

## Study on the three-dimensional structure description of implicit demand based on Incomplete Contracting Theory

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**Abstract.** The paper puts forward the implicit demand of construction contract with the support of Incomplete Contracting Theory, and conducts a systematic study on it by building a model of which use "think", "say", "write" three dimensions from the perspective of human cognition and expressions. And further, defines the connotation of implicit demand of construction contract and classifies its performance models. This paper provides a new train of thought for the study of improving the efficiency of contract management.

### Introduction

As the constructive information carrier of a construction project, in the construction project, Contract is the direct embodiment of both the owner and the contractor's demands. In that case, in the construction project, Can the contracting parties reach the other party's satisfaction only by fully performing the terms of the contract? The answer is no, according to survey on construction project. The survey found it do not only fulfill the terms of the contract, there are a lot of "special needs" in the process of contract management in practice. These needs may belong to one party of the contract, sometimes it could also be shared by the two parties. The "special needs" all have common characteristics:

- (1) They do exist and can affect the performance of the contract.
- (2) They may cause. Performance obstacles even lead to the contract relationship breakdown.
- (3) They are not specified. Or the stipulation is not clear in the contract. Here we call them the implicit demand.

Therefore, this paper argues that, there is a common cause behind the obstacles of the contract performance, it is the existence of "implicit demand" in the contract, or we call it the contract main body's "implicit demand".

### The theoretical basis of construction contract implicit demand - Incomplete contracting theory

Incomplete contracting theory/GHM model was co-founded by Grossman Hart (1986), Hart Moore (1990) in the late 1980s. the incomplete contracting theory stated that because of the limited rationality of people, information incompleteness and the uncertainty of transactions, the cost is too high to clear all special power. So, the contract is destined to be incomplete. Next, we make a comprehensive analysis of why incomplete contract theory is the theoretical basis of the construction contract implicit demand.

(1) The limited cognition of people. Due to the limited cognition of people, when signing the contract, the contract main body cannot exhausted all their demands, they also can't predict the various emergency situations that may occur during the process of contract performance.<sup>[1]</sup> so, some demands will surely be missed in the contract.

(2) The existence of transaction costs. Due to the existence of transaction costs, the both parties may subjectively give up to reach an agreement on some uncertain conditions, namely the contract main body will strategically to abandon or fuzzy on the expression of some demand.

(3) The incomplete information. Because of the complexity of the construction project, the contract main body can't obtain complete information. Incomplete information can be divided into

two cases, one is called the information asymmetry, the other is called information uncertainty.<sup>[1]</sup> It lead to that the contract party who have information superiority intentionally hide some information to maximize its own interests. Therefore, incomplete information will lead to that the contract main body do not express or vaguely express their demands intentionally.

(4)The fuzziness of language. Due to the fuzziness of language itself, contract language sometimes can only make an approximate description on events, this leads to some terms of the contract are ambiguous or even wrong. Therefore, the fuzziness of language will lead to fuzzy demand objectively.

According to the incomplete contract theory, we can draw a conclusion: Contract cannot fully reflect all the demands of both parties, namely, there must be some implicit demands in the construction contract.

### **The definition of implicit demand of construction contract**

Implicit demand, in simple terms, is the demand in a fuzzy state, its corresponding is explicit requirements. The thinking behind implicit demand is not new, but it is clearly put forward in the late 1980s. Through the literature retrieval, we found that the concept of implicit demand was first seen in Zheng Suolin's paper "To talk about the problem of implicit demand" in 1989, after him, many scholars have defined the concept of implicit demand.

Table 1 the concept of implicit demand

Author	The concept of implicit demand
Yikuan Hunag, 2005	The demands of each system can be divided into two categories: one kind is directly claimed by the demand subject, these demands can be derived from demand surveys, and the other depends on the requirements analyst to mining, analysis and deduction. So, we define the second kind of demand "implicit demand", and called the first kind of demand "explicit demand"[2]
Yongtai Luo , Zhengying Lu, 2006	Implicit demand is a kind of subconscious, fuzzy psychological requirements and behavior state.[3]
Xuejun Zhang, 2004	Implicit demand is a demand that the user is not satisfied or failed to express, it exists in the user's unconscious mind.[4]
Deying Lu, 2006	Implicit demand is that the user is not directly put forward (hidden in the explicit demand), but it have potential value to the user's real purpose[5]
Lianlian Liu, 2006	Implicit demand is the demand that the consumers didn't realize, or have realized but cannot be achieved based on the existing conditions.[6]
Keith Goffin Fred Lemke, 2004	Customers sometimes are not clear what are their demands, this kind of demand is called implicit demand. Because these requirements exist in the user's unconscious mind, they cannot describe them clearly.[7]

According to the study of implicit demand, combined with the characteristics of construction contract, we put forward the definition of implicit and explicit demand of construction contract.

The explicit demand of construction contract is the demand that the parties to a contract have clearly realized, clearly described, and accurately written in the contract, it is also the basic needs of both sides. Implicit demand of construction contract refers to demands that cannot be fulfilled because of various reasons. The reasons can be divided into four levels: The parties to the contract have no consciousness, the parties have realized but didn't express it, the parties have expressed is but haven't written in the contract, although written in the contract but not clear.

### **The analysis of the implicit demand of construction contract--three-dimensional structure model.**

**The contract main body's cognitive & the implicit demand of construction contract.** The generation of a demand is derived from people's cognition. In the construction contract the contract main body's information cognitive level determines whether it is a demand be made explicit, and then,

be included in the contract. In the construction contract, the contract main body's information cognitive performance as thinking or understanding, namely whether a specific requirement is realized or thought of when the contract is being signed, if has already been realized, is a fuzzy concept or a clear understanding about what it is. Therefore, cognition is one of the most important factors to determine the implicit demand boundary and analyze the implicit demand systematically.

**The contract main body's expression & the implicit demand of construction contract.** Can a demand be satisfied or not depends on whether it is expressed. In the process of formation of the construction contract, Although One of the parties to the contract realize a demand, whether or not he will express his demand to the other side determines it can be satisfied. Combining the construction reality, we divide the expression into two kinds, one kind is through language to describe, namely "speak", the other is expressed by agreement, that is, "write" into the contract. If a demand to be expressed, through which form, "speak" or "write", whether be express clearly and accurately determine the degree of implicit demand.

**Three-dimensional structure of the implicit demand of construction contract.** Explicit demand and implicit demand as a subset of a complete set of demands, their difference is that whether the demand can be realized and clearly expressed, as well as the methods and technologies to realize the demand is accessibility. <sup>[8]</sup>The same is true in the construction contract, the cognitive degree refers to the process of understanding a demand from know nothing at all to have a fuzzy idea, then to a clear understanding. So, the first dimension is contract main body's cognition, we Use T (thinking) to represent it. Expression is divided into two aspects, one is by language, and the other is by agreement. Degree of language expression refers to the process of express a demand with oral language from scratch to fuzzy to clear, now, we get the second dimension--language expression and use S(say) to represent it. Similarly, we get the third dimension--Written expression, we Use W (write) to represent it. What's more, each dimension can be divided into three states {initial state (No), Fuzzy state (Fuzzy), Clear state (Clear), simplify it into {N, F, C}. Finally form the following space model to study the characteristics and boundary of implicit demand.

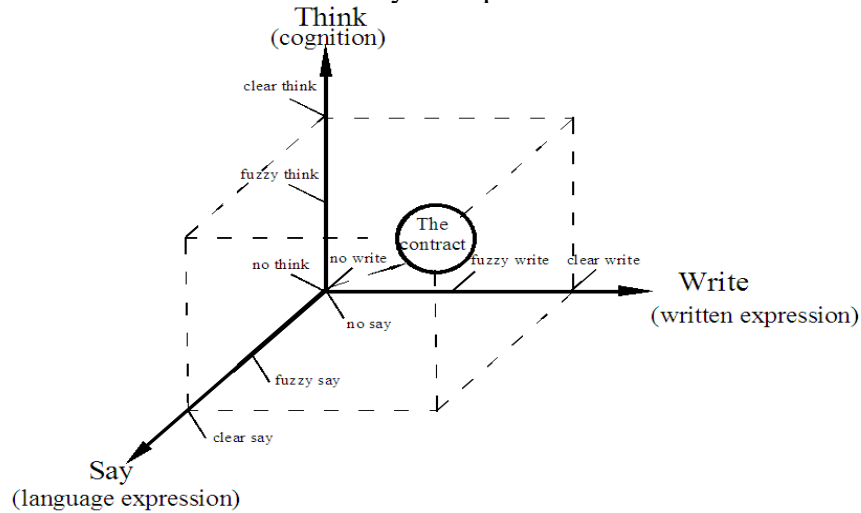


FIG. 1 Three-dimensional structure description of implicit demand

Table 2 Analysis of the existence of the 27 demand combinations ("√"Do exist, "×"Do not exist)

	NT			FT			CT		
	NS	FS	CS	NS	FS	CS	NS	FS	CS
NW	√	×	×	√	√	×	√	√	√
FW	×	×	×	×	√	×	×	√	√
CW	×	×	×	×	×	×	×	×	√

According to the above, we can get 27 kinds of combination modes, while due to the relations between cognition, language expression and written expression is not completely equal but has the order, so some of the 27 kinds of combinations is not exist. Next, we will analyze the existence of the 27 demand combinations and remove the impossible modes (table 2).

After analysis, there are ten modes exist:

Table 3 Demand patterns of construction contract

Number	The symbol	Demand pattern	Demand category
1	NTNSNW	{no think, no say, no write}	Implicit demand
2	FTNSNW	{fuzzy think, no say, no write}	
3	FTFSNW	{fuzzy think, fuzzy say, no write}	
4	FTFSFW	{fuzzy think, fuzzy say, fuzzy write}	
5	CTNSNW	{clear think, no say, no write}	
6	CTFSNW	{clear think, fuzzy say, no write}	
7	CTFSFW	{clear think, fuzzy say, fuzzy write}	
8	CTCSNW	{clear think, clear say, no write}	
9	CTCSFW	{clear think, clear say, fuzzy write}	
10	CTCSCW	{clear think, clear say, clear write}	Explicit demand

Therefore, in the construction contract, the contract main body's demands can be classified into two categories, one part is clearly agreed in the terms of the contract, namely explicit demand, another part is formed of implicit demand.

### Classification of construction contract implicit demand

According to the incomplete contract theory, we know that there must be implicit demand in the construction contract. Firstly, taking that whether the demand be thought of as a boundary, we split the implicit demand of construction contract into complete implicit demand and semi-implicit demand. Fully implicit demand refers to the part of demands that because of the limited cognitive of people they have not been realized completely by the contract parties, its corresponding pattern is {no think, no say, no write}. Semi-implicit demand refers to the part of demands that the contract main body do has realized but for various reasons finally cannot be directly fulfilled, it corresponds to the other 8 kinds of patterns.

According to the different reasons for the formation of implicit demand, we further divided Semi-implicit demand into 3 categories: Strategic semi-implicit demand, Opportunistic semi-implicit demand and Linguistic semi-implicit demand.

(1) Strategic semi-implicit demand: the contract main body have realized the demand, but could not consider it clear, for this part of demand they can only give up to express or have a fuzzy expression. The reason are the following: firstly, Due to the limited human cognitive lead to it could not be described accurately. Secondly, fully defined it will spend high cost. Thirdly, Small probability events namely the expected utility be not more than the cost of defined it fully. Its corresponding pattern include {fuzzy think, no say, and no write}, {fuzzy think, fuzzy say, no write}, {fuzzy think, fuzzy say, fuzzy write}.

(2) Opportunistic semi-implicit demand: the contract main body have clear cognition on demand, but because of the opportunism they do not express or vaguely express their demands intentionally in order to obtain more benefits. Its corresponding pattern include {clear think, no say, no write}, {clear think, fuzzy say, no write}, {clear think, fuzzy say, fuzzy write}.

(3) Linguistic semi-implicit demand: The demand that have been realized and expressed (said) clearly by the contract main body, but because of the fuzziness of language itself lead to they could not be clearly written in the contract terms. Its corresponding pattern include {clear think, clear say, no write} and {clear think, clear say, fuzzy write}.

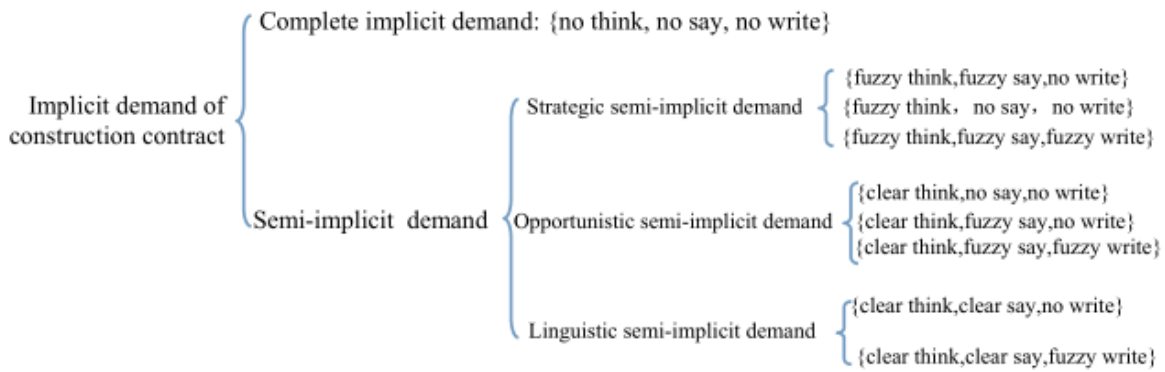


FIG. 2 Hierarchy chart of the implicit demand of construction contract

## Conclusion

Under the construction contract, the formation process of the contract is the definition process of the two parties' demands, in this process, the owner and the contractor's demands are divided into two parts, one part is clearly agreed in the terms of the contract, namely explicit demand, another part is formed of implicit demand. The process of the implementation of the contract is the process of the two parties' demands to be fulfilled, as well as the process that the implicit demand transform to explicit demand, in this process, some of the implicit demand emerge gradually, this demands, if handled improperly, may cause performance obstacles even lead to the contract relationship breakdown. For this cause, this paper, firstly, defines the connotation of implicit demand scientifically on the foundation of adequately analyzing the characteristics of the demand in construction contract. Secondly, establishes a 3D model of "think", "say", "write" from the perspective of cognition and expression, and then obtains 9 implicit demand patterns. Thirdly, this paper classifies the demand of construction contract based on the causes of the formation of implicit demand, and in end figure out the hierarchy chart of the implicit demand of construction contract.

This paper introduces "implicit demand" into the construction contract, and does a systemic research on the implicit demand of construction contract, it lays a foundation for further research of identification, mining and control of the implicit demand of construction contract.

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