

# VALUE CARRIERS IN A CONSTRUCTION PROJECT – HOW DIFFERENT ARE THEY?

Søren Wandahl<sup>1</sup>

## ABSTRACT

In recent years focus on the human aspect of the building process has increased in ‘real life’ and within the world of research on construction management. A new culture that views construction as social systems, both on the site and in the management, is flourishing. It is, therefore, important to develop an understanding / a theory that supports this new culture. One aspect of this new culture is the individual’s values. It is often said that the construction industry is tradition-bound and that the parties are locked in specific roles. This influences values of the individual and his/hers perception of value in general. These values are brought into the project organization by each individual, or are they?

This paper is built on a hypothesis, which states that the different legal parties in a construction project organization have different perceptions of value, and that they, thereby, carry different values into the project. One of the main pillars of Value-Based Management states that by influencing an individual’s value and by creating a common shared set of values, it is possible to improve the outcome of the production. Therefore, it is important to gain knowledge about the ‘value carriers’.

To test the hypothesis, three experiments are carried out, of which two are set-ups with construction industry practitioners, and the third is more an analysis of a former experiment. The analysis is of a construction project where ideas of partnering and Value-Based Management were tested. This construction project ended last year.

## KEY WORDS

Value, Social systems, Culture, Value-Based Management, Soft skills.

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<sup>1</sup> Ph.D.-student, Department of Production, Aalborg University, Fibigerstræde 16, DK 9220 Aalborg East, Denmark, +45 9635 8989, [soren@wandahl.net](mailto:soren@wandahl.net), [www.wandahl.net/phd](http://www.wandahl.net/phd).

## INTRODUCTION

Many actors in the construction industry can tell stories about construction projects where conflicts were more the rule than the exception. When talking with e.g. an engineer he has a lot of anti trust and reservation for e.g. the contractor. It is as if this conflict is an inevitable part of construction. But why do these conflicts occur? Some might say it is due to culture, others that the parties enforce these situations for their own sake. Thirdly, it might be pseudo conflicts. This paper wants to contribute to this discussion by examining how different parties in a construction project are, or at least to give a suggestion.

This article uses two important concepts that might not be well known to all the readers, thus important for understanding the article. These must, therefore, preliminary be explained. *Value* as a concept has a two-side meaning. It refers partly to “what something is worth” and partly to “the principles people apply to make decisions”. When these two meanings in a scientific sense is applied and adjusted to the construction world the author describes them as product value and process value respectively. A more in-depth explanation of value is presented later in the paper. The second concept important for this paper is *value carriers*. A value carrier is basically a synonym for a human, in this context a human participating in a construction project. As we remember the two-tailed meaning of value a person will carry both into the project team due to his/here personal and corporate background. When referring to “what something is worth” the person can carry e.g. knowledge into the team, and when referring to principles for decision-making it is clear that every human is unique and, therefore, carry different opinions, views on how to do thing, moods, etc. into the team.

We will now return to the explanation of the background for this paper. It is well known that we in construction deal with a lot of individual persons in a somewhat short term and non-replicating environment. It is commonly accepted that people have different behaviors and perceptions of behavior, due to their company culture and personal values. These personal values are brought into each project, and the project team must then overcome the differences and together perform which, hopefully, should result in lower cost, shorter building time, higher quality, e.g. higher value for all the participants. Psychological and social studies have indicated the importance of values in the pursuit of a common perception of behavior and, thereby, the foundation for decision-making (e.g. Kluckhohn 1951). The recently accepted understanding of construction projects as chaotic and dynamic (e.g. Baccarini 1996; Bertelsen 2003; Bertelsen & Koskela 2003) strengthens the importance of decision-making because you accept that it is impossible to plan the whole project in advance. The more complex the environment is, the less one should base ones decisions on rationality and instead use values.

But are the mentioned conflicts a result of individual values brought into the project, and are the personal differences so tremendous that they in general influence the cooperation of a construction project team and, thereby, the outcome of the construction? This paper is built around a hypothesis with the purpose of enlightening how different parties are in construction, and to discuss the influence on construction. The hypothesis is:

*In most construction projects the many legal parties have a not-congruent perception of values. Due to different professions and personal background the*

*parties carry different values into the project team. The team has, therefore, difficulties creating common goals, and a tangible background for decision-making.*

The procedure for working with the hypothesis is to seek the falsification of it, even though the author of this paper believes the hypothesis is true. The examination of the hypothesis is partly undertaken through theoretical studies and partly through empery. The empiric part is the substantial element of this paper, and it is built up of three experiments, or more correctly two set-up experiments and an analysis of a real construction project, called Limfjordskollegiet. The two set-up experiments derive from a Danish building development initiative called BYGiNORD. After working with the three experiments, it is discussed whether or not the hypothesis can be falsified on this basis. Therefore, no conclusion on the finding of each experiment is made, only on the findings of the three experiments together.

The relevance of this paper for the lean construction community is that no matter what production philosophy or theory we are trying to develop and implement in the construction industry we are depending on the cooperation between the parties in construction projects. Values and an understanding of their influence are, therefore, important. This paper should then be seen as a contribution to the flourishing of this subject.

## **THEORY OF VALUES AND CONGRUENCE BETWEEN HUMAN VALUES**

Construction management is not the most used forum for studying research on human values. Instead one should study research within philosophy and organizational theory. Science of philosophy is interesting when stressing why humans have values, how they got them, and how they influence behavior. Organizational theory is more interesting when studying congruence between humans' value set and congruence between organization and humans' value set. In the construction industry we do address the problem of temporary organizations with multiple legal parties. This organization must perform immediately and often under dynamic conditions.

Different definitions of values have been given over time. In general most scientists agree on the following broad definition: In general two types of value exist (Meglino & Ravlin 1998). One type is the value which an individual places upon an object or outcome, e.g. the value one places on pay. The second type of value describes a person's individual beliefs obtained through genes and through environmental influence. Rokeach (1973) describes these two values as the value "inherent in an object" and the value "possessed by a person". The second value is often described as individual, personal or human value. Human value is the more psychological aspect, and Schwartz (1994) defines it as: "Desirable trans-situational goals, varying in importance, that serve as guiding principles in the life of a person or other social entity". A kind of reverse description of human value is presented by Hauen, et al. (1999): "Whether a behavior is morally correct or not is determined by the value that lies behind the decision". A transformation of this concept into the context of construction projects is not straight forward. Some suggest that the two types of values could be identified as product value and process value, respectively (BEC 2003; Wandahl & Bejder 2003). The process is where you produce, the product what the client buys. One might, therefore, argue that process value is the main value to stress, because it is perceived as the means to the goals (product values).

As the definition of value now has been discussed, it is possible to continue to investigate how human value (process value) influences human behavior. The human value could be explained as your religion or the glass through which you see the world. In Schmalz (2003) the blind men “see” the world (the elephant) through their fingers, and indeed they “see” it different. More theoretically, it is acknowledged that values directly influence behavior, because they encourage individuals to act in accordance with their values (Rokeach 1973; Williams 1979). Values are, however, only one of a number of forces that effect behavior, but in situations of absence of other tasks and situational variables (e.g. incentives, limitations) that influence behavior, values should have great impact (Meglino & Ravlin 1998). This is often the situation we are dealing with in a construction project, i.e. the chaotic and dynamic build process. Human values have implications for the interaction between individuals because they influence each individual’s perception and behavior. Furthermore, when persons share similar values (i.e., interpersonal value congruence), they tend to perceive external stimuli in similar ways. Among other things, this similarity in interpreting and classifying environmental events serves to clarify their interpersonal communications. Individuals with similar value systems also behave in similar ways. This enables them to better predict the behavior of others and more efficiently coordinate their actions. In effect, value similarity produces a social system or culture that facilitates the interactions necessary for individuals to achieve their common goals (Kluckhohn 1951).

There exist no unambiguous proofs that shared values should result in higher task effectiveness, but in this paper the assumption is that this connection exists.

This is only an extremely short introduction to the theory of human values and value congruence. Due the scope and the limitation of this paper it is assumed that individuals have values and that values have a deep impact on behavior, especially in dynamic environments. The readers are advised to look into other literature for a deeper insight in values. A good starting point could be e.g. (Blanchard & O’Conner 1997; Jensen 1998; Meglino & Ravlin 1998).

## **LEAN CONSTRUCTION VIEW ON HUMAN VALUES**

Value as a concept has an import role in the theoretical foundation of lean construction. Koskela (2000) employs a general theory of production based on three different views on the production, Transformation, Flow and Value. Looking into his interpretation of values, it becomes clear that value is connected to customer requirements and the product delivered to the customer. This illustrates the most common perception of value in lean construction, values as the physical product and the connecting yields the client buys. An example of this view can be found in e.g. Bertelsen & Koskela (2002) “...*the construction process generates the value wanted by the client.*”

When looking for the perception of values as human values most is found implicit in the research, i.e. between the lines. Marosszeky, et al. (2002) describes the importance of working with project culture and values for achieving the desired level of quality. A model for reinforcing the manager’s belief is applied and it is concluded that each organization tends to view quality from its parochial perspective due to the culture.

Few other authors (e.g. Garnett 1999; Green 2000) are also working with related topics such as culture, human resource management and conflicts. But in general lean construction has not yet been working purposeful with human values.

### **THREE EXPERIMENT FOR DISCOVERING VALUE CONGRUENCE**

This section of the paper will describe and analyze three experiments in the process of seeking the falsification of the stated hypothesis. The three experiments are:

- The value matrix
- Visual value clarification
- Partnering combined with Value-Based Management.

The two first experiments are set-ups carried out by the author among others in the BYGiNORD development initiative. The last experiment is in this paper more an analysis of the experiment, because the experiment was designed and carried out on a real construction project by Limfjordskollegiet<sup>2</sup> (the client). Before describing experiment one, a short introduction to the BYGiNORD initiative is provide below.

In spring 2003 a new Danish building development initiative started, called BYGiNORD (in English: Build-in-the North, due to its origin in the most northern county in Denmark). The development initiative is founded on three subjects:

1. The user, the professional client and the local government's invitation for tender on the role of the client
2. Future modes of co-operation in the construction sector
3. Co-operating supply teams and the future production on the building site.

A group of approximately 75 engaged persons from the construction industry are involved in discussions in small groups concerning ideas and methods for improving the building process. These discussions are concentrated around the participants' everyday problems and their practical knowledge. More information (in Danish) can be found on the BYGiNORD website, [www.byginord.dk](http://www.byginord.dk), and in (Olsen, et al. 2004).

The author of this paper is participating in subgroup no. two and, furthermore, a member of the BYGiNORD organizing committee.

#### **EXPERIMENT ONE: THE VALUE MATRIX**

Within the BYGiNORD project one sub group had a task on values, how values are defined, how they work, etc. Their task was formulated as:

*"To create suggestions for common and shared goals, ideas and values that create values and contain advantages for all parties."* (BYGiNORD 2003)

The starting point of their exploration was a brief study on the use of the word 'value' in Danish construction reports and, they discovered an overwhelming and inconsistent use of

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<sup>2</sup> Limfjordskollegiet is an independent housing organization. Further details on the content of the experiment and findings from the case can be found in Bejder & Wandahl (2004).

the word/concept. This indicates that the use of value, value management, etc. is a fairly new discipline in the construction industry and that an unambiguous definition of the concept of value is needed. Some examples<sup>3</sup> of the discovered use are given below (BYGiNORD 2003).

- Personal values
- Criminal preventive values
- Product values
- Value based....
- Value chain
- Individual values
- Long term values
- Social values
- Value requirements
- Value goals
- Aesthetic values
- Ethical values
- Shared values
- Etc.

### Three different angels for describing value

Through literature studies and group discussions the group members observed three important parameters in describing value. Firstly, a differentiation between *product and process values*. This bifurcation is also mentioned in Wandahl & Bejder (2003) and has lately been demonstrated in the most recent Danish state of the art report on Value Management (BEC 2003). The product value describes the technical and aesthetic construction, the price and the use of the construction, e.g. brick type, top lighting, color, usability, flexibility, etc. The process value describes elements in the building process and cooperation between the parties, i.e. time, agreement discipline, communication, etc. Secondly, value should be connected with its context, i.e. *value for whom?* Thereby, you have a list of roles or parties in a construction project, e.g. engineer, architect, user, client, contractor, etc. Furthermore, a team role is specified. Thirdly, value is connected to the phases in the construction project, i.e. *value in time*. The division of time-periods can differ from project to project depending on the project characteristics, and the parties' wishes.

The group, therefore, invented the concept of the value matrix, which contains all three parameters. The value matrix is illustrated in figure 1.

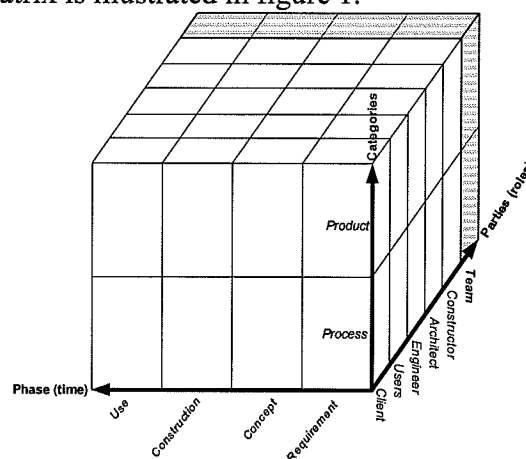


Figure 1: The value matrix.

<sup>3</sup> The list of different use of values has over 40 entries.

The value matrix is one component of the subgroup's work, which is described in a working paper on the Build-in-North website (BYGiNORD 2003). This working paper, especially the matrix, was the starting point of the first experiment.

### Description of the experiment

The experiment had two objectives. Firstly, to discover congruence or incongruence between the parties' values both product and process values. Secondly, to test the value matrix to see whether the idea is operational or not.

A group of practitioners from the Build-in-North project were invited to participate in the experiment. Deliberately two construction clients, two users, two architects, two engineers and two contractors were invited. This was to ensure a representative outcome of the experiment. Clearly, the experiment could not be carried out on a real project (this was only the first beta version of the concept). Instead a short description of a fictive construction project was made. This description should give the participants a similar background for describing their values.

The value matrix was then the subject for debate on a one-day workshop, but in advance the participants had been asked to fill out their part of the matrix and prepare a presentation of their values of the fictive project. The participants wrote two to five values for each phase, requirement, concept, construction and use. At the workshop they explained their own values, one by one, and then tried to agree on common values for the team. After the workshop the data was analysed, and the results are presented below.

### Analysis of values in the matrix

The main objective in this experiment is to observe (in)congruence of the values of the different parties. Two perspectives are applied. Firstly, differentiation in product and process values. This is an important aspect to examine because it could be expected that e.g. the client's perception of the importance of the building process not is as highly rated as by the contractor. Instead one might suppose that the client would pay great attention to the product. In figure 2, the number of process values is shown on the left-hand side, and the number of product values on the right-hand side. Both charts are divided into the phases of construction.

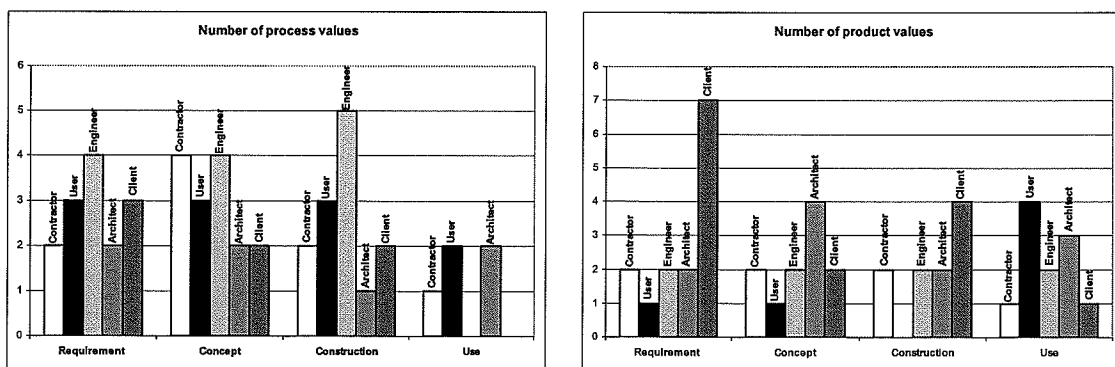


Figure 2. Number of product and process values in each phase for the respective parties.

Secondly, the total number of process and product values of each phase. This is illustrated on figure 3 with the party as the dependent variable. One might assume that the different parties do not pay equal attention to each phase, e.g. the contractor is perhaps not as interested in the requirement phase as he is in the construction phase.

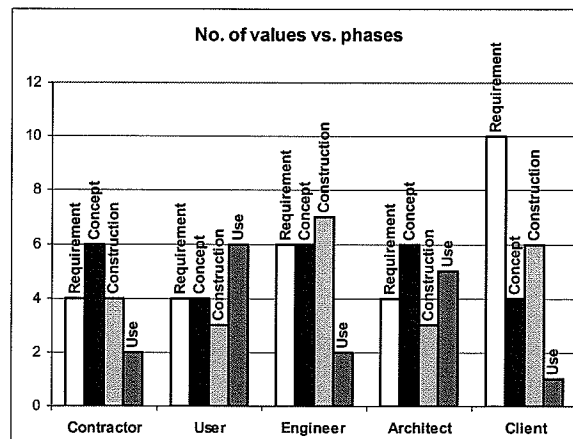


Figure 3. Number of values in each phase for the different parties in the experiment.

The following elements of congruence and incongruence are recognized from figure 2 and 3.

- The contractor and the engineer care more for the process than for the product (determined by the number of process and product values.)
- The client has most of his product values in the requirement phase, indeed 50% of all his values. This illustrates that the client mainly has his attention on the requirement phase, and that the primary interest is the product.
- In general there are less values in the use phase.
- The total number of values is decreasing with time of the project.
- All parties have approximately the same total number of values.
- The users care mostly about the use phase, but they do not neglect the other phases.

## EXPERIMENT TWO: VISUAL VALUE CLARIFICATION

The second experiment also derives from the BYGiNORD development initiative. The visual value clarification idea was developed with the purpose of gaining a common perception of value in a real construction project. The concept is basically to create common values through being together and through a discussion of visual examples of what is beautiful, what is ugly, what works, etc. As one of the participants said: "It must be functional, but it would not be a disadvantage if it is beautiful, too."



To achieve this, all the participants in a construction project are equipped with a digital camera, and a field trip to different buildings and construction sites in the community is made. The participants should then take pictures of elements in construction which they find good and bad. Afterwards, the participants should present their pictures along with oral explanation of their values at a workshop. Before the field trip, the groups should agree on five value parameters. These parameters could be interior, low maintenance, ecology, outdoor space, materials, etc. (BYGiNORD 2003). The pictures should reflect these areas.

### **Description of the experiment**

An open invitation to all participants in the BYGiNORD initiative was sent out, and around 15 joined the experiment. A field trip to a newly finished apartment house, which heavily has been commented on in the local media due to its architecture, was arranged. All the participants were then equipped with a digital camera, and then we all played photographers and arbiters for a day. Next, the participants were grouped by profession, e.g. engineer, architect, etc. and the groups then picked out some of the pictures for visual and oral presentation. In all, this experiment was carried out in one day.

### **Analysis of the values illustrated through pictures**

An analysis of the values illustrated through pictures including some keywords will always be subjective, but some more or less obvious differences in the pictures do occur. Due to the space limitations of this paper, only a few pictures are presented. All the pictures can be found in the BYGiNORD white paper (BYGiNORD 2003).

In general all the parties took pictures of some of the same elements, both of what they liked and what they disliked. Furthermore, each party also clearly had their own focus area. This is further investigated below.

### **Similar focus areas**

There were, not surprisingly, similar pictures from all the participants. On figure 5 and 6 are shown two elements which all the parties liked and disliked. Firstly, all participants were thrilled by the view from the 18 m<sup>2</sup> grand roof terrace. Secondly, none of the participants liked the radiators in the windows. In the local press the apartment building is called the radiator house. There were more examples of common values/pictures, but the readers are advised to read the white book for further details.



Figure 4. Roof terrace.

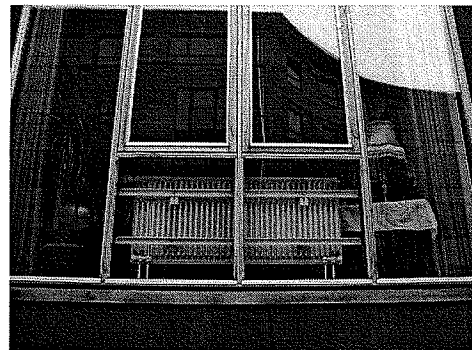


Figure 5. The radiator house.

### The parties' own focus areas

The *users* immediately focused on the interior and its use and flexibility, along with architecture. They were e.g., interested in the kitchen and dining area and their opportunity to change the layout. The *client* had instead his focus on maintenance cost, usability, flexibility and crime preventive arrangements. Especially the usability was in focus. A lot of attention was given to the use for elderly and handicapped people. An example of an inappropriate construction is illustrated on figure 6. A very high doorstep from the living room to the terrace is not suitable for walking-impaired people. In that sense the client mainly stressed anti values.



Figure 6. A high doorstep

The *architect* could not stop taking pictures of architectural details, e.g. of how the building fitted into the surroundings and architecture in combination with functions of the building. An example is skew fields of vision in the apartments, which increase the run through of sun light.

The *engineer* was more concerned about technical details such as the use of elements, prefabricated bathroom cabins, etc. The *contractor* was also interested in details, but details of construction execution. Figure 7 illustrates a construction detail. The ends of the timber used beneath the surface have not sealed endings. A lot of robber lists was also used, and both elements can cause maintenance problems.



Figure 7. Construction detail

### EXPERIMENT THREE: PARTNERING COMBINED WITH VALUE-BASED MANAGEMENT

The third element in the quest for congruence between the perceptions of values of the parties of construction projects is borrowed from an independent development project, which ended in the summer of 2003. The project concerned rehabilitation and extension of a students' hostel. In that project the construction client wanted to combine the ideas of partnering with some elements of Value-Based Management, e.g. common values, behaviour influence, etc. The partnering team defined individual company goals, as known from other partnering projects, and they also defined eight common/shared process values including description of "best practice" for correct behaviour according to each person's specific process values. All this was incorporated into the partnering agreement. The project partners and the workers on

the site recorded their perception of the obedience with the eight values every two weeks on a project web, designed for the purpose.

A more detailed description of the experiment and its findings can be found in (Bejder & Wandahl 2004). In connection with this paper, the interesting element in the students' hostel project is the company individual goals. Bejder & Wandahl (2003) has not examined congruence in the project partners' values. This is analyzed below.

### Analysis of the individuals' values

One of the elements of the experiment was that the parties could create and follow individual goals as long as their goals not are conflicting with the other parties' goals and with the common team goals. These party individual goals I assume represent each individual's underlying values.

When analysing the values on the project web, they are subjectively placed into the groups listed below. In the partnering agreement, the parties do not direct differentiate between the product and process values, and, furthermore, there is no direct link to the different phases of construction. The division below is made only for this paper.

- Product values (Architecture, economy, technical details, others)
- Process values (Regarding the cooperation and regarding the building process)
- The time perspective (requirement, concept, construction, use)

Other categories for placing the values are possible, but these respond nicely to the categories in the other experiments. On figure 8 and 9 the values are illustrated, and the main observations are listed afterwards.

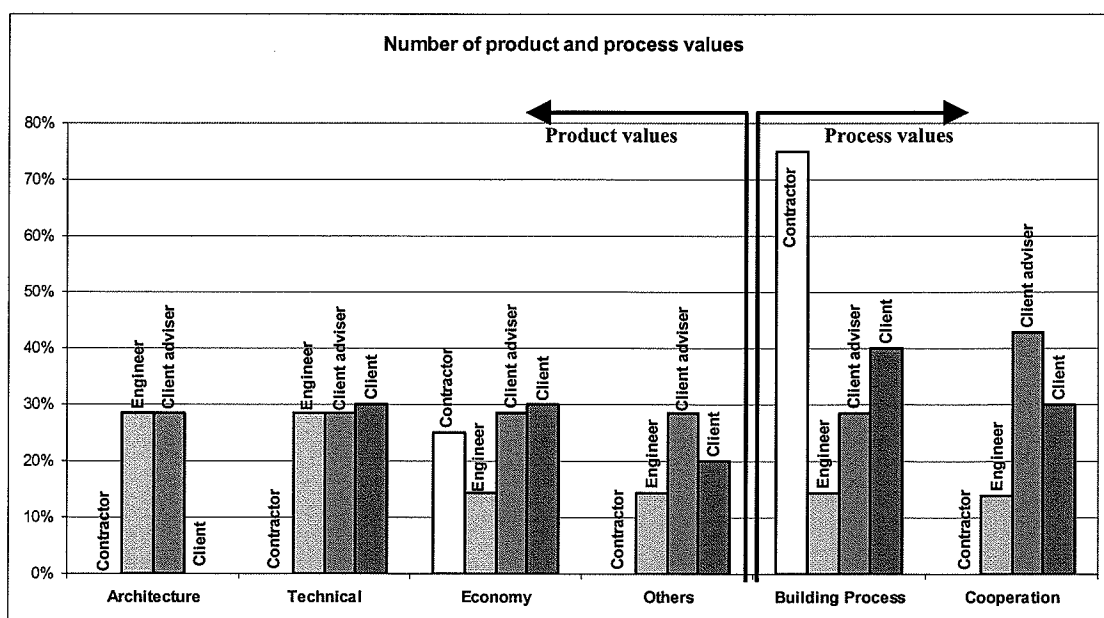


Figure 8. Each partner's number of values illustrated relatively to their total number of values (both product and process).

From the product value part of figure 8 the following main tendencies are observed. The engineer has most of his values in the technical or architectural field. The client has no product values describing architecture. This is somewhat odd, but it could indicate that the client has given the architect free hands. The contractor focuses exclusively on economical values, such as “To obtain a marginal income on at least xx %...”. In general, only limited differences between the parties’ product values are observed. When looking at the process values the following tendencies are observed. Again the contractor’s values can be arranged into only one category, and that is exclusively the building process. Cooperation is the top scorer from the client and his adviser.

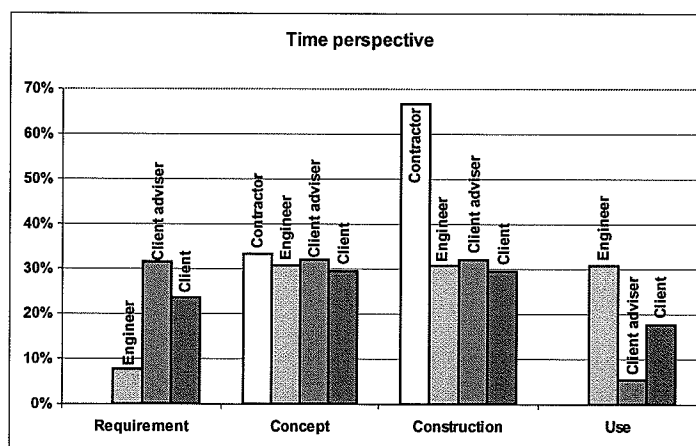


Figure 9. Values in the different phases of construction.

On figure 9 values in the different phases of construction are illustrated. Two clear tendencies occur. Firstly, the contractor has his primary interest in the construction phase and then next in the concept phase. He has no values in the other phases. The reader should remember that this project was a partnering project where the construction partners should attend the early phases with their practical knowledge. Secondly, the construction client has a holistic view on construction and has, therefore, equally placed his values in the four phases.

### GATHERING ON THE THREE EXPERIMENTS

The analysis of the three experiments reveals both some examples of dissimilarities between the different parties’ perception of values and also some examples of congruence. From this it can be concluded that the different parties in construction project have a slightly different perception of value in a construction project. The differences are, though, not as large as expected. What must be drawn into consideration here is the problem in measuring value congruence mentioned in the theories (Meglino & Ravlin 1998). The most basic technique for determining value congruence is simply to ask the respondents themselves to estimate the extent their values are similar to those of the other. When assessing this technique you assume that the respondents know what values are, that they know their own values and that they know the others’ values. This is most often not the case. Therefore, a technique where the researcher has the responsibility for determining value congruence is applied. Thus, it is

assumed that the parties' actions reflect their values. The results will always be connected with some uncertainty.

## CONCLUSION AND REFLECTION

We now have quite certain indications of the differences in the construction project parties' perception of value. It is, though, important to be aware of that we never will get a definite proof of a construction teams' different values, due to the difficulties in knowing, explaining and measuring values and value congruence. It is observed that persons from different professions in the construction industry have different values, but the differences are not as tremendous as expected. Perhaps the expectation of high differences is due to the human nature of remembering worst case instead of best case. Therefore, we mostly hear about the project where there were high differences in the participants' values, which lead to failures, errors and conflicts. On the basis of the above, *it is concluded that the hypothesis are true, the parties do carry different values into a project.* On a basic level (how to behave among other people) the participants' values are not that different, perhaps this is because most participants are from the same society and the differences would be higher if multiethnic projects were measured. But anyway, conflicts do still arise in the Danish construction industry.

In the two set-up experiments the participants did not know that they would be measured on their values and congruence between their values, they thought the experiments were arranged only for testing the application of their own ideas. This brings the results of this paper beyond the problem of "you only get what you measure" and the results are, therefore, more reliable. On the other hand, the conclusion of the experiments in this paper can also be perceived as slightly misleading, because the experiments consists of people who all, more or less, know each other, and their values might therefore be more matched. Furthermore, they all have a great interest in the construction industry's development, especially concerning cooperation, partnering, soft values, etc.

The result of this research is that we now do know that the different parties of a construction project carries different values into the team, and that this may be a problem. The paper has not gone a step further and explained how we do observe the different values, and how to work with the values in such a manner that they not will be a barrier. Some might say that working "correctly" with the different values may be an advantage which can result in positive synergy. This is what the author is trying to figure out in his research in Value-Based Management, see e.g. (Wandahl & Bejder 2003; Bejder & Wandahl 2004; Wandahl 2004). Value-Base Management is only one idea of how to work purposeful with the different values to improve effectiveness and efficiency in the construction industry.

## ACKNOWLEDGEMENT

I would like to thanks the more than 20 participants in sub group no. two of the BYGiNORD initiative for interesting and learning discussions. In connection with experiment one I would especially like to thank Bent Bundgaard (politician and professional construction client from Lejerbo) for his inspiring life-view and good discussion on soft values. The second experiment would not have been as fruitful an experience as it was without Mogens Kristensen (architect from Århus Arkitekterne). Finally, the project partners from

Limfjordskollegiet, in particular Erik Bejder (Manager of the board in Limfjordskollegiet housing organization), for their discussion of the case.

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