking and real practice need to be filled (Foxell and Cooper 2015).

There is a consensus that policy needs to be well designed to be effective, and that this design should occur collaboratively to fill the gap between design and implementation (Foxwell and Cooper 2015). Policy co-design involving stakeholder communities and experts has been suggested as an alternative that could address the design-

implementation gap (Foxell and Cooper 2015). Another common suggestion to reduce the existing gaps is for policy design to be evidence-based. Scholars have argued, however, that the production and provision of evidence do not automatically lead to better-informed policymaking (Muller 2016). Evidence is powerful for defining issues to which policy should attend, capturing the attention of decision-makers and testing outcomes, but evidence-based policy is not always truly evidence-based (Simmons 2015).

Recently, studies focused on policy implementation have criticised the traditional and rationalist view of policy design and the design-implementation link. They have suggested that policy design and implementation can be framed as a political process through the lens of institutional theory, where the institutionalisation of a new practice is framed by actors' actions in supporting or counteracting the attempts to transform or replace existing institutions in their institutional environment (Rasmussen *et al.*, 2017). Indeed, institutional theory provides a useful lens with which to explore change processes and has been widely applied in management research to explore how organisations respond to environmental pressures, which has been mostly investigated through the lens of the decoupling concept, as described next.

Organisational Responses to Institutional Pressures

The seminal work of Meyer and Rowan (1977) has inspired a number of scholars to explore the deviations between adopted policies and the actual practices in organisations, which has been conceptualised as policy-practice decoupling (Bromley and Powell 2012). Indeed, the concept of decoupling has been a long-standing topic of discussion in institutional research and a dominant explanation for the post-adoption heterogeneity of practices (Bromley and Powell 2012).

Decoupling has been mostly conceptualised as a rational response to two organisational-level problems—the contradiction between the institutional pressure and internal organisational efficiency and the contradictions amongst multiple institutional pressures (Boxenbaum and Jonsson 2008). Thus, decoupling is usually viewed as a rational response employed by organisations (Boxenbaum and Jonsson 2008). Recent literature on built environment policy has also held this assumption and has posited that the construction industry can be considered a social space and that actors produce strategic activities that affect the implementation of changes in their institutional environment (Rasmussen *et al.*, 2017).

However, recently, scholars have started to challenge the assumption that decoupling between the adoption and implementation of practices is always an intentional and strategic response to external pressures (Gondo and Amis 2013). Most existing research on the adoption and implementation of practices adopts the assumption that if relevant actors accept the need to adopt a particular practice, implementation should occur nonproblematically (Gondo and Amis 2013). However, organisations are not passive receptors of legitimate ideas, and what happens within organisations when new practices are adopted remains a 'black box' in the literature (Gondo and Amis 2013). The literature on project management has also acknowledged that projects have been treated as 'black boxes', with the low level of concern for interior processes and how they interact with wider institutional issues being a major weakness of current theorising in connection with real practice in projects (Soderlund and Sydow 2019). Thus, in this research, we adopt institutional theory and the decoupling concept as a lens to open the 'black box' of projects and explore what happens within those projects in the process of implementing a BIM policy mandate.

METHOD

The exploration of how the BIM Level 2 mandate has been implemented in projects and the identification of the reasons why projects and organisations have responded to the policy mandate in the way that they have are conducive to inductive theory development. The employment of inductive reasoning means that data collection was used to investigate the dependent variable (projects) and identify patterns in the way that the BIM Level 2 policy has been implemented in practice to create a conceptualisation of responses.

The context of analysis in this research is the UK. The UK was selected because it has been considered a highly mature country on BIM adoption. Additionally, by considering the aim of exploring a variety of possible responses employed by projects and identifying possible patterns in such responses, a multiple-case design was chosen as a research strategy because of its capacity for demonstrating replication.

Previous research on BIM adoption has found that when BIM adoption and implementation is driven by internal drivers, implementation is more collaborative and flexible than when implementation occurs simply to comply with external demand (Papadonikolaki 2018). Thus, we selected cases in which implementation occurred for both reasons, aiming to identify whether the responses employed differed. Nine construction projects from four client organisations were analysed longitudinally in this research. We selected institutional construction projects (school and university buildings) because BIM implementation is well disseminated among those types of projects. Also, we selected projects from organisations that had a similar context and could be easily and accurately compared.

Multiple data collection techniques were employed to collect data on enactment of the BIM Level 2 policy mandate, including observations and shadowing of project stakeholders, semi-structured interviews with stakeholders directly involved in the implementation, document analysis and secondary data analysis. The research started with an analysis of five construction projects within the first organisation under analysis (organisation A) and progressed with data collection sequentially in the other organisations—organisation B (one project), organisation C (two projects) and organisation D (one project). The shadowing process helped in the identification of practical enactment and supported the design of semi-structured interviews that were performed afterwards with a range of stakeholders—project managers, information managers and BIM coordinators, from both the clients' and contractors' side. The semi-structured questionnaire included open questions related to aspects of practical implementation in each stage of the project life-cycle and information delivery cycle, according to the PAS 1192 suite of standards (part of the BIM Level 2 policy approach). Additionally, a range of project documents was analysed for all projects, including Employer Information Requirements (EIRs), Asset Information Requirements (AIRs), BIM Execution Plans, etc. Some secondary sources of data were also considered.

The analysis involved two main stages—a within-case analysis and a cross-case analysis. In the within-case analysis, the 'what', 'how' and 'why' of implementation were analysed. The 'what' involved the content of implementation, the 'how' involved the way implementation occurred, and the 'why' involved the causes underlying implementation. Data was triangulated to build on those different elements. The cross-case analysis involved comparing the cases and the 'what', 'how' and 'why' of implementation for identification of patterns. The coding process for the

data analysis involved clustering the data and creating second-order themes, which formed the categories of responses. The second-order themes were then clustered into aggregated dimensions of decoupling (i.e. policy-practice and means-end decoupling). The underlying causes were also aggregated in second-order themes, as presented next.

RESULTS

Projects' Responses to the BIM Policy Mandate

The analysis of how project stakeholders are responding to the mandate revealed that a number of the rules as prescribed by the BIM Level 2 suite of standards have been violated or not implemented, characterising policy-practice decoupling. In other circumstances, although implemented, some of the adopted practices did not necessarily lead to the intended outcomes because of a lack of assimilation of their meaning. In other words, although the 'letter' of the standards has been followed, the goals for which those rules have been defined (or the 'spirit') have not always been achieved. Our data revealed that, when confronted with the institutional pressure of the mandate, project stakeholders adopted four different responses.

Non-implementation

The first possible way that projects responded to the BIM level 2 mandate identified across the cases was through non-implementation. The content of implementation or the 'what' varied in terms of breadth and depth. Non-implementation occurred in two main forms: i) lack of adoption/implementation of a principle, standard or document as prescribed by the principles of BIM level 2 maturity (BSI, 2013); and/or ii) although adopting the principle, standard or document, some of its clauses/prescriptions and respective processes/activities have not been implemented. That included, for instance, the non-definition of an organisational information requirements (OIR), or the adoption of a BIM protocol (document).

While some of the processes have not been implemented as a consequence of being early stages of BIM adoption, other aspects were either intentionally or unintentionally unimplemented. On the other hand, we also identified that having all processes and activities in place as recommended by the standards did not necessarily mean full compliance, as revealed by another type of response, as discussed next.

Violation

For some processes and activities, although the standards were followed, some of the recommended practices were violated or ceremonially implemented. In other words, the clause/process/activity has been violated or its implementation has not complied with the 'letter'. By analysing the 'how' of implementation this pattern of response has been observed across a range of processes and activities over the information delivery cycle. Those included, for example, EIRs and AIRs not having all the specifications necessary, such as guidelines on the handover process between CAPEX and OPEX and procedures for maintaining the asset information model. The data revealed that the ceremonial adoption was an obstacle to the realisation of the envisaged benefits, leading to rework and waste.

Assimilation

The data also revealed that, on some occasions, project members enacted the BIM policy by assimilating the new practices or the new knowledge of the standards into existing ways of doing things, differing many times from what was initially meant by the standards. Project stakeholders' sensemaking, therefore, was identified as a

critical mediating link between shifting logics in the environment as established by the mandate and practice change at the intra- and inter-organisational levels.

Indeed, the implementation of policy involves interpretation (Spillane and Callahan 2000). Individuals might make sense of new information through existing knowledge and beliefs rather than merely replacing previous knowledge with new information (Spillane and Callahan 2000). The data revealed that project stakeholders constructed what Spillane and Callahan (2000) called 'form-focused' understandings of 'messages' of the policy or formal structure. That is, project members understood and implemented the standards in terms of incorporating new practices but did not make the related structural changes in related institutions (the causes of decoupling as discussed next) necessary to completely and successfully implement those practices. In other words, they enacted the standards fitting existing underlying assumptions, which led to a symbolic implementation of the policy.

Processes and activities that were assimilated included, for instance, the definition of information requirements. The information requirements were defined following the existing normative and cultural-cognitive systems in place and existing within the construction industry, i.e., by adopting the traditional division of labour in projects or considering the existing assignment of roles. Thus, although the 'letter' of the standards was achieved, project stakeholders enacted it in a way that the intent of policymakers was missed, representing decoupling between the means and the ends.

Accommodation

Finally, although the lack of reconfiguration of existing institutions led to unintentional decoupling in many processes, in other occasions, project team members also engaged with the standards, implementing the standards as intended. In other words, as pointed out by Coburn (2004), implementers focused on underlying assumptions of the standards. Although full compliance with the 'letter' and the 'spirit' of the standards was not found in any of the analysed projects, this type of response was mostly observed on the organisation's C projects. The accommodation, however, started to occur after the implementation of BIM Level 2 in the first project, which served as a learning experience. The leading cause for the low accommodation of the new practices was a lack of reconfiguration of existing institutions, as discussed next.

The Underlying Causes of Decoupling

The data revealed a range of causes underpinning the observed responses, including aspects related to both the organisational context of project organisations and the industry context. Those causes are briefly outlined next, due to space limitations.

Early stages in the adoption process

At the early stages of adoption of BIM Level 2, the lack of knowledge and experience of the supply chain was a cause of decoupling from the standards' recommendations, or on other occasions, violation of the standards. This is aligned with existing management literature positioning that policy-practice decoupling is more likely if it is early in the adoption process (Bromley and Powell 2012).

Client organisation's existing structure

Another identified reason for non-implementation or violation of the standards was the client's organisation current structure. In the case of organisation B, for example, the fact that the organisation does not operate its estate limited the efforts to adopt BIM during the operational phase.

Weak capacity - lack of resources, skills and knowledge

Previous decoupling studies have identified that despite many organisations adopt formal structures to attain legitimate standing, many of them lack the capacity to put those structures in practice, even if it is not early in the adoption process, which may result in a ceremonial adoption. Decoupling from the formal structure, therefore, takes place not only because of a lack of will but also because of a lack of capacity (Bromley and Powell 2012). Indeed, in the analysed projects, a lack of skills, resources, technical knowledge, and lack of practical, experiential knowledge led to decoupling. The data showed that, for example, a lack of human resources with technical knowledge (e.g. an information manager) and skillset within the client organisation, led the client organisations to appoint an external party to provide support in some activities, such as the identification of information requirements, which resulted in decoupling. Lack of technical resources (e.g. an appropriate computer-aided facility management system), and human resources with necessary skills to manage the data during the operational phase, for example, was also highlighted in the interviews as a reason for non-implementing some processes.

The weak capacity and subsequent behaviour of project stakeholders when enacting the BIM Level 2 standards in practice can also be related to the maintenance of existing institutional elements. As previously mentioned, project members used their existing knowledge to make sense of the policy message, which led them to assimilate new knowledge of the standards into existing ways of doing and reproduce habitual dispositions, routines, procedures, power systems, etc., as discussed next.

Lack of reconfiguration of normative, cultural-cognitive and regulative institutions

The data also revealed that existing normative rules that introduce a prescriptive, evaluative and obligatory dimension were a cause of non-implementation, violation or assimilation of process and practices as prescribed by the standards. Existing structures within the construction sector, operation of projects and at an organisational level include existing normative systems that comprise both norms and values. The data revealed that, for example, a lack of reconfiguration of expectation for existing roles or expectations regarding how specified actors are supposed to behave led to assimilation of the processes and activities and consequently symbolic implementation and decoupling from the intended outcomes. Lack of reconfiguration of existing codes of conduct, as for example regarding how designers work, also led to decoupling in some projects. In other words, authority systems, codes of conduct, roles played by project team members (specified goals and activities for particular individuals, social positions) have not been reconfigured as needed when implementing the new practices. Moreover, the data has shown that existing cultural-cognitive institutions - for example, the roles or templates for particular types of actors and scripts for action - have been followed. Actually, cultural-cognitive systems operating at both the level of organisations' culture, such as the client organisation, with its common frames and patterns of belief, and at the level of organisations' fields have been followed, leading to decoupling between the means and the ends. Finally, regulative elements, including reward and cost structures, governance systems, power systems and procedures were also found as elements that have been reproduced and have led to both types of decoupling. In terms of rewards and cost structures, for example, contractors noted that because of the dominant cost and reward structure of the industry and the way that subcontractors get paid in projects, they tend to perform their work as quick as possible, and they have not used the information models to support decision making during the project, which is actually one of the purposes of

using new technologies and having new information management processes. The lack of reconfiguration of existing structural elements, therefore, even if unintentionally, was identified as a major issue to the successful implementation of the BIM mandate.

CONCLUSION

Previous studies have already identified a range of barriers to the successful implementation of BIM, such as lack of skills and knowledge. By approaching BIM implementation as a policy mandate, our findings demonstrated a range of responses employed by projects to the environmental pressure of the mandate. A range of reasons caused those responses, some already identified in previous literature on technology implementation, such as in the case of a weak capacity to implement it. Also, in alignment with previous decoupling studies, our data revealed that failure on implementation might also be a rational response. For example, as a critical agent in the implementation process, the client organisation may decide not to implement a BIM policy extensively due to poor fit with, for example, its existing structure.

However, while acknowledging those conventional explanations for implementation heterogeneity and decoupling, our data has also shown that if project stakeholders do not understand the spirit of the BIM policy advanced through the standards and implement the necessary institutional change, the implementation will not occur in a way that resonates with policy makers' intent. Decoupling, in this case, was observed as an unintentional response, as project stakeholders failed to transform the existing structure for not realising it. Our findings suggest that although project stakeholders assimilated the BIM policy, they drew on their tactic worldview and assumptions to construct their understanding of the content and implications of the policy, increasing the likelihood of decoupling and heterogeneity in responses, which turn influences the pace of the transformation of the sector.

Thus, we observed that the rules of the policy mandate are socially constructed in action, as project stakeholders enact the meaning of the BIM mandate (the meaning of the standards) in a cycle of interpretation and action. The way that those rules have been enacted in practice calls attention to the role played by the formal structure itself (or the policy) and its content, in shaping the implementation and transformation of the sector, and its interaction within existing institutions as an essential aspect to be considered by institutional designers. The knowledge generated through the investigation of a BIM policy practical implementation can serve as the basis for thinking about policy design in a way that the implementation that follows will perform as envisaged, as policy and reformers rarely take account of implementers' prior knowledge when designing policy.

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