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Procedia Computer Science 121 (2017) 1080–1087

**Procedia**  
Computer Science

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CENTERIS - International Conference on ENTERprise Information Systems / ProjMAN - International Conference on Project MANagement / HCist - International Conference on Health and Social Care Information Systems and Technologies, CENTERIS / ProjMAN / HCist 2017, 8-10 November 2017, Barcelona, Spain

## Pursuing Value Creation in Construction by Research -A Study of Applied Research Methodologies

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### Abstract

This paper presents the results of a study on research methodology applied within the field of Value and Value Creation in construction industry. The purpose of the paper is to give an overview of approaches that are used, and map which research philosophies and methods are most common within this field.

The research is based on an extensive literature review. Relevant research contributions from 1980 to 2016 were studied. The publications have been categorized based on their data collection method (literature review, interviews, surveys etc.), and which philosophical approach (positivism, interpretivism, realism and idealism) that is applied.

Research on value has been conducted in many different contexts such as marketing, psychology, manufacturing and construction. However, this research is limited to publications that are directly associated with buildings, construction projects and construction industry. The paper also presents the development of research methods on value and value creation.

The results, besides providing a knowledge status, give an overview that can be helpful for fellow researchers to improve the research quality, and see if there is a need to look into the topic from alternative perspectives.

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Peer-review under responsibility of the scientific committee of the CENTERIS - International Conference on ENTERprise Information Systems / ProjMAN - International Conference on Project MANagement / HCist - International Conference on Health and Social Care Information Systems and Technologies.

*Keywords:* Value management, Value Creation, Construction projects, Research methodology, Research philosophy

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10.1016/j.procs.2017.11.138

## 1. Introduction

Value and Value Management have been discussed in management and marketing literature during the last decades especially since 1980s. A large number of researchers have attempted to conceptualize and define value<sup>1-9</sup>. This has mainly been done in the context of marketing, production and manufacturing, as well as sociology and psychology.

There have been numerous research streams within value in construction where economic issues, sustainability and customer satisfaction have been in focus. Value creation, Value Engineering and Value Management are topics that have received increasing interest lately, and a substantial amount of research has been conducted within these fields. Some researchers have had their focus on defining and conceptualizing value, while others try to suggest processes to improve value management, and some have attempt to measure and optimize the processes. This paper aims to provide an overview of the available research related to value, value creation, and value management in construction projects with focus on research methodology by answering: i) What philosophical views has the research been based on? ii) What have the research approaches been? iii) How has the development of the research been over the years?

## 2. Data collection and limitation

The research is based on review of scientific articles. The articles are chosen among several thousand articles from databases Emerald, Science Direct, Scopus, Google Scholar, and ORIA (Norwegian search engine for university libraries and numerus publication databases)

In order to identify the articles, search words such as Value creation construction; Value measurement, buildings; Buildings, value, clients; Value, construction projects; Value Creation, buildings; Value management, construction projects; and Value measurement, buildings were used.

Relevant publications were chosen using the following criteria:

- Only published scientific articles in the databases mentioned above.
- All publications were in English language.
- Publications were limited to the period of 1980 to 2016
- Focus on what creates value in construction projects and how it can be measured.
- Life cycle and sustainability focus was included.
- No focus on production and manufacturing (lean production).
- No focus on infrastructure projects unless the research was relevant for construction projects.
- No books since books can be a combination of research publication and contain several research approaches and philosophies.

The database search using the keywords resulted in several thousand hits. Fifty-five articles were selected by reviewing titles and abstracts. Five publications turned out to be irrelevant after reviewing the articles and three had unclear research methodology. Consequently, the final number of the articles that create the basis for this paper is 47. These articles have been categorized and analyzed using the framework presented in

Figure 1.

## 3. Theoretical Background and Framework for Analysis

First part of this chapter presents a brief theoretical background on the concept of value and value creation. The main part of the chapter is a reflection of existing theories in research methodology including research philosophies, research approaches, and research design.

### 3.1. Value and Value Creation

Previous research revealed that the pursuit towards defining value is of ancient character<sup>10</sup>. The discussion and debate has been ongoing since Aristotle (4th century BC) who first distinguished between two meanings: “use-value”

and “exchange value”<sup>11</sup>. Adam Smith brought the discussion further in the middle of the 18th century. He focused on “productive activities” that contributed to exchange value through the manufacturing and distribution of tangible goods. In 1926, Henry Ford indicated the significance of focus on customer’s value and its importance for industrial manufacturing<sup>12</sup>.

Although different theories and research streams have been applied in different contexts to conceptualize “value”, the common ground is the focus on the customers and users<sup>13</sup>. As Womack and Jones<sup>14</sup> stress, “The real value of goods or service can only be defined by the ultimate customer”. Earlier research led us to the fact that the researchers have had different approaches towards value<sup>15</sup>. Research has been conducted in different contexts with different philosophical worldviews.

Value creation in a project depends on the relative amount of value that is subjectively realized by a target user who is the focus of value creation- whether individual, organization, or society<sup>16</sup>. Stakeholders in a project seldom share the same views on what is valuable. Unique knowledge, goals, context and conditions that influence how the novelty of the value is conceived and evaluated can influence the perception of value. The interests and viewpoint of what is valuable can even be competing<sup>16</sup>. However, according to Coenen and Alexander<sup>17</sup> success in collaboration between actors and cooperation among all stakeholder contribute to value creation for all stakeholders.

### 3.2. Philosophical Worldviews

Methodology literature includes several categorization of various research philosophies. Creswell<sup>18</sup> pinpoints four worldviews, Post-positivism, constructivism, transformative and pragmatism.

**Post-positivism** holds a deterministic philosophy where causes determine effects or outcomes. The knowledge developed by post-positivists is based on measurements of objective reality that exists. There are also laws and theories that need to be tested so we can understand the world. This worldview has similarities to Positivism, which has a long intellectual history. Giddens<sup>19</sup> describes four claims made by positivists; i) Reality consists of what is available to the senses; ii) Science is the primary discipline; iii) The natural and social science share a common unity of method; iv) There is a fundamental distinction between fact and value.

**Constructivists** believe that individuals develop subjective meanings based on their experiences towards certain objects or things<sup>18</sup>. These meanings are varied, leading the researcher to look into complexity of views rather than narrowing meanings into a few ideas. This means the researchers intend to make sense of the meanings other have and inductively develop a theory rather than starting with a theory. Howell<sup>20</sup> refers to Lincoln and Guba<sup>21</sup> who state that in the constructivist paradigm, researcher and researched continually interact and influence one another and the research project has limited possibilities for generalization. Only temporal and context-bound working hypotheses are possible and it is impossible to distinguish causes from effects. Finally, the enquiry is value bound overall.

Neuman<sup>22</sup> characterizes constructivism as a part of interpretivism and claims that interpretive social science differs from positivism concerning choice of method, but is related to positivism concerning value. Hence, interpretative social sciences have a relativistic understanding with “no single point-of-view or value position”. This indicates that interpretivist research can both be value-neutral and value-laden.

The **transformative** worldview arose from researchers who felt that constructivist stance did not go far enough in advocating an action agenda to help marginalized people. The research contains an action agenda for social reform and change. This philosophical worldview focuses on needs of groups and individuals that may be marginalized. Neuman’s Critical and Feminist philosophies have similarities to Creswell’s descriptions of transformative worldview. Neuman<sup>22</sup> states that critical studies of social reality “necessarily contain a moral-political dimension, and moral-political positions are unequal in advancing human freedom and empowerment”. According to Neuman<sup>22</sup> feminist research is “action-oriented research that seeks to facilitate personal and societal change”. This means that the research contains an action agenda for social reform and change as Creswell suggests. Common for all these philosophies is that they all seem to be value-laden and the reality is only knowable through the human mind and has no absolute existence. This brings us further to the discussion on idealism. According to McLaughlin<sup>23</sup>, idealism asserts that “reality is only knowable through the human mind and through socially constructed meanings”. The “ideas” that are confined to the mind is the reality.

**Pragmatism** has many forms but for many, it arises out of actions, situations and consequences rather than antecedent conditions. In pragmatism, the researchers uses all available approaches to understand the problem rather

than focusing on methods. In pragmatism, truth is what works at the time and pragmatists have believed in an external world independent of the mind as well as that lodged in the mind. This corresponds with how McLaughlin<sup>23</sup> describes realism. McLaughlin<sup>23</sup> explains that realism is based on the assumption that there is an external reality that exists independently of our views and understanding about it. According to Klungseth and Olsson<sup>24</sup> “Realism is interpreted as problem-oriented, and aims to be value-neutral and real-world oriented without any underlying consciousness”.

Despite the wide range of definitions and distinctions of philosophical views, a profound look reveals that there are some established common ground. Firstly, there are mainly two types of research: Objective or subjective research. Positivism and all its related definitions have “objectivity” in common while interpretivism, constructivism and their related views have mainly a subjective perspective. Objectivism and subjectivism have been described as a continuum’s polar opposites with varying philosophical positions aligned between them<sup>25</sup>. At the same time, both objective and subjective research can be value-neutral or value-laden. They can be issue-oriented or problem-centered. In both subjective and objective research, the reality can have or have not absolute existence.

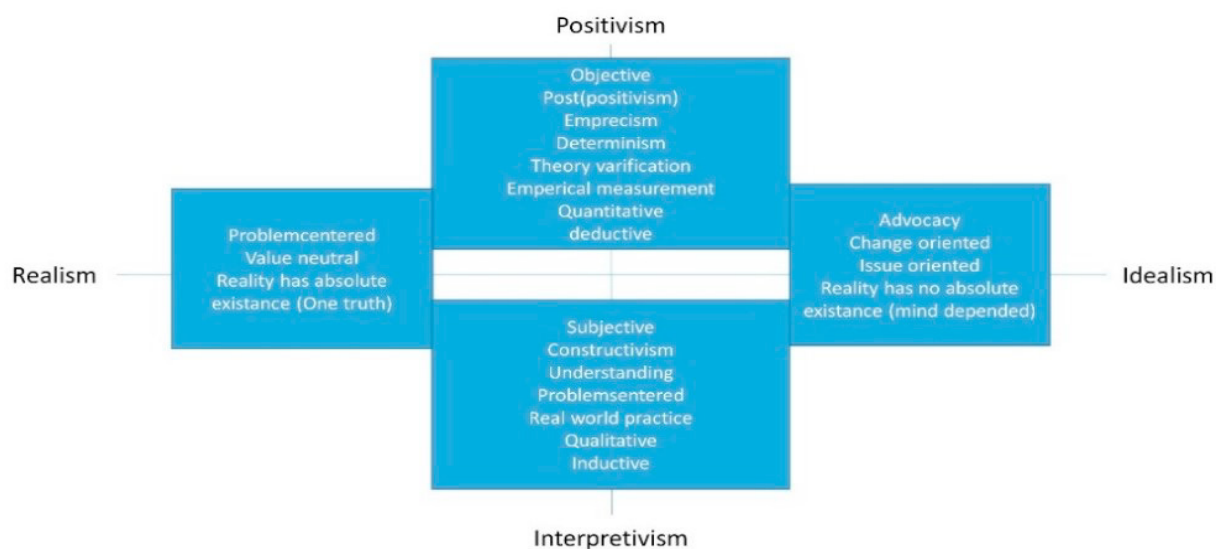


Figure 1. Major philosophical worldviews and their characteristics

Alexander<sup>26</sup> describes researchers’ philosophical views, especially within facilities management research, into four categories of positivism, interpretivism, realism and idealism. These categories correspond with our

Figure 1. Our research categorizes worldviews within the field of value creation in construction by applying this framework.

### 3.3. Research Approaches

Creswell<sup>18</sup> defines research approaches as “Plans and procedures for research that span the steps from broad assumptions to detailed methods of data collection analysis, and interpretation.” Creswell points out that there are mainly three decisive elements in a research approaches: i) Philosophical worldview; ii) Research design; iii) Research methods

Philosophical worldviews have been described and discussed in previous chapters. This chapter contains a closer look at research design and research methods. Research design is basically the procedures of inquiry while research methods is about how the data is going to be collected, analyzed and interpreted. Qualitative, Quantitative and Mix Methods as three main approaches to research

Qualitative methods are mainly linked to the interpretivist perspective of philosophy<sup>23</sup>. Fellows and Liu<sup>27</sup> has a general description of qualitative approach saying it seeks to gain insight and to understand people’s perception of the world both as individuals and as groups.

Payne and Payne<sup>28</sup> stress that “qualitative” is an umbrella term and refers to a set of approaches that share common features such as: i) Seeking out and interpreting the meaning that people ascribe to their own actions. ii) Actions are seen as contextualized, holistic and part of a social process. iii) Seek to encounter social phenomena as they naturally occur. iv) They work with smaller samples looking for depth/detail of meaning with a less general and abstracted level of explanation. v) They use inductive as opposed to deductive logic allowing ideas to emerge as they explore the data.

The process of qualitative research has several characteristics. First, it involves emerging questions and procedures; second, the data is collected in the participants setting; third, the analysis of data builds inductively from particulars to general themes and finally the researchers make interpretation of the meaning of data. Interviews, case studies and literature reviews are typical methods for collecting data in qualitative studies<sup>18</sup>.

Creswell refers to literature and increased visibility of this type approach during 1990s and into the 21st century and points out the following designs, among others, as common methods of conducting qualitative research:

- Narrative research, where the researcher retells the information collected by inquiry from the lives and stories of the participants who are the sources of data by turning it into a narrative chronology.
- Phenomenological research, in which the researcher describes the experiences of individuals about a phenomenon as described by participants. This design typically involves conducting interviews.
- Case studies, in which the researcher develops an in-depth analysis of a case like a project, an event, a program or a process by using a variety of data collection methods.

Quantitative approaches on the other hand, tend to relate to positivism and seek to gather factual data in order to study relationships between facts and how the facts and such relationships accord with theories and findings of any previous research<sup>27</sup>. Common features of the quantitative research according to Payne and Payne<sup>28</sup> are: i) The core concern is to describe and account for regularities in social behavior. ii) Patterns of behavior can be separated into variables, and represented by numbers. iii) Explanations are expressed as associations (usually statistical) between variables, ideally in a form that enables prediction of outcomes from known regularities. iv) Social phenomena are explored through systematic, repeated and controlled measurements. v) They are based on the assumption that social processes exist outside of individual actor's comprehension, constraining individual actions, and accessible to researchers by virtue of their prior theoretical and empirical knowledge.

Creswell<sup>18</sup> simplifies the definition of quantitative research by expressing it as “an approach for testing objective theories by examining the relationship among variables”. He explains further that these variables can be measured and the numbered data can be analyzed using statistical procedures. He brings the focus on two main designs within quantitative approaches. Survey Research, which provides a quantitative description of trends, attitudes, or opinion of a population by studying a sample of the population, and Experimental Research, which seeks to figure out if a specific action or treatment influences an outcome. Experiments, surveys and questionnaires are normal data collection methods in quantitative studies.

Mixed method is another research approach that involves both qualitative and quantitative data. The main assumption of this approach is that the combination of both qualitative and quantitative approaches provides a more complete understanding of the research problem than either approach alone<sup>18</sup>. Fellows and Liu<sup>27</sup> use the term “Triangulated studies” for this type of approach and points out that this approach may be employed to reduce or eliminate disadvantages of each individual approach by employing two or more research techniques. However, McLaughlin<sup>23</sup> stresses that the researcher still has a responsibility to ensure that the methods work together in such a way that they provide additionality and address the research questions. That means generated data must still be analyzed rigorously and methodically. Creswell<sup>18</sup> describes three primary designs within mixed methods as following:

- Convergent parallel mixed methods, where the researcher merges the qualitative and quantitative data (which are typically collected roughly simultaneously) to provide a comprehensive analysis of the research problem.
- Explanatory sequential mixed methods, in which the researcher starts with conduction quantitative research, analyzes the results and then explains the results further in more details by qualitative research.
- Exploratory sequential mixed methods, in which the researcher begins with a qualitative research and after analyzing the data, the information is used to build into a quantitative phase. The qualitative phase is for example used to identify appropriate instruments or questions in the follow-up quantitative study.

The focus in this paper is on which data collection methods has been used for the research in order to get an overview of the typical research approaches in the field of value creation in construction project.

**4. Findings and results**

As mentioned earlier, total number of 47 publications were studied in this research. In the following results are presented both regarding worldviews and applied methods of data collection.

*4.1. Philosophical Worldviews*

The framework in

Figure 1 is used to map how the philosophical worldviews have been within the field of value creation in construction. Figure 2 illustrates the number of publications within each category.

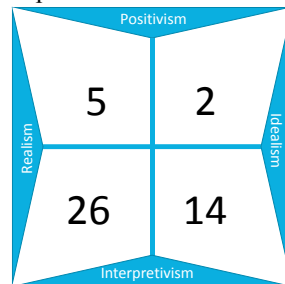


Figure 2 Research philosophies within value creation in construction projects

Five of the publications were based on a positivist/realist worldview. This means that the research has an objective and value-neutral approach and strives theory verification by using quantitative methods and empirical measurements. These papers are mainly trying to look into a problem and figure out how to solve it. Two papers were based on positivist/idealist philosophical view. These publications have also an objective approach with quantitative methods and empirical measurements, but they are issue-oriented and not value-neutral. They are advocating for change and believe that reality has no absolute existence. The major part of the publications had an interpretivist/realist worldview. This indicates that the research has a subjective approach where the researcher(s) attempt to collect data (mainly by qualitative or mixed methods) in order to understand a problem. These publications are mainly real world practice, are value-neutral and problem-centered. Fourteen publications were based on interpretivist/idealistic philosophical view. The research in these publications also has a subjective approach with qualitative and mixed methods. The research tries to understand a problem, but is not value-neutral. It is change and/or issue-oriented. Figure 3 shows the number of publications in each category over the years.

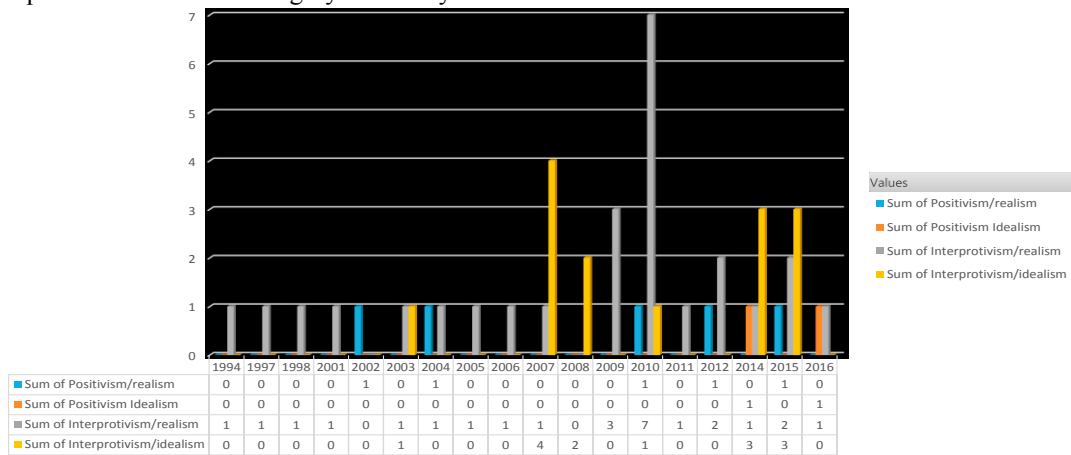


Figure 3 number of publications in each category over the years

The results indicate an increasing interest in research within this field, in particular for the last decade. The graph also shows that interpretivism is the dominating philosophical worldview. From 1994 up until 2003 and even further until 2007, the main portion of the research within the field has been based on interpretivism and realism. After 2007, the idealism worldview in combination with interpretivism has increased.

#### 4.2. Research approaches

In addition to the worldviews, research approaches are mapped by investigating methods of data collection for the sample publications. The results show that twenty-six out of forty-seven publications only used one (seventeen qualitative and nine quantitative) method to conduct the research. Four out of nine quantitative research was conducted before 2007. Twenty publications had two methods and one publication had three different methods for collecting data. Twenty-one publications have used two or more data collection methods. Case studies is the dominating source of data in the field, combined with literature reviews. Table 1 shows how many times each method has been used.

Table 1. Methods of data collection

An example of a column heading	Main Method of data collection	Second Method of data collection	Third Method of data collection	Total
Case study document & observation	6	1		7
Case study Action research	3	2		5
case study interviews	4	2		6
Case study survey	3	1		4
Interviews	3	1		4
literature reviews	17	10	1	28
survey	11	4		15

## 5. Concluding discussions

*How has the philosophical views of the research been and what philosophical views has the research been based on?* The results indicate that interpretivism is the dominating philosophical worldview. This implies that researchers in the field of Value creation in construction projects are trying to make sense of a problem within real world practice and develop a theory or present their subjective understanding of the results. However, it is interesting that the authors of these publications are mainly not social scientists but engineers who are trained to think objectively and are expected to prefer positivistic approaches. Although positivism is the stereotypical philosophy within engineering sciences, it is not represented as the fundamental view within the field of Value creation in construction projects. The positivist view verifies theory, normally through empirical measurements. As Figure 3 reveals, the research field is still young and there is an inadequacy of established theories in the field to be verified. Even the researchers who have attempted to define the concept of value do not totally agree over a common definition for value. Considering that value has been conceptualized as a perception, it is reasonable to believe that studying the concept of value requires a mindset that seeks to understand the meaning that individuals have and make sense of it. This is probably the reason why interpretivism is the dominating philosophical view in this field.

As Figure 2 illustrates, the vast majority of the publications are based on interpretivism/realism worldview. This implies that the research is mostly value-neutral and problem centered while seeking to understand the real-world practices. However, Figure 3 also shows that the idealistic worldview with its issue-orientation and advocacy for change has entered the research and escalated over time. A profound look at this type of publication reveals that the escalation has started, as sustainability has become an issue related to value creation. The advocacy for change in these publications is primarily associated with environmental issues and sustainable development of buildings. Another interesting finding is that positivism in the research is mainly associated with assessment, measurement and evaluation of processes, partially in order to increase the productivity, rather than testing and verifying theories.

The interpretivist research philosophy consequently results in an overweight of qualitative approaches of data collection. Case study is the dominating strategy of data collection. One of the characteristics of interpretivist philosophical view is the fact that it addresses real world problems. Hence, it is not a surprise that case studies are popular way of collecting data. The data collecting methods within case studies (interviews, action research, document studies and surveys) are more or less evenly distributed.

What has the research approaches been and how has the development of the research been over the years? One of the objectives of this research was to look into how the development of the research has been over the years. The results show that the research started with interpretivist view based on realism. This implies that the research has been attempting to deal with real life problems by understanding the concepts. Publications from 1990s and early 2000 are mostly about understanding the customer value, and developing or improving processes to increase project success and satisfaction of the customers. After 2007, the idealistic base has increased in line with increasing interest for sustainability and environmental issues. Interestingly, almost 40 % of the publications from 1994-2006 have used purely quantitative methods. The number of publications after 2006 with purely quantitative methods is reduced to less than 20% of the total. In addition, the number of publication with mixed methods has increased over the years. This reveals that by increasing interest around the subject and a burst in research publication, the philosophical view around how to do research has also changed. This might indicate that the understanding of value and value creation has started as a deterministic approach. The researchers have attempted to figure out what value is and what creates value but over the time, the questions have moved towards how to define value and how to create it.

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