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Potential success and failure factors

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Cooperation network "lifecycle-oriented buildings" – potential success and failure factors

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While construction companies seek for new possibilities of differentiation, institutional clients demand the paradigm shift towards a focus on the costs of a complete life-cycle and away from a focus on the initial investment costs. Within the scope of the development of a new cooperative business model for life-cycle service provisions (LCSP), market success factors for such LCSPs have been deduced, using the hypothetico-deductive research method. The hypothetico-deductive determined market success factors are: information, competence, sustainability, trust, integration and standardization. This paper introduces the methodic approach and discusses the identified market success factors.

Keywords: lifecycle service provision, co-operation, business model, conflict of interest, success factor.

1. Paradigm shift in the construction industry

With the basic conditions of the Swiss construction market, the tender price becomes the decisive factor for success or failure of a construction bid. A possible way out of the price-competition for construction companies is the differentiation strategy [1] that allows for customer-oriented service provisions [2] that creates added value and that cannot be adopted easily by competitors.

Institutional clients expect the possibility to flexibly change the use of a building with reasonable efforts and low costs of operation and maintenance along with working and living conditions in compliance with social norms (optimal cost-benefit ratio). For several years now, the construction industry accordingly claims the paradigm shift to consider life-cycle costs during the tender phase for construction services rather than merely the initial investment costs.

2. Business model for life-cycle service provisions

The research at the Institute for Construction Engineering and Management (ICEM) of the ETH Zurich aims at developing a cooperative business model (fig. 1) for a strategic cooperation network in order to establish a life-cycle service provision (LCSP) for building construction. For the construction companies involved, the business model offers the possibility to lastingly disengage from the predominant pure price competition through a differentiation strategy. Clients obtain a custom-made building that is optimized to life-cycle costs and satisfies all important aspects of sustainability. Thus, the LCSP constitutes a win-win situation for all participants [3].

Figure 1. Cooperative business model for life-cycle service offering

3. Research methodology

For the research necessary to produce this paper, the hypothetico-deductive method [4] has been applied to determine market success factors for LCSPs. During the subsequent research process, the scientific theoretical results have to be rehabilitated by empirical studies (workshops, expert interviews) [5]. With the hypothetico-deductive method, market success factors for life-cycle services have been determined following these steps (fig.2):

1) Basic evaluation of empirical data by review of literature;
2) Derivation of potential market success factors for energy-contracting services by means of deduction;
3) Structural analogy of energy-contracting services and LCSPs;
4) Transfer of market success factors for LCSPs by means of deduction.
4. Strategic guiding principles

As a starting point for the further hypothetico-deductive research process, the following strategic guiding principles were extracted from the analyzed empirical studies:

1. A clear, trust-building message must be communicated.
2. A developing market demands the concentration of market forces.
3. There is a need for an expedient interaction in the market for energy contracting services between cooperation and competition based on division of labor.
4. Strategic alliances have to be entered.

5. Structural analogy of energy contracting and life-cycle services

The implementation strategy of the business model consisting of three levels of cooperation development which was developed in workshops including experts, was a first evidence for the analogy of both business segments, energy contracting services and life-cycle services. By considering the following parameters significant for the object of research, the structural analogy has been demonstrated:

- The targeted customer segment of both energy contracting and LCSPs are identically.
- The pursued market strategy and the competitive strategy of both business segments are extensive-ly analogue.
- With energy contracting as well as with the intended life-cycle services, the particular service provider ought to be integrated responsibly in the life-cycle phases following the construction phase: utilization, operation, maintenance, change of usage and demolition.
- The life-cycle costs of the works of both business segments are a substantive component of the competition for construction services.

- The objects of the service provision with both forms of project delivery include all essential aspects of sustainability (environmental compatibility, profitability and social components).

6. Results - Market success factors for LCSPs

From the perspective of the strategic cooperation network (fig. 1), it is primarily the so called instrumental success factors that are of interest ([6], [7]). Instrumental success factors are configurable by the company and decisively affect the success of the company (achievement of objectives).

By applying the hypothetico-deductive research method, the existence of market success factors (information, competence, sustainability, trust, integration and standardization) for the LCSP to be developed was demonstrated. These market success factors are the basis of the further development of the LCSP and the necessary cooperative business model.

At the next stage of the research process, the hypothetico-deductive results of the presented research work ought to be reabilitated by empirical examinations (expert interviews and workshops).

References

Cooperation Network “Lifecycle-oriented Buildings” – Potential Success and Failure Factors

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Abstract

In the tense situation of the construction markets in the German-speaking countries and especially in Switzerland, innovative construction companies seek to differentiate themselves from their competitors by new approaches. At the same time, mainly institutional, professional clients claim the paradigm shift in the competition for construction services towards a focus on the costs of a complete life-cycle and away from a focus on the initial investment costs.

Within the scope of the development of a new cooperative business model for life-cycle service provisions (LCSP), market success factors for such LCSPs have been deduced, using the hypothetico-deductive research method. On the basis of substantial empirical studies aimed at exploring the potential of energy contracting service provisions and hence extracted so called strategic guiding principles, the market success factors for energy-contracting service provisions were initially identified. Subsequently, the structural analogy between energy-contracting services and LCSPs was shown. Finally, with this legitimation, six market success factors for LCSPs were deduced.

The hypothetico-deductively determined market success factors are: information, competence, sustainability, trust, integration and standardization. They are basis for determining the requirements of the cooperative business model and life-cycle service provision and have to be reliabilitated empirically in the further research process.

Keywords: lifecycle service provision, co-operation, business model, conflict of interest, success factor.

1. Introduction

The tense competitive environment in the construction markets of the German-speaking countries has a number of reasons. Among the main reasons are [1]:

- the stagnating demand for construction services within the domestic markets;
- market competitors coming from low-wage countries;
• the practice of tendering and awarding construction contracts with a focus on minimum investment costs;
• the interchangeability of many service providers due to little or no features of differentiation.

With these conditions of the construction markets, the tender price becomes the decisive factor for success or failure of a construction bid. In consequence, the participating construction companies try to underbid each other’s prices using a cost leadership strategy which leads to a negative price spiral at the expense of the profit of the construction companies [2]. In this competition characterized by pricing pressure, only those companies have a realistic chance to succeed which minimize their process costs, have a flexible organization and select contracts that guarantee sufficient contribution margin. So far, no construction company really managed to achieve cost leadership on a medium term basis. A possible way out of the price-competition for construction companies is the differentiation strategy [3] that allows for customer-oriented service provisions ([4], [5]) that creates added value and that cannot be adopted easily by competitors.

The globalization of markets for production and service locations entail high flexibility of the shareholders in the relocation of these locations. For this reason, competitive real estate along with attractive locations which are the outcome of a favourable political process are in demand. The rate of return and the possibilities to sustain values are measures to reach competitiveness of real estate. The rate of return depends on the technical, constructional and architectural quality of the real estate, the extent of the specific adaptation to the user’s needs and last but not least the costs of operation and maintenance for the building. This is why institutional, professional clients increasingly consider the life-cycle costs of potential real estate investments. They expect the possibility to flexibly change the use of a building with reasonable efforts and low costs of operation and maintenance along with working and living conditions in compliance with social norms (optimal cost-benefit ratio). For several years now, the construction industry accordingly claims the paradigm shift to consider life-cycle costs during the tender phase for construction services rather than merely the initial investment costs. This demand is motivated by the perception that within a short period of time the costs of operation and maintenance of buildings [6] exceed the initial investment costs many times [7]. Thus, the costs of operation and maintenance of a building become a significant performance indicator for a real estate investment (fig. 1).
The research at the Institute for Construction Engineering and Management (ICEM) of the ETH Zurich aims at developing a cooperative business model (fig. 2) for a strategic cooperation network in order to establish a life-cycle service provision (LCSP) for building construction [8]. The implementation of the cooperative business model passes through three so called levels of cooperation development that have been developed in workshops with experts. The extent of the service provision and the scale of integration of the cooperation network increase gradually with the progress in these levels of cooperation development. At the first level of cooperation development, the service provision of a total service provider for building construction (turnkey construction) is supplemented integratively by energy-contracting services in cooperation with an appropriate service provider. At the second, for this paper most important level of cooperation development, the service provision of the cooperation network for life-cycle services in building construction is extended to a full life-cycle service provision including all system service elements that interact within the building’s energy system. Basically, those elements are the building facade and the energy-related technical infrastructure of the building. An energetically optimized life-cycle oriented service provision is facilitated by an interactive integrated system service provision and the large scale integration of the cooperating, service providing partners (service provider collaboration structure). At the third level of cooperation development which has to be developed as a result of further research, a system service completed by further aspects of facility management will be offered, in order to provide complete office and/or housing infrastructure that is fully adapted to the needs of its users.

For the construction companies involved, the business model offers the possibility to lastingly disengage from the predominant pure price competition through a differentia-

Figure 1. Comparison of the investment costs of a building with its life-cycle costs [7]
tion strategy. Clients obtain a custom-made building that is optimized to life-cycle costs and satisfies all important aspects of sustainability. Thus, the LCSP constitutes a win-win situation for all participants [9].

2. Research methodology

For the research necessary to produce this paper, the hypothetico-deductive method ([10], [11]) has been applied to determine market success factors for LCSPs. During the subsequent research process, the scientific theoretical results have to be reliabilitated by empirical studies (workshops, expert interviews) ([11], [12], [13], [14]). With the hypothetico-deductive method, market success factors for life-cycle services have been determined following these steps (fig.3):

1. Basic evaluation of empirical data by review of literature

Detailed records of empirically conducted studies that were aimed at determining the market potential of energy-contracting services have been the basis of the hypothetico-deductive identification of market success factors for LCSPs ([15], [16], [17]). Referring to successfully implemented energy-contracting services, the authors of those studies produced in conclusion so called strategic guiding principles. For the purpose of further deduction within the presented research work, these strategic guiding principles were extracted.

2. Derivation of potential market success factors for energy-contracting services by means of deduction

Figure 2. Cooperative business model for life-cycle service offering
Within a first deduction step, potential market success factors for energy-contracting services were derived logical-deductively from the strategic guiding principles.

3. Structural analogy of energy-contracting services and LCSPs

By means of logically determined parameters that are relevant for the market, the structural analogy of energy-contracting services and LCSPs were shown. These logically deducted analogies served as a fundamental assumption for the logical-deductive transfer of the deducted market success factors from energy-contracting services to LCSPs.

4. Transfer of market success factors for LCSPs by means of deduction

As the result of the hypothetico-deductive research work, market success factors for LCSPs were deducted on the basis of the market success factors for energy-contracting services from step 2 and legitimized by the structural analogy shown in step 3.

![Diagram showing hypothetico-deductive methodology to deduce success factors for LCSPs]

**Figure 3. Hypothetico-deductive methodology to deduce success factors for LCSPs**

### 3. Potential of life-cycle services

Within the scope of the research project „From a product to a LCSP – cooperative business model“, the potential of life-cycle services within the Swiss construction market was evaluated through a qualified review of literature. For the empirically profound, logical deduction of this potential, three significant sources proved to be promising with regard to the research objectives:

In the course of the ICEM research project „KicK“ [17] that was aimed at systematically exploring the tendering criteria of clients, quantitative empirical studies were carried out among clients in order to demonstrate the need for LCSPs within the Swiss market.
The need for LCSPs and its potential can be directly reasoned from the high relevance of the capability to benchmark the consequential costs of real estate investments already in the tendering phase, thus making the complete life-cycle costs of a real estate a subject of competition. The life-cycle oriented project delivery offers the possibility to consider the quality of performance of the real estate and the technical implementation of the value of benefit to make use of its monetarily valued optima as a criterion for the awarding of a construction contract.

The study [16] that deals with energy-contracting services gives a detailed overview of energy-contracting activities and its potential in Switzerland. The qualitative results of the study with regard to the potential of energy-contracting services are as follows:

The energy-contracting market in Switzerland contains a considerable potential for growth. The study assumes that due to an increasing contracting denseness and an increasing level of awareness about its merits, the potential will increase even more.

Another study [15] on market potentials of contracting services summarizes relevant results of various studies about the energy-contracting market.

This study, too, concludes that the market for contracting services will grow remarkably and will have a lasting impact on the sustainability of buildings (profitability, environmental compatibility and long-term utility), as well as on the labour market.

4. Strategic guiding principles

As a starting point for the further hypothetico-deductive research process, the following strategic guiding principles were extracted from the analyzed empirical studies [16]:

1. A clear, trust-building message must be communicated.

This guiding principle postulates the customized presentation of the service provision to potential clients taking into account the unique selling propositions and the benefit for the client that enables the involved players to differentiate themselves by developing a profile distinct from that of their competitors and by higher benefits for their clients.

2. A developing market demands the concentration of market forces.

To obtain a rapid wide effect within the developing market with promising potential for energy contracting services, this guiding principle postulates the usage of existing synergy potential to achieve economies of scope and scale.
3. There is a need for an expedient interaction in the market for energy contracting services between cooperation and competition based on division of labour.

This guiding principle aims at adequate market structures with regard to the size of the participants and postulates an interactive cooperation between small, medium and larger service providers. Thus, innovations can be generated and flexibility can be achieved. Service providers as well as their potential clients profit from this win-win situation.

4. Strategic alliances have to be entered.

Strategic alliances bundle the core competencies of the partners involved, thus facilitating access to new markets ([4], [18]). Through synergy effects, the cooperating partners achieve economies of scope.

5. Success factors for energy contracting services

From the perspective of the strategic cooperation network, it is primarily the so called instrumental success factors that are of interest ([19], [20], [21]). Instrumental success factors are configurable by the company and decisively affect the success of the company (achievement of objectives). The following success factors for energy contracting have been deduced by means of the described hypothetico-deductive research method from the empirical studies ([15], [16], [17]) and hence extracted guiding principles.

Information

The unique selling propositions and the benefits of energy contracting (cost savings, shifting of risks, professionalization of operations, cash generation and references) for the clients are to be communicated by means of an adequate marketing strategy [22].

Competence

Depending on the type of energy contracting and the scope of services, potential clients expect various competences (financial competence, design competence, technical system competence, competence for operation and maintenance of buildings) from the contractor. Missing competences have to be supplemented through strategic cooperation and bundled to reach a holistic service provision.

Sustainability

In order to successfully exist in the long term on the market for energy contracting services, all requirements of sustainability (profitability, environmental compatibility and utilization comfort) must be fulfilled.
**Trust**

The involved participants (contractor, client) of an energy-contracting service provision are associated in a relatively long-termed business relationship. Depending on the type of energy contracting, the client passes specific decision-making competences on to the contractor, who in return takes over certain risks. In order to create a climate of confidence and trust (transparency), it is important that the contractor can communicate certain qualities of confidence ([23], [17], [24]) to the client by means of the service provision. Confidence and trust are obtained through the contractor’s solvency as well as the acceptance of guarantees with regard to service and performance.

**Integration**

In order for the energy contracting service to be sustainable and successful, the contractor has to be involved in the process of the design of the energy concept at a very early stage. With his competences, he can exert influence to the service aspects that he later has to be accountable for. Thus, this so called scale of integration is an important success factor for energy contracting services.

**Standardization**

In the course of the empirical studies, the high need for consulting services and the complexity of energy contracting service provisions was subject of criticism by potential clients because these factors significantly influence the profitability of energy contracting services. Standardization with regard to standard procedures, model contracts and checklists can reduce such criticism.

**6. Structural analogy of energy contracting and LCSPs**

In order to project the deductively identified market success factors of energy contracting services to LCSPs, the analogy of energy contracting services and LCSPs with regard to basic strategic objectives and mechanism of impact had to be demonstrated. The implementation strategy of the business model consisting of three levels of cooperation development which was developed in workshops including experts, was a first evidence for the analogy of both business segments. Within the temporal sequence of these levels of cooperation development, the energy contracting represents the first and the energetically optimized LCSP represents the second service level of the cooperation.

By considering the following competition parameters the structural analogy has been demonstrated:

- The targeted customer segment of both energy contracting and LCSPs are identically.
The pursued market strategy and the competitive strategy of both business segments are extensively analogue.

With energy contracting as well as with the intended LCSP, the particular service provider ought to be integrated responsibly in the life-cycle phases following the construction phase: utilization, operation, maintenance, change of usage and demolition.

The life-cycle costs of the works of both business segments are a substantive component of the competition for construction services.

The objects of the service provision with both forms of project delivery include all essential aspects of sustainability (environmental compatibility, profitability and social components).

The structural frameworks (objectives and mechanism of impact) for both service provisions are comparable with regard to the above mentioned competition parameter. According to the chosen hypothetico-deductive research method, the market success factors for energy contracting services can be transferred to market success factors for LCSPs.

### 7. Market success factors for LCSPs

As a result of the demonstrated analogy of energy contracting services and life-cycle services, the market success factors for energy contracting services can be transferred to market success factors for life-cycle services with regard to the following considerations.

**Information**

The high level of innovation of the LCSP requires an intensive communication of the unique selling proposition to potential clients by application of an adequate marketing strategy. Hence, a trust-building message can be developed with the following core elements:

- the potential of energy and operation costs savings through system optimization of the building facade, energy related installation and resulting type of energy;
- the trust-building potential of service qualities and guarantees;
- the shift of various operational risks to the contractor;
- the professionalization of operations;
- the generation of cash for alternative investments.

Furthermore, pilot projects with motivated clients rapidly generate necessary references.
Competence
Compared with the necessary competences for energy contracting services, the competence portfolio for life-cycle services has to be completed to the extent of a systemic competence. On the one hand, this competence arises from the cooperation network and its involved partners and on the other hand from the integral moment of the system concept for integrative design, construction, operation and maintenance of an energetic system concept consisting of all elements necessary for an optimized building energy concept (HVAC, building facade, energy provision and reutilization infrastructure).

Sustainability
LCSPs exceed energy contracting services if compared with regard to sustainability:

- **Profitability**: The consideration of complete life-cycle costs of an energetically optimized building and the associated life-cycle oriented optimization of the building come along with cost-effective benefits for potential clients.

- **Environmental compatibility**: Through the system oriented optimization of the building, LCSPs enhance the rationale use of resources.

- **Social interests**: LCSPs focus on the user when optimizing the building and its facilities to ensure the level of comfort as defined by the client with an emphasis on room climate condition and security of supply.

Trust
In time as well as in the extend of its scope, life-cycle services cover considerably larger grounds than energy contracting services. A trustful relationship among the partners of the cooperation network as well as between the service provider and the client is therefore of high significance. Qualities of confidence to potential clients can be documented by a strong solvency of the providing strategic cooperation network and its involved partners as well as by extended service and performance guarantees that might include an energy consumption oriented incentive system (Principle-Agent-Theory [25]).

Integration
The business model to be developed supports the energetic system optimization of buildings by applying a high level of integration in two dimensions.

The horizontal dimension integrates the competences of the involved partners of the cooperation to the extend of an energetically optimizing system competence consisting of HVAC, building facade, energy provision and reutilization infrastructure.
The vertical integration dimension meets the service complexity that accrues from increased scope of services and the specific requirements of potential clients by introducing an extended added value. This extended added value starts with the requirements management at an early stage, an integrated design and the provision of the system to the subsequent life-cycle phases of operation and maintenance of the energetic system. The client is provided with the optimal energetic system because the service provider takes over responsibilities for all phases of value creation.

**Standardization**

Due to the high level of innovation, the complexity and the small present level of awareness about its merits, a high effort of consultancy to potential clients has to be anticipated. Through processual standardization of procedures (e.g. checklists, model contracts) within the LCSP, the framework of the service provision can be standardized without giving up the customer-oriented approach.

**Conclusions and Outlook**

By applying the hypothetico-deductive research method, the existence of market success factors (information, competence, sustainability, trust, integration and standardization) for the LCSP to be developed was demonstrated. These market success factors are the basis of the further development of the LCSP and the necessary cooperative business model.

At the next stage of the research process, the hypothetico-deductive results of the presented research work ought to be reliabilitated by empirical examinations (expert interviews and workshops).

**References**


