

The Stakeholder Value Delivery Model

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Abstract

Purpose: The purpose of this paper is to argue the need for better conceptual models for value delivery in construction projects and to introduce one such model

Research Method: Conceptual Research

Findings: The paper introduces the idea of project value configuration and presents a conceptual model for value shop configured projects

Limitations: This is a conceptual paper and a theoretical contribution.

Value for practitioners: Gain a better understanding of value delivery mechanisms in projects

Keywords: lean construction, theory, tfv, value, value delivery, conceptual model

Paper type: Main paper

Introduction

In the last few decades, project management's focus has shifted - from merely delivering scope on time and within budget - to delivering value (Laursen and Svejvig 2016). Within Lean Construction (LC), value has always been central; however, the topic of value is not without issues. While there is no contention that the goal of projects is to deliver value (Emmitt et al. 2005), there is no agreement on what value is (Drevland et al. 2017a; Salvatierra-Garrido et al. 2010) or to which stakeholders we should deliver value (Drevland and Tillmann 2018). I would argue that the fundamentals of value delivery in modern-day construction projects are poorly understood. Furthermore, I would argue that this is partially due to not having any suitable conceptual model of value delivery.

In general, models represent reality in some way or form (Gregory 1993; Meredith 1993). Models can have different levels of abstraction. On one end of the scale, we find iconic models, physical representations of objects or systems, such as scale models. There is a one-to-one relationship between every part of the model and the real object or system it represents in these models. On the other end of the scale, we find pure conceptual models, where the elements of such models do not necessarily have a real-world equivalent (Gregory 1993).

The literature is ambiguous regarding what a conceptual model is. This paper defers to Greca and Moreira's (2000) definition. According to them, a conceptual model is an "external representation created by researchers, teachers, engineers, etc., that facilitates the comprehension or the teaching of systems or states of affairs in the world."

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The literature contains little in the way of conceptual models of the value delivery process in projects. What exists on the subject mainly falls into one of two categories; 1) those that treat projects as a black box and 2) those tied very closely to specific tools and models such as Value Management (see, e.g., Kelly 2007). The one notable exception is Koskela's seminal Transformation-Flow-Value (TFV) theory of production, a cornerstone of the LC theoretical body of knowledge. However, this paper will argue that the TFV-theory is inadequate for fully understanding value delivery for the *value configuration* that modern construction projects use.

Value configuration is a term from the business literature used to explain how companies are rigged regarding delivering value to their customers. Following the method section, the paper introduces the concept, and the different archetypes of value configuration, in detail and contextualizes it for construction projects. Next, it gives a brief overview of the TFV-theory and presents arguments for its inadequacy in describing value delivery in construction projects - followed by a presentation of a new conceptual model for value delivery in construction projects, named the Stakeholder Value Delivery (SVD) model. Finally, the paper discusses the model's aptness versus the TFV-theory.

Method

I have anchored this paper in the pragmatic research paradigm. This paradigm avoids the contentious issues of truth and reality by accepting, philosophically, "that there are singular and multiple realities that are open to empirical inquiry and orient itself toward solving practical problems in the 'real world'" (Feilzer 2010).

Within the pragmatic paradigm, "inquiry aims at utility for us rather than an accurate account of how things are in themselves" (Rorty 1999). The paradigm sees truth as a matter of useful belief. To understand what is meant by this statement, consider the geocentric model of the solar system. While we now know it to be wrong, it was a useful belief in its time. It allowed the development of navigational methods that were useful.

The conceptual model presented later in this paper has been developed through abductive reasoning. Abduction is an alternative form of inference to the more traditional induction and deduction. The pragmatist philosopher Charles Sanders Peirce first coined the term (Burks 1946). Pierce refers to it as the logic of discovery, the only logic that can truly create new theoretical knowledge (Peirce et al. 1994).

Value configuration

In his seminal book *Competitive Advantage: Creating and Sustaining Superior Performance*, Porter (1985) introduced the concept of the *value chain*, which he describes as a representation of the collection of activities that are performed in a company to design, produce, market, and deliver the company's product.

Porter argues that the general value-creating logic of the value chain model is valid for all industries. This notion is challenged by Stabell and Fjeldstad (1998), who argue that the value chain concept has several shortcomings in describing the value creation taking place in many companies. One of their examples is that of banks:

"Our experience is that value chain analysis frequently results in either postulating deposits as the 'raw material' that the bank's primary

activities transform into loans, or postulating that all primary banking activities collapse into a single major activity class: operations. In either case, the chain model cannot deal explicitly with both lenders and borrowers as bank customers. The value chain metaphor obscures the competitive logic of banking by focusing attention on transaction-processing unit costs, with little attention to interest spread and risk management.”

Stabell and Fjeldstad (1998) further argue that the value chain is but one of three generic value configurations. The other two being the *value shop* and the *value network*. Table 1 summarizes the attributes of each of the three models. While Stabell and Fjeldstad developed these value configurations to describe how companies create value, I would argue that they are also applicable for describing projects as value delivery systems.

Value network configured companies deliver value linking their customers together, for instance, telecommunication providers. Construction projects have no analogue to the value network; however, I would argue that the other two configurations have analogous project delivery models.

The value delivery logic of traditional project management and traditional design-bid-build delivery resembles the value chain's logic. The scope is locked at the outset of the project, and optimization is a matter of minimizing the inputs needed for delivering this output. Conversely, modern project delivery approaches, such as Lean Integrated Project Delivery, are more open-ended at the outset and focused on fulfilling the client's purpose rather than delivering a locked scope. I would argue that we can consider such delivery models as value shop configured.

The Transformation-Flow-Value theory

According to Koskela (2000), the 20th century saw three different production conceptualizations. He argues that all three are needed and synthesizes them to one common theory; the Transformation-Flow-Value (TFV) theory.

Historically, the predominant conceptualization of production has been that of a transformation of inputs to outputs. This conceptualization assumes that we can decompose the overall transformation into several smaller transformations and optimize the whole by optimizing these smaller parts.

One limitation of the transformation conceptualization is that it only considers where transformation or processing occurs, i.e., the value-adding activities. Suppose we decompose a production process into smaller transformation activities. In that case, this decomposition will also yield several non-value-adding activities in between the transformations - such as transportation, inspection, and waiting. This issue is the focus of the second conceptualization - flow. It considers production processes as flows of materials and resources. Flow activities - or non-value adding activities - are considered waste and are sought to be minimized or eliminated.

Another flaw of the transformation conceptualization is that it is prone to sub-optimization. Neither consequences on downstream operations nor the final product qualities are of concern when optimizing the smaller tasks. Such issues belong to the third conceptualization domain, value, which is concerned with realizing the customers' (internal and external) needs.

Table 1: Overview of alternative value configurations (Stabell and Fjeldstad 1998)

	Chain	Shop	Network
Value creation logic	Transformation of inputs into products	(Re)solving customer problems	Linking customers
Primary technology	Long-linked	Intensive	Mediating
Primary activity	<ul style="list-style-type: none"> ▪ Inbound logistics ▪ Operations ▪ Outbound logistics ▪ Marketing ▪ Service 	<ul style="list-style-type: none"> ▪ Problem-finding and acquisition ▪ Problem-solving ▪ Choice ▪ Execution ▪ Control evaluation 	<ul style="list-style-type: none"> ▪ Network promotion and contract management ▪ Service provisioning ▪ Infrastructure operation
Main interactivity relationship logic	Sequential	Cyclical, spiralling	Simultaneous, parallel
Primary activity interdependence	<ul style="list-style-type: none"> ▪ Pooled ▪ Sequential 	<ul style="list-style-type: none"> ▪ Pooled ▪ Sequential ▪ Reciprocal 	<ul style="list-style-type: none"> ▪ Pooled ▪ reciprocal
Key cost drivers	<ul style="list-style-type: none"> ▪ Scale ▪ Capacity utilisation 		<ul style="list-style-type: none"> ▪ Scale ▪ Capacity utilization
Key value drivers		<ul style="list-style-type: none"> ▪ Reputation 	<ul style="list-style-type: none"> ▪ Scale ▪ Capacity utilization
Business value system structure	<ul style="list-style-type: none"> ▪ Interlinked chains 	<ul style="list-style-type: none"> ▪ Referred shops 	<ul style="list-style-type: none"> ▪ Layered and interconnected networks

Critique of the TFV-theory

Winch (2006) provides a thorough critique of the TFV-theory. Of particular interest is his critique of the unitary value concept implied in the TFV theory, focusing solely on the final customer. Winch argues that one must consider three different value aspects:

- the contribution that the asset created by the process makes to the client's business processes
- the contribution that the process makes to the supplier's business processes
- the contribution that the asset makes to society as a whole

Drevland and Tillmann (2018) have argued that one should consider even more groups than those who Winch (2006) mentions; however, Winch's view is in line with the arguments by Drevland and Tillmann. The salient point is that projects as value delivery systems must consider the value for more than one customer at once.

The TFV-theory does, to some extent, consider multiple customers. Here, all downstream workstations are customers, and one should always consider the value for those. However, the value measurements and optimizations that take place are always

related to the final customer. I.e., better value delivered to a downstream workstation is only of interest because it improves the final customer's value.

I would argue that the TFV-theory is excellent for explaining and optimizing production in cases where one has fixed the output that the production system should deliver at the outset, for example, assembly lines or traditionally scope locked projects. However, I would further argue that it comes up short for any project model that can be considered a value shop configuration.

The TFV-theory equates the value to be delivered with what the customer wants in terms of hard requirements. The customer will formulate these requirements based on their current perception of what is valuable. Herein lies the problem. This perception will be dependent on both the context and the knowledge of the customer (Drevland et al. 2017a).

Construction can take a significant time to complete, and the changes in the customer's context could be significant during that time. Furthermore, knowledge can be considered the essential product of any design process (Reinertsen 1997). Thus, the customer's perception will change as the project moves forward, and they gain new knowledge. Therefore, modern project delivery models - typically integrating design and construction - require value to be treated dynamically.

Another issue with the TFV theory is that it is - at the core - a linear model. While it is well suited for a value chain configuration, with its sequential logic, it is not equally so for a value shop configuration. The main interactivity logic in a value shop configuration is cyclical or spiraling. I would argue that a purely linear model is a bad fit for a conceptual model of a value shop configured project's value delivery process. Instead, such a model should have some notion of interactivity.

The Stakeholder Value Delivery model

This section presents the Stakeholder-Value-Delivery (SVD) model. The model - shown in Figure 2 - is heavily inspired and influenced by Gero's (1990) Function-Behavior-Structure model of design. However, the SVD model is too fundamentally different as to be considered derived from it.

Stakeholders

As previously discussed in the critique of the TFV-theory, one might be interested in delivering value to many different stakeholders. For the sake of the SVD-model, precisely who they are is of no concern. In general, any project's goal will be to deliver value to a set of stakeholders. When delivered, the project will yield V_{Actual} , this being the set of value actually delivered to each stakeholder. The project delivery process then becomes a matter of finding and executing a *Solution* that will maximize V_{Actual} .

Mapping desired value

The project's starting point for formulating the solution will be its insight into what the different stakeholders perceive as valuable, represented in the model as $V_{Desires}$. The literature commonly refers to explicit processes undertaken to understand stakeholder value as elicitation (Barney et al. 2008; Boehm 2006; Grünbacher et al. 2006; Niazi et al. 2006). However, the SVD model refers to processes that help form this understanding as *mapping*. Partially because any explicit elicitation does not necessarily form this

understanding, the project could form its understanding by other means, such as assumptions and general knowledge. For example, any designer will know that a customer does not want a leaky roof.

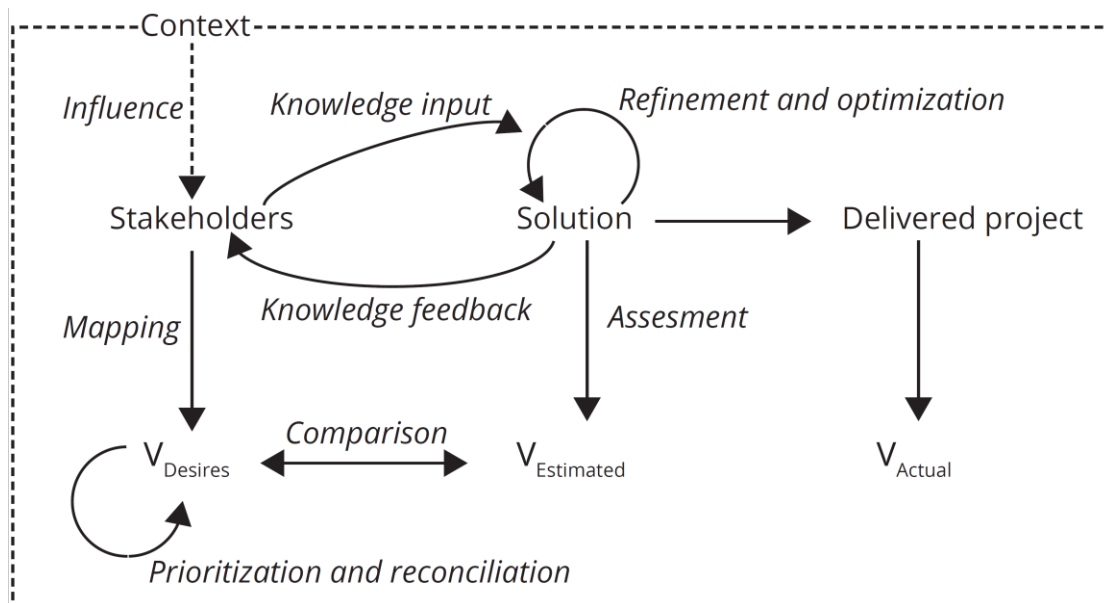


Figure 1: The Stakeholder Value Delivery Model

Another reason for choosing the term mapping lies in the relationship between someone’s understanding or perception of what is valuable and what truly is valuable, which is analogous to a map and the terrain it represents.

According to Drevland et al. (2017a), three elements come into play for a stakeholder’s perception of value 1) their values, 2) their context, and 3) their knowledge. While people’s values can and do change, especially when dealing with money (DeScioli et al. 2014), I would argue that stakeholders changing values is not a typical nor expected result of the value delivery process. Furthermore, insofar as they do, this can be said to be as a function of new knowledge received from the solution. Similarly, we can consider any change in values caused by something outside the project due to a changing context. Values, as such, are therefore not an element of the model.

Context influence

A context surrounds every stakeholder and the project. This context influences the stakeholders’ perception of value and the value they desire from the delivered project. For example, hospital projects take a long time to complete. Several contextual factors could come into play during the project execution, such as developments in medical technology or demographic shifts, that could change how the owner would want the facility’s final design.

Knowledge input and feedback

Creating the solution requires knowledge from the stakeholders - those who will design and build the project and those who will own and use it. However, there is also a feedback loop. The solution process creates knowledge that feeds back to the stakeholders. The perception of value is dependent on knowledge, which entails that what

the stakeholders see as valuable might now have shifted. Thus, the project should ideally update the map to how the stakeholders currently observe the terrain.

Prioritization and reconciliation

In many projects - especially in large buildings and infrastructure projects - there are many stakeholders, and there will inevitably be value misalignments between some of them (Drevland et al. 2017b). In such cases, the project must go through some sort of prioritization and reconciliation processes. These could be formal and explicit, or informal and subconscious. However, somehow, such processes must necessarily take place at some level.

Solution

From some notion of $V_{Desires}$ - what is of value for the different stakeholders - we can attempt a solution that achieves the desired value. The solution's form and the content will vary wildly, depending on where the project is in its life cycle, from a pure cost model in the early stages to full-blown design drawings, execution plans, installation instructions, and other models and documents in the final stages.

Refinement and optimization

We iterate on the solution either through refinement or optimization. Refinement entails taking the solution forward, i.e., adding elements or details that we have so far abstracted away. Conversely, optimization entails improving the solution at the level that it is. We can conceptualize both refinement and optimization as a process of identifying, developing, and selecting solution alternatives, as illustrated in Figure 2. However, there is one key difference: For optimization, one of the alternatives will be the existing solution with some evaluation of whether iterating on the solution will be worthwhile, i.e., that the solution's expected marginal improvement outweighs the expected cost of doing the optimization.

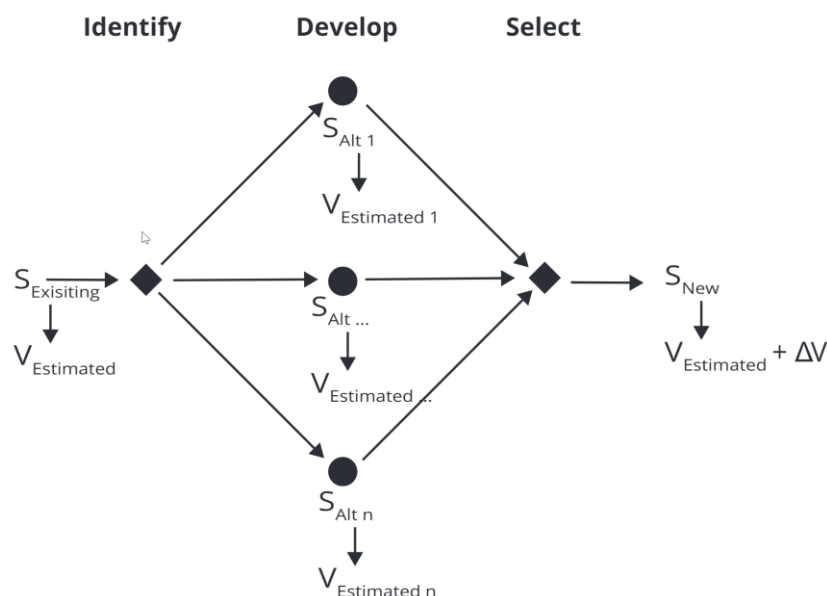


Figure 2: Process of refining or optimizing solution

Assessment

The basis for the choices that one makes during refinement or optimization will be some notion of which alternative yields the most value. $V_{Estimated}$ is the estimate of what value the solution will give. One commonly expresses the solution in terms that are not directly relatable to $V_{Desires}$. For example, a hospital owner will desire a cheap - to build and maintain - facility fit for purpose. In contrast, the design of the building is a three-dimensional arrangement of materials and building elements. Thus, assessment categories any processes related to estimating the impact of the elements contained in $V_{Desires}$.

Comparison

By comparing $V_{Desires}$ and $V_{Estimated}$, one can assess the goodness of the solution. This comparison feeds into the decision to refine or optimize further and sets the target for these processes.

Discussion and conclusion

In this paper, I have made the case that projects using modern project delivery models should be considered value shop configured. However, this view is somewhat simplistic, one that I would argue would not hold up well when faced with reality and the immensely complex nature of construction projects. Regardless of the delivery model, certain aspects of any project would benefit from being optimized through a value chain lens or a value shop lens. While traditional projects are heavily value shop configured in the execution phase, the early phase still focuses on problem-solving. Conversely, while the problem-solving stretches further out in modern project delivery models, at some point in time, the project will lock down what it will build, and the construction process can be considered sequential.

The TFV-theory provides an excellent foundation for analyzing and optimizing projects through a value chain lens. However, it is ill-suited to do the same when regarding projects through a value shop lens. I propose that the SVD-model presented in this paper can fill that role. Thus, I would argue that the TFV-theory and the SVD-model are complementary rather than competing conceptual models of project value delivery.

Is the SVD-model a good representation of the value delivery process in value shop configured projects? The model is anchored to the pragmatic research paradigm, where truth is a matter of useful belief. Thus, the question is not whether the model is a truthful representation of reality in the positivist sense, but instead, if it is useful. This question cannot be fully answered here and is something that the paper must leave to future research. However, I can allude to how it can have some explanatory powers versus the TFV theory.

A feature shared by some of the most successful tools used in Lean Construction is that they have very rapid feedback cycles related to the SVD-model loop. Some could even be considered integrated tools - in the sense that Mapping, Prioritization and Reconciliation, Knowledge Transfer, Solution and Optimization, and Assessment are all performed by the same people in a very rapid feedback setting. One example is the 3P method, which involves getting key stakeholders together and making full-scale mock-ups of facilities - typically using cardboard and tape - and simulating their use. Other examples are Choosing-by-Advantages for decision making and pull planning for scheduling.

While the TVF-theory can, to some extent, be used to describe the effects of the use of such tools, it does not have the vocabulary or constructs to explain the fundamental mechanisms upon which they act. The SVD-model, on the other hand, does. I would argue that this is essential to have such vocabulary or constructs if we want to go beyond the incremental improvements of trial and error when bettering such tools or developing new tools to replace them.

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