# Exploring the Potential Contributions of Benefits Realisation to the Management of Complex Construction Projects

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## Abstract

Recent research has pointed out a need for better considering complexity issues in the development of construction projects, and a need to shift the traditional paradigm of project management. Within this context, it is argued that projects should be seen as value generating processes, linking business strategy to projects and managing the delivery of benefits to different groups of stakeholders rather than the simply delivery of physical assets. In other sectors, such as information systems and technology, an approach named benefits realisation has emerged to focus the management of projects on the delivery of benefits. The approach intents to bring a greater awareness for stakeholders of what are the project benefits, who should be involved in their definition and what are the actions that need to be performed in order to achieve and maximise them. Thus, this research was motivated by a need to explore the contributions of the benefits realisation approach for understanding construction projects as value generation processes, while recognising projects as complex systems and the need to better deal with such characteristics. This was pursuit through a literature review on project complexity, complex systems thinking and main publications that introduce the benefits realisation approach. As a result, this paper summarises contributions of the benefits realisation approach for seeing projects as value generation processes and for better dealing with complexity in project management. Finally, further steps of this research are highlighted.

**Keywords:** benefits realisation, value generation, project management, complex construction projects

# 1. Introduction

Construction projects are typically characterised by the engagement of several separate and diverse organisations, such as consultants and contractors, for a finite period of time (Baccarini, 1996). According to the same author, the greater the differentiation and interdependency of the varied interrelated parts that constitutes a project, the more complex the project is. Projects can be characterised as complex due to the involvement of multiple stakeholders, the scope of the product being created, as well as to the existence of multiple goals (Williams, 2002). Moreover, the assumptions upon which the tasks of a project are based are often instable (Jones and Deckro, 1993), leading to uncertainty, which contributes to project complexity.

Accordingly, Atkinson *et al*. (2006) and the Office of Government Commerce - OGC (2006) describe that some projects present clearly and understood objectives, in which relevant solutions are easily identified. In projects with higher complexity, the scope is generally unbounded, the objectives are unclear and tends to be little agreement on objectives among parties involved (OGC, 2006). Thus, it is difficult to determine what constitutes a solution.

Winter *et al*. (2006) suggests that the complexity of projects is increasing as organisations face the challenge to shift from the delivery of products (e.g. capital asset, system or facility) to better aligning business strategy to projects, maximising revenue generation and managing the delivery of benefits in relation to different stakeholder groups (Winter *et al*., 2006). Moreover, the literature suggests that the success of a project or programme should extend the quality, time and cost triangle, to include the generation of benefits and value aligned with business strategy (Winter and Szczepanek, 2008). The importance of considering benefits as major success criteria for projects has also been emphasised (Thorp, 1998; Farbey *et al*., 1999)

In this context, an alternative approach for managing programmes of change in companies implementing Information Technology (IT) solutions emerged in the beginning of 90's, focusing on realising the benefits of such initiatives (Thorp, 1998). The benefits realisation approach intends to better deal with project complexity, increasing the predictability of project outcomes through a continuous process of envisioning results, implementing, checking intermediate results and dynamically adjusting the path leading from investment to results (Thorp, 1998).

The literature on benefits realisation points out that many large organisations and complex public interest sector programmes and projects fail to identify and achieve planned benefits (Bradley, 2006). According to the same author, this is related to the difficulty of managing highly complex programmes, portfolios or projects rather than lack of infrastructures' performance. Similarly, OGC (2006) argues that failing to achieve success is more related to managerial than to technical problems. The same author argues that a key reason for failure is the informal approach that some organisations take to managing change. The expected benefits of projects are usually vaguely defined (Reiss *et al*., 2006), there is usually a poor identification of necessary means to achieve benefits and poor ability to manage change (Thorp, 1998).

Even though there is extensive literature on benefits realisation, most publications are dedicated to provide models and tools to support the introduction of the benefits realisation approach (e.g. Bradley, 2006; OGC,

2007). Little discussion is focused on the contributions of such approach for a different understanding of projects, and how this may contribute to moving forward from the traditional view of project management. The importance of considering alternative approaches for project management is further explained under the session 2.2 of this paper.

Thus, the present research is motivated by a need to discuss the contributions of the benefits realisation approach for understanding construction projects primarily as value generation processes, while recognising projects as complex systems and the need to better deal with such characteristics. This was pursuit through a literature review on project complexity, the complexity thinking view of management and benefits realisation approach, which are presented in the following sections. Finally, a table summarises the main relationships of benefits realisation to complexity thinking, highlighting the possible contributions of such approach to project management. Further steps of this research are presented on the last session.

# 2. Complex construction projects

## 2.1 Defining project complexity

Complex projects can be understood as consisting of many varied interrelated parts (Baccarini, 1996). The same author suggests that project complexity can be interpreted and measured in terms of differentiation and interdependencies. Differentiation refers to the number of varied elements, while interdependency refers to the degree of inter-relatedness (or connectivity) between these elements.

Williams (2002) refers to organisational and technological complexities as structural complexity, which is in the underlying structure of the project. According to this same author, for projects such as design-and-manufacture, or design-and-build, the first major source of structural complexity is product complexity. Product complexity can be understood as the number of sub-systems of a product and their inter-relationships, e.g. changes in the design to one sub-system that produces cross-impacts and affect the design of the other system.

According to Williams (2002) there are two other types of structural complexity that should be taken into account: the multiplicity of objectives and the multiplicity of stakeholders (Williams, 2002). The same author explains that generally, projects are multi-objective, with conflicting goals, in which the effects of activities on all goals have to be assessed and trade-offs have to be considered. In addition, many projects have a multiplicity of stakeholders (e.g. owner, champion, the public, public bodies), which will add complexity in a similar manner to the multiplicity of goals (Williams, 2002).

Another source of complexity is uncertainty (Williams, 2002). Uncertainty can be understood as the instability of the assumptions upon which the tasks are based (Jones and Deckro, 1993). Two types of uncertainty can be present in projects: how well defined the goals are and how well defined are the methods of achieving those goals (Turner and Cochrane, 1993). According to Williams (2002) when project requirements are not frozen, uncertainty and change in some requirements will mean that

interfacing elements also need to change, leading to cross-impacts, rework and feedback loops, thus, increasing complexity.

## 2.2 The need for alternative approaches to manage complex projects

The complexity of projects has been the main reason why the traditional practices of project management have been criticised in the literature (e.g. Thorp, 1998). The traditional vision of project management considers that a group of sequential activities are necessary to achieve pre-defined objectives. Thus, project management is mainly dedicated on controlling these activities and removing or reducing uncertainty that may affect the achievement of expected objectives (Atkinson *et al*., 2006; Winter *et al*., 2006; Koskela and Howell, 2001). Traditional approaches consider projects and programmes as linear progressions, from activities to objectives and not take into account the need for further judgement and decision-making throughout their implementation (CDRA, 2001). Moreover, Winter *et al.* (2006) emphasise the inadequacy of such approach to deal with the emergent nature of front-end work, for tending to treat all projects as if they were the same, and for not accounting sufficiently for human issues

Thus, it is important to understand the nature of projects in order to determine the appropriate managerial approach (Atkinson *et al.*, 2006). The same authors, based on the work of Crawford and Pollack (2004) present some main characteristics that can be used to identify the nature of projects, which can either lean towards a 'hard' systems model (rational and deterministic) or a 'soft' system model (Figure 1).

| | *Hard characteristics* | *Soft characteristics* |
|---|---|---|
| *Goal clarity* | *Clearly defined objectives* | *Objectives ambiguously defined* |
| *Goal tangibility* | *Tangible end product* | *Abstract concept* |
| *Success measures* | *Quantitative measures* | *Qualitative measures* |
| *Project permeability* | *Not subject to external influences* | *Highly subject to external influences* |
| *Number of solution options* | *Refinement of single solution* | *Exploration of many alternative solutions* |
| *Participation and practitioner role* | *Expert practitioner, no stakeholder participation* | *Facilitative practitioner, high stakeholder involvement* |
| *Stakeholder expectations* | *Values technical performance and efficiency, manages by monitoring and control* | *Values relationships, culture and meaning, manages by negotiation and discussion* |

Figure 1: hard and soft characteristics of projects (Crawford and Pollack, 2004)

The recognition that some projects may be more complex than others, and that the theoretical developments on project management were not properly supporting the problems faced by practitioners, triggered new discussions in the field (Winter *et al*., 2006). Research projects, such as the EPSRC funded *Rethinking Project Management* or the German Programme *Beyond Frontiers of Traditional Project Management*, are examples of efforts to move forward from the traditional view of project management, and better understand the issues surrounding that discipline. Systems theory is a topic that was brought up (e.g. Saynisch, 2005) as an alternative way to understand projects and project management. On the

following session, a brief discussion about this topic is presented; focus is given to aspects related to value generation.

## 2.3 Complexity thinking applied to management

Although there is no universal definition of complexity science, its principles have inspired many academics and practitioners in the field of management in the development of useful explanatory frameworks to understand organizations as complex systems (Mitleton-Kelly, 2004). In the literature, there are some publications in which the topic of complexity and systems thinking are implicitly related to value generation. Issues arising from these are briefly described bellow.

Complexity thinking views the world as a network of interacting systems where change in one element can alter the context for all other elements (Kernick, 2004). Plsek (2000) describes a system as a coming together of parts, their interaction and sense of purpose. A system can exist in one of four different states: stasis, order, complexity and chaos. Stasis is the absence of dynamic behaviour; order is used to describe predictable, linear and stereotypical behaviour. Chaos refers to a system that appears random but contains hidden order. Complexity is the state between order and chaos (Sweeney, 2006).

Holt (2002) emphasises four main characteristics that need to be understood in complex systems: (a) the multiple dimensions – multiple variables can be related to the cause of one effect; (b) dynamicity – change in course caused by a determined factor; (c) non-linearity – two variables can result in a non-linear effect; and (d) emergency – complex interactions can generate new properties. Moreover, Burton (2002) describes complex systems as consisting of multiple components that should be understood by observing their interactions. Such interactions are non-linear, this means that the result of any action depends on the state of the elements at the time as well as the size of the input. Moreover, those interactions can generate new properties, called emergent behaviours of the system, which cannot be predicted or explained through studying the elements of the system (Burton, 2002).

In the management literature, it is suggested that complex systems exist in dynamic and changing environments (Lawlor-Wright and Kagioglou, 2008). According to the same authors, in order to develop and adapt themselves, systems need to process information about their environment (and other systems within it) and learn. Thus, in organisational management, Nonaka and Takeuchi (1995) define learning organisations as the ones capable to adapt in a changing environment by creating new knowledge, disseminating and effectively applying it to practice.

Regarding value generation, Gault and Jaccici (1996) emphasise the importance of a strong leadership to define a clear vision of goals, steering the organisation to success. Additionally, Smith and Graetz (2006) highlight that organisational structure is a continual topic of concern, as managers try to loose control enough to stimulate creativity and innovation whilst maintaining strategic direction. Similarly, Beckerman (2000) points out the predominance of the reductionist view to solve complex engineering problems, while the combination of both strategies (reductionist and holistic) can facilitate the understanding of key factors that are necessary to achieve a specific effect. The holistic view allows the beginning of product

development from the desired properties to the identification and development of the components and interactions required to achieve the desired effects (Beckerman, 2000).

In construction projects, Pennanen and Koskela (2005) make a distinction between necessary and unnecessary complexity. According to these authors, necessary complexity is related to the desirable flexibility of solutions during the design process. The design process is inductive by nature and the problems to be solved are wicked, as suggested by Rittel and Webber (1987). The same authors classify wicked problems through a set of characteristics, among them: there are no right or wrong solutions to wicked problems, but good or bad solutions instead; the nature of the problem changes from the original one; it is difficult to know whether the problem actually has been solved, as there is no stopping rule to a wicked problem and there is no ultimate test for a solution. Conversely, complexity should be avoided in deductive problems (Pennanen and Koskela, 2005). According to the same authors, achieving consensus among stakeholders, for instance, is a way to deal with uncertainty regarding clients' requirements, and thus avoiding further complexity. Also, during production, which is a deductive process (there are right and wrong solutions), complexity is unnecessary and should be avoided.

Complexity thinking seems to introduce a more holistic and dynamic view to projects, enabling the introduction of project management practices that can better support the problems being faced by practitioners. According to Farbey *et al.* (1999), several managerial implementations are not successful because they are based on the premise that all is stable in a stable world. The same authors introduce an active benefits realisation process, arguing that such approach does not only provide procedures for accountability and control, but also should enable the maximisation of benefits from its investment through learning and coping with contingencies (Farbey *et al.*, 1999), Thus, the potential contributions of a benefits realisation approach to deal with complexity are presented in the next section.

# 3. Potential contributions of the benefits realisation approach

## 3.1 The benefits realisation approach

Traditionally, the concept of value in project management thinking (including the value management body of ideas) has been essentially related to product creation: the development or improvement of a physical product, system or facility to specification, cost and time (Winter *et al*., 2006). The same authors argue that the understanding of value should exceed the boundaries of product creation and be aligned with the business strategy, focusing on the generation of benefits for different stakeholder groups.

Bradley (2006) and Ward and Daniel (2006) define benefits as an outcome of a change that is perceived as an advantage by a particular stakeholder or a group of stakeholders. According to Payne (2007) and the OGC (2007), benefit is a measurable improvement resulting from outcomes, which is perceived as an advantage by a stakeholder, and should contribute towards one or more of the strategic objectives (OGC, 2007). Benefits are anticipated when a change is conceived (OGC, 2007) and are owned by individuals or groups who expect to obtain value from an investment (Glynne, 2007).

According to Reiss *et al*. (2006) benefits are achieved during the life of a programme, as completing projects are decommissioned and new ones commissioned. The same author explains that only when this capability is used by the organization is a benefit actually realised: transport for London, for instance, has a portfolio of programmes, each of which creates a component of the London transport infrastructure, combining construction, ticketing, marketing and the integration projects to deliver improvements to Londoners. Thus, Reiss et al. (2006) explains that there is a value path from projects to benefits: projects create deliverables and the combination of these deliverables generates the capabilities that enable the desired benefits to be achieved. Moreover, OGC (2007) presents a diagram that shows the path from project outcomes to strategic objectives (Figure 2), highlighting not only the realisation of benefits, but also the emergency of unexpected benefits or dis-benefits that are side effects of achieving the desired outcomes, and that also need to be managed.

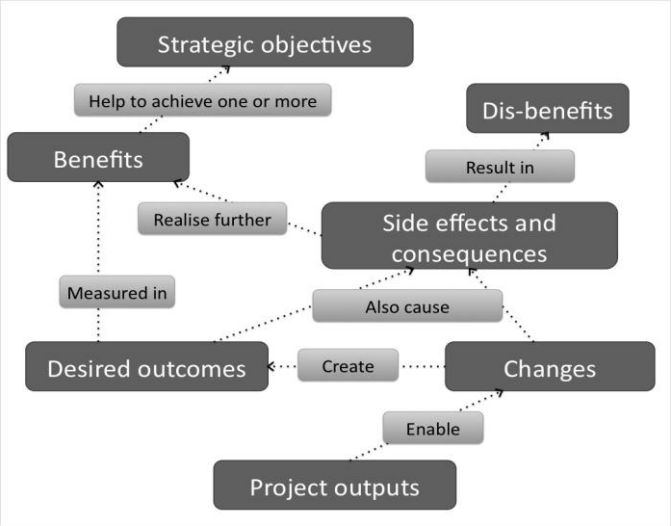


Figure 2: Path from project outputs to strategic objectives (OGC, 2007)

Thus, the success of a project or programme often depends on the synergy among different activities, as one project or set of activities might only be successful if others complete in a certain way (Barlett *et al*., 2006). In this sense, the benefits realisation approach has been suggested as a way to expand the traditional way of managing projects based on the control of costs, quality and time, to providing accountability for the realisation of expected business benefits, and thus the achievement of success (Farbey *et al*., 1999). Moreover, the same authors emphasise that another contribution of this approach is to also enable benefits maximisation through learning and coping with contingencies.

## 3.2 The benefits realisation management process

The benefit management process ensures that the capabilities created are used to deliver the anticipated benefits (e.g. improved quality, enhanced cost effectiveness, etc.). In the benefits realisation approach, emphasis is given to the need of looking at the project from a systemic view, being aware of every change that is necessary to achieve the expected benefits (Ward, Taylor and Bond, 1996).

According to Thorp (1998), a benefits realisation process should be able to deal with four dimensions of complexity: (a) Linkage – the link between expected results and the organisation's strategy should be clear; (b) Reach – there is a need to understand the scope of the change which is necessary to achieve the expected results, including the areas that will be impacted and to what extend stakeholders will be affected; (c) People - people must be motivated and prepared to change; and (d) Time – the time for the transformation process should also be considered.

Since 90's different benefits realisation models have been developed and applied in many sectors, e.g. Ward, Taylor and Bond (1996), Thorp (1998), OGC (2007), Sapountzis *et al*. (2010). Generally speaking, the models present a similar process, following a Plan-Do-Check-Act cycle (Nogeste and Walker, 2005). However, while some authors emphasise the contributions of benefits realisation for summative evaluations (evaluations for accountability), others also highlight the contributions of such approach to formative evaluations (evaluations for learning) (e.g. Farbey et al., 1999). Furthermore, generic guidelines for a benefits realisation process could be drawn from the literature (Ward and Daniel, 1996; Thorp, 1998; OGC, 2007):

- Identifying and engaging stakeholders;
- Identifying and agreeing on benefits and possible dis-benefits;
- Setting the plan for benefits realisation and defining targets;
- Realising the benefits and measuring achievements;
- Adapting the process based on monitoring data and on emergent changes in expected benefits; and
- Review achieved benefits and identify opportunities to improve the process.

Ward and Daniel (2006) argue that the non-consideration of some stakeholders and how they can influence projects' results is a major reason for project failure. Reiss *et al.* (2006) suggests that the expected benefits of a project are usually vaguely defined, leading to difficulties in maintaining focus when subsequent problems occur. The vagueness of expected benefits can also lead to an increased uncertainty in allocating responsibility for managing and delivering benefits (Lin and Pervan, 2001).

When planning for benefits realisation, Thorp (1998) emphasises the need to consider the interconnected issues that might influence the project's results, in order to achieve success. Moreover, Ward, Taylor and Bond (1996) argue that the purpose of benefits realisation, when this process was introduced in IT was "*not to make good forecasts but to make them come true."* In this sense, planning for benefits realisation, including key assumptions and sensitivity and risk analysis of those benefits expected to contribute most to outcomes - should be seen as a major component of this decision-making process, being a roadmap for the programme and providing focus for delivering change (OGC, 2009).

OGC (2007) argues that the ultimate success of a programme should be judged by its ability to realise benefits and the continuing relevance of these benefits to the strategic context. In this sense, the benefits

realisation is an approach has also been suggested as a way to better considers the dynamic nature of projects, recognising the emergency of unexpected benefits and dis-benefits, while supporting learning and adaptation (OGC, 2007; Alhurst and Doherty, 2003). Sapountzis *et al.* (2010) also emphasise the need for understanding that changes in expected benefits will emerge during the process, and these should be recognised and appropriately managed.

# 4. Discussion

Based on the literature, it was possible to highlight potential contributions of the benefits realisation approach for the management of complex construction projects. Due to space constraints, such contributions are summarised in the table bellow. The figure presents a comparison between the guidelines for benefits realisation and issues discussed on complexity thinking related to management, and more specifically value generation.

| ***Generic guidelines for benefits realisation*** | ***Main contributions to managing complexity in projects*** |
|---|---|
| *Identifying and engaging stakeholders;*<br>*Identifying and agreeing on benefits and possible dis-benefits;* | *Understand key factors that are necessary to achieve the desired effects, by adopting a holistic view (Beckerman, 2000);*<br>*Achieve consensus to deal with unnecessary complexity and uncertainty (Pennanen and Koskela, 2005);*<br>*Clearly define the goals, maintaining the organisation's focus on success while stimulating creativity (Gault and Jaccici, 1996; Smith and Graetz, 2006);* |
| *Setting the plan for benefits realisation and defining targets;* | *Start from the desired effects to the identification and development of the components and interactions required to achieve such effects (Beckerman, 2000);*<br>*Understand the multiple variables that can be related to the cause of one effect (Holt, 2002);*<br>*Reduce unnecessary complexity in deductive problems, after solving the inductive ones (Pennanen and Koskela, 2005);* |
| *Realising the benefits and measuring achievements;* | *Understand the system by observing the components interactions (Burton, 2002);*<br>*Monitor emergent behaviours of the system, which cannot be predicted or explained through studying the elements of the system (Burton, 2002);* |
| *Adapting the process based on monitoring data and on emergent changes in benefits; and*<br>*Review achieved benefits and identify opportunities to improve the process* | *Process information about the environment and learn (Lawlor-Wright and Kagioglou, 2008);*<br>*Adapt in a changing environment by creating new knowledge, disseminating and effectively applying it to practice (Nonaka and Takeuchi, 1995);*<br>*Take advantage of necessary complexity in inductive problems to develop better solutions (Pennanen and Koskela, 2005); and*<br>*Stimulate creativity while maintaining strategic focus (Smith and Graetz, 2006).* |

Figure 3: Major contributions of benefits realisation to managing complexity in projects

It was observed that the guidelines presented in the benefits realisation literature are related to complexity issues pointed out in the project management and complexity thinking literature. Even though it is not

explicit in the benefits realisation literature, it seems that such approach can be partially supported by the theory related to the complexity thinking view of the world.

## 5. Conclusion and further steps of research

The importance of considering value and benefits in managerial practices has been increasingly discussed in the literature, e.g. Thiry (2002), Winter *et al.* (2006), OGC (2007), Winter and Szczepanek (2008). However, based on traditional managerial practices, project managers are generating sub-optimal solutions, in which the expected benefits defined in the project conception, are not materialised (Bartlett, 2006; Thorp, 1998).

The benefits realisation approach is being suggested in the literature as a way to better consider the complexity of projects (e.g. Thorp, 1998). Through a literature review on major complexity issues that affect the management of projects and on the main literature on benefits realisation, it was possible to identified and make it explicit some contributions of such approach for dealing with complexity issues in project management. It is believed that this was one step forward in understanding the theoretical contributions of a benefits realisation approach to the management of construction projects. Further steps of this research will be to further explore benefits realisation in practice, testing its practical contributions for dealing with value generation in complex construction projects in a more holistic and dynamic way.

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