

Development of an Assessment Tool to Evaluate and Improve SME Business Models

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Abstract

Purpose: The approach presented in this paper addresses entrepreneurs and managers of SMEs in the construction sector that are willing to refine their current business model.

Design: The main scope for defining the assessment was the transformation of generic industry performance indicators into a framework that encompasses the needs of SMEs in the construction industry. The assessment comprises for example typical key success factors that are relevant in the construction sector. These are for instance aspects like project management capabilities, implementation of risk-management mechanisms or mastering the value network in the construction sector.

Findings: The set of indicators we identified is thematically aligned to the Osterwalder Business Model Canvas which means that nine aspects of a business model are distinguished and elaborated in the assessment. For each of the indicators questions and respective multiple-choice answers were formulated to identify the degree of performance achieved by companies conducting the assessment.

Originality / Value: The framework distinguishes from existing approaches concerning the complexity. The developed tool is the initial ignition for managers to start change projects in their companies. The idea is to help entrepreneurs in their strategic decision-making process and to enable them to control their complex and continuously progressing company environment. In the future, it is envisaged that the assessment, implemented as a self-assessment tool, will be part of a holistic approach.

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Keywords: Business Model; SME Self-assessment; Construction Industry

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Introduction

This paper aims at developing a business model assessment for locally acting medium-sized companies of the construction industry who offer solutions of high to medium complexity to their customers. In particular, this assessment should give first orientation especially to managers who want to adjust their business model to changed environment conditions. It is designed as a self-assessment, reviews the main aspects of a business model and has been created as lean as possible.

The assessment is based on a performance factor analysis, derived by comparing different literature sources. This initial assessment was reviewed and enhanced with experts from the construction industry.

The framework described in this paper is a helpful tool for managers of SME to roughly gauge the performance of their company and business model. It can be seen as a starting point for a deeper analysis of a company's business model and as initial activity that helps to direct a change process in a company.

The working structure of this paper is broken down into six chapters, as described in the figure below.



Figure 1: Working structure of this paper

Trends and the state of the art in business models for the construction industry is explained in chapter 2. The research approach used to develop the assessment is

described in chapter 3. Chapter 4 gives an insight into the different performance factors of the assessment framework. The conclusion, implications and next steps are reported in chapter 5.

Trends in business models of the construction industry

Since the economic recession has bottomed out in 2005, the European Construction Industry is still struggling. As opposed to other regions, Europe was not able to establish continuous growth in the construction industry during the last years (Statista 2015).

Facilitated by continuous instability during the last years, many building contractors need to reorient. Especially the European climate targets offer a high growth potential for companies focussing on the refurbishment of buildings (Saheb et. al. 2015). Adjusting to this situation, many companies have to change their competitive strategies or changed and adjusted their whole business model. The refurbishment of existing buildings is an attractive market for companies of all sizes. Additionally, large construction companies are expanding in emerging markets. Moreover, a change of strategy in the field of services has taken place (Schober 2011). This means that companies are not limited only to mere construction activities or services related to construction. In the future, the construction industry is expected not to increase as much as many years before but the growth trend promises improvement. The long-time image of being a risk sector does not exist anymore which is also visible through banks having increased the loan volume for the construction sector. However, not all weaknesses have been overcome so far. A time driven business rivalry has been existing for many years instead of a preferable competence-oriented competition.

Traditional business models like general contractors or total contractors are no longer the benchmark in the construction industry. During the last years and also today, new models like GMP-models, open books, IPI contracting (e.g. Performance or Energy contracting), OSS, Target costing and the consideration of the building cycle have gained more importance and are still developing (Gralla 2001, Mahapatra et al. 2011, Heilfort 2004, Bertoldi et al. 2014, Cabinet Office 2014).

The main goal of all models is to enable transparency, partnership and trust between all participants but most of all between customer and contractor. As a rule, for this purpose targets are set like cost targets, time lines but also corporate objectives like energy consumption targets or life-cycle costs of the renovated building.

So-called energy performance contracting is also highly attractive. The contractor commits to provide energy, including operation, maintenance and exchange of the corresponding infrastructure. The main contract is based on specific energy (cost) saving whereby measures for energy saving and for improving energy efficiency are taken. As guaranteed savings, these improvements include the systematic and overall optimization of facilities and building. The contractor receives these saved energy costs or bonus payments proportionately as a compensation for his investments and services for a defined period of time. Such energy saving contracting has the advantage that needs are adjustable in a highly flexible way to customer instructions (Decc 2015).

All new business models aim to improve the customer interface. However, the customer interface cannot be regarded separately but effects with all building blocks of the business models have to be considered. In this case the changes concern all companies in the construction industry, regardless of the size. Summarizing all aspects, it can be stated that in the future SMEs will collaborate to offer business models covering nearly the whole value chain and providing a holistic service portfolio to customers.

Research

The research covered the analysis of cross-industry performance factors and in particular those that are related to the construction sector. Industry performance factors were derived from various business model approaches and extracted from strategic management literature. A set of factors was derived from the work related to industry models by Kern in 2014 (Kern 2014). Some others can be found in literature related to business models (Osterwalder 2010; Hamel 2002; Pateli, Giaglis 2003; Johnson et al. 2008; Linder, Cantrell 2000; Bouwman et al. 2005; Teece 2010. Voelpel et al. 2005, Porter 2008) and finally there is also literature with a focus on the construction industry (AK Partner-

schaftsmodelle 2005; Girmscheid 2010a; Giesa 2010; Girmscheid 2010b) that proposes performance factors. The industry performance factors of the different literature sources were compared against each other and doublings eliminated. Finally, they have been discussed and prioritized with industry experts.

Based on those industry performance factors, design fields were derived and defined. The design fields are not overlapping and have been validated with academics and industry experts.

The next step comprises the identification and definition of different characteristic per design field, whereas the characteristics should be without any overlap against each other. The characteristics were defined in a way that they are representing different maturity levels of the corresponding design field. In the following, the list of the 19 design fields that have been defined for the self-assessment is presented:

- Competitive strategy (Porter 2008, Schober 2011)
- Efficiency and sustainability of business models (Schober 2011, Drucker 1963)
- Acquisition of projects (expert interview with a construction manager)
- Degree of the technological interweavement (Kern 2014, expert interview with a construction manager)
- Project management (Heilfort 2004, Girmscheid 2010b)
- Risk management (Girmscheid 2010a)
- Assets, resources and competences (Heilfort 2004, Ewald 2012)
- Appropriate offers (Heilfort 2004, Racky 2004)
- Environmental conditions of the market (Schober 2011)
- Power over suppliers (Porter 2008, Schober 2011)
- Customer orientation (Osterwalder 2010, Schober 2011)
- Corporate culture and human resource management (Lies 2014)
- Investment in knowledge base (Davenport 2000, expert interview with a construction manager)
- Power over buyers (Porter 2008, expert interview with a construction manager)
- Degree of network competence (Thorgren 2009, Schober 2011).

- Contracting models (Gralla 2001)
- Quality management (Girmscheid 2010a)
- Revenue streams of the company (Osterwalder 2010, expert interview with a construction manager).
- Project cost structure (Osterwalder 2010, expert interview with a construction manager)

It has to be emphasized that the number of maturity levels were restricted to three. The idea was to avoid complexity by developing a high number of maturity levels for each design field. Practitioners should be able to do the self-assessment in a short time. Several successful examples from different application areas and industry sectors show that frameworks with a low number of maturity levels can serve the needs of the industry (e.g. CMMI Framework (4 capability levels), Fraunhofer RnD-Assessment (4 maturity levels)).

With the support of six construction companies, the assessment was revised and adjusted. As a result, the mentioned 19 design fields were approved by the companies and the content revised to some extent. Since the assessment has been designed especially for medium-sized construction companies, this target group has also taken part in the validation process. Two medium-sized construction companies and one medium-sized consulting company from Germany have validated the assessment. Additionally, a company from Finland and one from Spain supported the beta-tests.

All companies did the self-assessment and identified gaps in the design field as well as unclear points in the description of the design fields and in the maturity levels. Strengths and weaknesses identified in this process were discussed with the project managers and CEOs in order to ensure that the assessment screens most important aspects in a coherent way. Summarizing, it can be stated that the assessment could be validated in different use cases.

Assessment Framework

The assessment consists of the above mentioned 19 different design fields which now will be illustrated in detail. These design fields have been structured additionally by means of the Osterwalder Business Model Canvas (see Figure 2).

This is intended to guarantee that all necessary aspects of a business model have been considered. The Osterwalder approach has been chosen due to the following arguments:

- The Osterwalder approach was used to describe business models in different sectors (e-business, discrete manufacturing, consumer goods, service companies) (Osterwalder et al 2010). This means that the approach is flexible and generic enough to be used also in the construction industry.
- The network perspective is a building block of the Osterwalder Canvas. Since this is truly becoming a

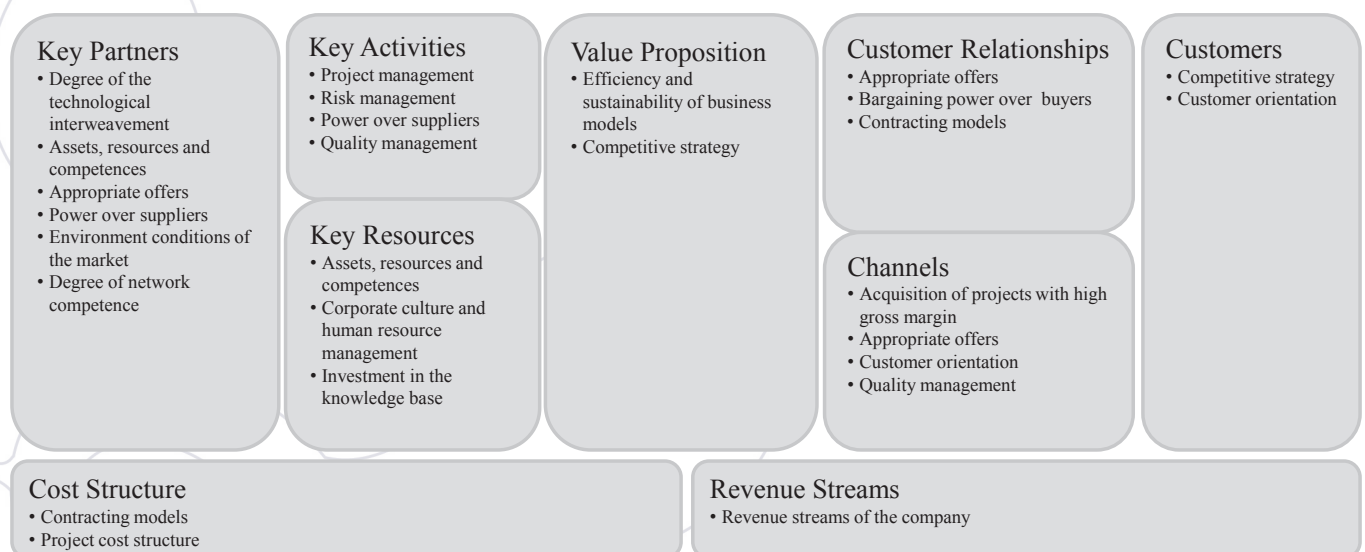


Figure 2: Assessment Structure

focal point for SMEs in the construction sector, it is an important criterion for the selection of an adequate modelling framework.

- The Osterwalder approach was applied regularly in the industry during the last years which means that it is proven to be appropriate for practitioners.
- All well-known approaches can be mapped with the building blocks of the Osterwalder model (Schuele, Sturm 2012).

The mapping of the 19 design fields also reveals key levers of a construction sector's business model. Both the partner network and the customer interface are influenced by many different aspects which have to be controlled. The structure and the management of the project network mainly influence the project success.

Due to thematic overlaps, some buildings blocks are multiply. However, design fields which have been mentioned two or three times are not more important than others but are of more generality as others. This applies to the design fields "Competitive strategy", "Assets, resources and competences", "Power over suppliers", "Needs-based offers" and "Quality management". In a first step, each design field being part of this assessment is explained clearly for the practitioner. The respective overall meaning is explained and, if possible, particularities or examples from the construction sector are added. Self-assessment of the company takes place based on maturity levels. For each view on the business model, two or three different maturity levels are defined.

Competitive strategy

Competitive strategies are strategies on company level in order to get or create competitive advantages on company level (Porter 2008). If the envisaged competitive advantage is only aimed for a submarket, we speak of a concentration on focus areas (niche strategy such as housing, local civil engineering or renovations). However, rapidly expanding companies still try to cover the entire design and construction process. Typical examples of the construction industry are companies with a broad product portfolio that have either a high vertical integration or act as a one stop shop in the market (Schober 2011). Based on a diversification of the product portfolio, demand fluctuations can be compensat-

ed and risks can be avoided. A good balance between customer value and price for the service offered should always be achieved. With the help of a good business model, a company can dominate its market segment. Thereby its competitive strategy is consciously developed, implemented and scrutinized regularly. Poorly elaborated business models in the construction industry are characterized by the fact that market shares are declining, competing products are preferred by customers and that the insolvency risk is increasing.

Derived maturity level:

- Good: The business model enables companies to be one of the leading actors in his market segment. The competitive strategy being the basis of the business model is developed consciously, realized and questioned on a regular base.
- Intermediate: The business model still ensures economic growth. Although the company responds to market changes, it will not dominate the market. The approach to strategic orientation and business model development has not been formalized.
- Bad: Market shares decline, competitor products are preferred by customers, the risk of insolvency exists. There is neither a deliberate competitive strategy nor a deduced business model.

Efficiency and sustainability of business models

The efficiency and sustainability of business models must always be considered in combination. A high flexibility of the company is needed to overcome projects and their challenges such as bureaucratic hurdles easily. In the foreground is the response time of the company to serve customer needs quickly with minimum effort (Schober 2011, Drucker 1963). Sustainability in the construction industry means that customers are satisfied permanently and that ecologically and economically integrated solutions are implemented for them. A high efficiency and sustainability is defined by the right balance of total costs for the value proposition and the company's profits, whereby customer loyalty is high. Efficiency and sustainability are low when the majority of completed projects are characterized by a negative balance and there is no customer loyalty.

Derived maturity level:

- High efficiency and sustainability: This is defined by the right balance of a company's total costs of

values and profits. Customer loyalty is high.

- Intermediate efficiency and sustainability: The company is still profitable, however, the margin compared to competitors is low due to high development and project costs. Customers move to competitors.
- No efficiency and sustainability: The majority of projects being handled has negative results. Company viability is endangered. There is no customer loyalty.

Acquisition of projects

One of the most important acquisition methods in the construction industry is still the word of mouth but, of course, an excellent reputation must exist. If this is not sufficient, additional marketing measures have to be initiated. For example, companies can selectively improve their profile and act as holistic, green or cheap construction companies on the market and thus address specific customer groups.

Meanwhile, new tender forms (e.g. internet auctions) are used. Although this results in transparent pricing mechanism, it usually affects also corporate profits in a negative way. In contrast to classical negotiations, proximity to customers is neglected (as one main focus of SMEs) through internet auctions. Independent of the company size, an above-average equity capital ratio helps if the company's goal is to participate in larger projects.

Derived maturity level:

- High success rate: It is easy for the company to acquire projects with large contribution margins.
- Intermediate success rate: The company has average success in the acquisition of projects with large contribution margins.
- Low success rate: Projects with large contribution margins are rarely acquired.

Degree of the technological interweavement

The degree of technological interweavement describes the interdependencies between network partners in a value chain due to components or trades or to the complexity growth by interweaved different technologies which require a common and early planning (Kern 2014). Especially in key trades, such as facades or the technical building orientation, it is important that part-

ners are involved at an early stage to help managing and optimizing the system parameters and to ensure process quality and process stability. In case of bad technological interdependence, the company provides primarily isolated solutions to the customers.

Derived maturity level:

- High: Large-scale projects being handled by a company usually have high technological interweavement. Complex structures and technical systems are realized with partners. In accordance with their task formulation, technological interdependence of smaller projects is mostly low.
- Low: Primarily, isolated applications having low technological interweavement are offered to the customer. This is independent from project size and thus applies to small and medium undertakings.

Project management

Project management is a key component in order to carry out a construction project within the contractual limits of time, cost and quality. Especially work covering overlapping trades is challenging for responsible project managers. A good project management works solution-oriented to counteract any problems as early as possible.

The range of tasks of project management includes, for example, professional purchasing- and partner management, tendering, construction site organization, project controlling or interface management (Heilfort 2004, Girmscheid 2010b).

Companies acting in networks need to synchronize their project portfolios when they want to succeed (multi-project management). Poorly managed projects exceed again and again the given time and budget or do not lead to a final result which corresponds to the expected quality.

Derived maturity level:

- Structured: Project managers or site managers in a company are able to coordinate value networks and to reach project goals agreed with the client. The experience of project managers or site managers within a company is high.
- Unstructured: Projects are managed without de-

tailed planning in accordance with arising requirements within the project. Projects exceed the given time and budget frame.

Risk management

Especially in pre-contact phases, corresponding risk management is often not done or not carefully enough performed. Problems occur during the project if risk analysis has not (sufficiently) been carried out. The overall objective is to increase customer benefits and to decrease the own risk. In addition to efficient project and cost controlling, an adequate equity base reduces the entrepreneurial risk in case of payment default/debt default in the construction sector. Each project manager should be able to establish a project-related risk management in his projects. Structured risk management makes risks and effects visible at an early stage and enables appropriate countermeasures. In this way, project cancellation can mainly be avoided (Girmscheid 2010a).

Derived maturity level:

- **Structured:** Project risks are managed in a structured way. As a result, risks are detected at an early stage, effects are made visible and measures are determined which are monitored continuously.
- **Partially structured:** Project risks are managed in a partially structured way. Most risks are detected at an early stage. Unrecognized risks do not cause project cancellation but are removed with great effort in the course of the project.
- **Unstructured:** Risk management is not part of project management. In the past, unrecognized, serious risks have caused project cancellation.

Assets, resources and competences

SMEs often do not have all necessary assets and competences for offering a service portfolio to customers. To manage and carry out larger renovation projects, complementary knowledge, competences and equipment are necessary which are covered by a partner network. Among other things, during the construction phase it is possible to call for tenders in the partner network and therefore jointly offer a solution in early project phases (Heilfort 2004). It is also most important to have access to experts and subcontractors which can master certain building trades, renovation or manufacture components. Approaches that include

the cooperation of all contract partners and project members (incl. the client) ensure that projects can be conducted cheaper, faster, qualitatively better and thus more satisfying for all partners. Iteration loops in the planning process are avoided and conflict potential is eliminated. This requires social competence as well as formal (guidelines and rules) and informal (not officially required) communication structures of the involved partners. Especially cross-company teams make it possible that appropriate professional skills are immediately available in each project phase (Ewald 2012). For big projects so-called temporary working teams are often used. An optimal status is developed if all required assets, resources and competences for the execution of the task are available in the own company or are provided by trusted partners.

Derived maturity level:

- **Available:** Usually all required assets, resources and competences for the realization of the task are available in the company itself or are directly provided by project partners. Networking between project partners is given.
- **Rarely available:** Not all required assets, resources and competences for the realization of various tasks are available. In some cases, projects could not be acquired or conducted due to unavailable resources. The networking of project partners is fragmented.

Appropriate offers

The basis for appropriate offers are always market analysis on a regular basis with internal and external references that consider actual trends and changes and thus extend the use for the client. Usually the architect or planner is the contact for the building contractor. The actual aim should be the direct contact with the client (resp. the contribution of the own competence). Nowadays, clients act more independently and often approach the company directly. To save time and costs, the client and – in case of investment projects – also his network should be included in the planning. The close cooperation with the client in the performance description leads to the consideration of all client expectations and strengthens the trust in the contractor (Heilfort 2004). More and more owners expect a continuous involvement in the building process or want to conduct many activities autonomously. Thus the value propo-

sition has to be appropriately scalable (Racky 2004). Nevertheless, from the perspective of the contractor the client can only be partly included in the proposal preparation as pricing pressure in the construction industry is very high. Finding a cheaper supplier is always possible for the client.

Derived maturity level:

- Well balanced: The value of an offer is well balanced in relation to pricing. The market is regularly analysed to understand customer requirements and to keep an eye on current trends and changes. The customer is actively involved in proposal preparation.
- Unbalanced: Price and customer benefits of the solution are unbalanced. There is no or insufficient customer orientation which is not or only partially focused on the market. Market analysis is only conducted once in a while, customer requirements are not considered for proposal preparation.

Environmental conditions of the market

Good companies that are established in the market are protected by entrance barriers. These are aspects like technological complexity, established and strong value added networks, client lock-in or capital intensity in the building material industry. Companies that try to overcome these barriers are currently from low-wage countries, e.g. from Eastern Europe. The long-term market trend to move from new construction to renovation of buildings requires an adapted service offer by the contractor. Tendencies to modular construction or the use of prefabricated components also change the parameters of the market (e.g. reduction of the vertical integration at the construction site). Especially for KMU, new markets often can only be opened with a strong partner network (Schober 2011).

Derived maturity level:

- High: The company is part of a powerful network or is itself a powerful player on the market. Competitors and new challengers are not able to gain market shares. New markets can be developed with the help of partners.
- Intermediate: The own market segment(s) could not be defended constantly against competitors in recent years. Nevertheless, the market position could be nearly maintained.

- Low: Competitors continually enter the own market segment. Market shares decline steadily.

Power over suppliers

In general, the factor “power over suppliers” describes the bargaining power towards the supplier (Porter 2008). This power over suppliers only exists partly in the construction industry. Due to high workload in specific craft businesses, a general contractor only has little power over companies with competences in mechanical services, electronic installations or the envelope construction. Indeed partner enterprises are often evaluated by criteria like expertise, capability or reliability, but there is no actual competition due to the current lack of capacity. For other crafts (e.g. stucco work, screed linings or door installation) the workload is much lower and thus the balance of power between contractors and suppliers is different.

Another example is the cooperation between building materials industry and construction companies. Due to the limited transportation options, on regional level for many building materials often no serious competitor exists (Schober 2011).

Derived maturity level:

- High: The companies control more than 70% of their suppliers and observe and measure regularly criteria to monitor the performance of their suppliers. These criteria are revised and updated regularly. Strategies are available preventing to be dependent on only one supplier (multi-sourcing).
- Intermediate: Approx. 50% of the suppliers are controlled whereas the other 50% cannot be controlled. Strategies for performance evaluation of suppliers are only used sporadically. Again and again single-sourcing relationships occur.
- Low: More than 70% of suppliers dictate the market, for example because of their products' competitive advantage. Furthermore, the company has no strategy to evaluate the performance of its supplier. In the past, single-sourcing relationships with some suppliers could not be prevented.

Customer orientation

Companies need to differentiate from its competitors in terms of the value proposition or customer channel resp. the customer interface (Osterwalder 2010). The

construction industry differentiates between specialists with custom-made solutions and generalists who offer customers everything from one source. This includes construction-services such as inspection, certification, testing and verification or communication with the respective authorities (Schober 2011). The definition of a target system between client and contractor should always be conducted. However, it must be kept in mind that not every customer is the same and each company has different customers. For example, the demands and requirements of a project developer are different from those of a company keeping the existing building stock or an investment company.

Derived maturity level:

- High customer orientation: The company has a unique selling proposition towards customers or differs from other competitors by means of the customer channel's layout.
- Low customer orientation: For the customer, no difference regarding benefit promises or customer channel is visible.

Corporate culture and human resource management

The staff must be regarded as the most important asset by the company's management. Excellent motivation, culture, skills and knowledge are a result of this appreciation and should be reciprocated by reward and promotion. A strong workforce has a high level of motivation. The skills of employees are increased by regular training and further education. Due to satisfaction there is small fluctuation (Lies 2014). As summary it can be stated that the corporate culture has a positive effect on each project results.

Good performing companies do not set-up uncontrolled capacities due to past, good order situations. Their image and mind-set makes it easy for them to find new qualified employees.

Derived maturity level:

- Strong staff: The motivation of employees is high and skills of employees are enhanced through constant trainings (strategic must). The corporate culture has a positive impact on project results. There is a low turnover due to high satisfaction.
- Weak staff: The motivation of employees is subject

to change. Skills and knowledge are not applicable and have a negative impact on project results. Trainings are rarely offered and new work content is not communicated appropriately. Furthermore, there is high fluctuation.

Investment in knowledge base

Investment in the knowledge base ensures that the knowledge in the enterprise is updated regularly (Davenport 2000). In the context of the construction industry this includes the latest developments and trends in the construction industry. Especially knowledge of lean on-site manufacturing methods, functional materials and technologies is of high importance. Dealing with intellectual property is also covered by this factor.

Derived maturity level:

- High: A process for the allocation, structuring and delivery of knowledge has been established, for example good monitoring of the business environment (DESTEP = demographic, social, technological, ecological and policy analysis; PESTL = sociological, technological, economic and political change; Technology Roadmap, Trend Radar; trainings for employees). Possibilities, e.g. networks for the informal exchange of knowledge, are offered. Employees are ready to share and transmit their knowledge. Mechanisms for explicit safeguarding of knowledge exist.
- Intermediate: Allocation, structuring and provision of knowledge is informal. From time to time, there is a monitoring of the business environment (DESTEP, PESTL, Technology Radar, Trend Radar ...); training programmes for staff members exist. Employees are ready to share and transmit their knowledge. Mechanisms for explicit safeguarding of knowledge exist.
- Low: Allocation, structuring and provision of knowledge are seldom realized.

Power over buyers

This factor describes the bargaining power of a company towards its customers (Porter 2008). Especially towards small private investors (e.g. construction of a detached house), contractors often have a high bargaining power since clients usually do not have the necessary knowledge. In contrast, the situation is often just the opposite of commercial clients who have

specialized e.g. in property management. In this case the client has a high power due to his own professionalization degree.

Derived maturity level:

- High: Companies dominate customers or there is a balanced (partnership) relationship between companies and customers, yielding benefits for both.
- Low: Customers have great influence on the company and the value offer.

Degree of network competence

The degree of network competence describes, on the one hand, the social competence and ability to interact in networks in order to achieve common goals and, on the other hand, the ability to bring expertise and experiences into collaborations.

Regional operating companies usually have a wide network from which all parties benefit, enabling also a strong diversification (Thorgren 2009, Schober 2011). Therefore, cooperation mechanisms (e.g. partnering, construction team approach, construction management contract) were developed in the past. However, in one's own network not only craftsmen and planners should be integrated but also other roles such as banks or facility managers.

Derived maturity level:

- High: High degree of social and technological competence. Networking partners are often actively involved as external specialists.
- Low: Low degree of social and technological competence. There is only irregular or no cooperation with partners.

Contracting Models

Contracting models describe the contractual relationship between the prime contractor and the client. The cooperation of the construction company with partners and subcontractors must also be regulated by contracts. The open books approach, the enterprise-wide disclosure of balance sheets along the value chain, creates transparency in the cost structure. With the help of this approach, changes to services after contract conclusion can also be handled transparently and conflicts caused by supplements can be reduced. Typically, construction overheads or costs of the shell are fully disclosed within this approach. Costs of finishing

trades are negotiated and contracted commonly but, in contrast to overhead costs, not fully disclosed. An important lever for reducing total project costs are so-called GMP contracts which means that a guaranteed maximum price is offered. When exceeding or falling below this GMP, the difference will be allocated according to the contracting parties depending on the contract (Gralla 2001).

Derived maturity level:

- Strong: If possible, new contracting models like GMP or open books principle are applied.
- Weak: Contracting models are not or only rarely applied.

Quality management

Key aspects of a quality management system are the control of the customer-customer process (translate customer requirements, generate customer satisfaction), the management of the resources involved, the designation of responsibility or the responsibility of management and continuous improvement of all processes (Girmscheid 2010a). Due to the high amount of needed resources for a certified quality management system, this is not always the best solution, especially for small enterprises. However, the continuous improvement and documentation of processes and structures are also of great importance for typical SMEs. In micro-enterprises, the degree of documentation must be questioned with respect to the efforts needed for it. It is important that in the construction process the quality of construction output is always agreed with the customer.

Derived maturity level:

- Strong: A suitable QM system or an appropriate CIP (continuous improvement process) has been implemented and is effective.
- Intermediate: A suitable QM system or an appropriate CIP (continuous improvement process) has been implemented but is only effective to some extent.
- Weak: A suitable QM system or an appropriate CIP (continuous improvement process) has not been implemented.

Revenue streams of the company

Revenue streams can be divided according to different

types, such as purchase price, instalments or shares of turnover (Osterwalder 2010). The latter is gaining more and more importance in the construction industry. The general rule in determining the price is that customers benefit and corporate interests should always be in balance. It is typical for the construction industry that construction companies have in many cases problems with payment delays or denials. The problem often arises in the early stage of the contract design, if instead of an agreement about supplements only partial payments are defined. Another problem is that often the liquidity of the client is not evaluated beforehand. A good measure to obtain revenue streams are third-party guarantees.

Derived maturity level:

- Strong: Sources of income are known for each project. Due to the good financial planning, profits are constantly obtained.
- Intermediate: Sources of income are known for each project but no constant profits are obtained.
- Weak: At contract signing, sources of income are only considered limitedly and therefore assets are only rarely obtained.

Project cost structure

The project cost structure determines the profit, as all fixed and variable costs incurred in the company, will be accounted accordingly (Osterwalder 2010). "Unavoidable costs" ("fixed costs") include rents or personnel costs. "Variable costs" (e.g. transport costs) are based on the quantity sold. Overhead costs should be distributed to the different projects in a construction company as in any company. Especially for smaller companies this is mainly done in a poor manner as a project cost structure persecution is not implemented.

Derived maturity level:

- Strong: The cost structure of projects is always mastered.
- Intermediate: The cost structure of projects is mostly mastered.
- Weak: In the past, pricing often has not been correct. Supplements or losses within the balance of projects become the standard.

Conclusion and next steps

Given the comprehensive literature review and the feedback from the industry, many aspects have been elaborated in detail. Since the assessment was aimed to be lean, only the main design fields in the construction industry were taken into account. It also represents the consensus on European level as this work has been created within a recently finished European research project. By establishing this, managers of medium-sized companies can take advantage of the tool in the future as it allows a "health check" of the business model in their company. The assessment framework aims to reduce the complexity of a business model and addresses managers (especially those with a technical background instead of an economic or management background) in construction companies and makes the user of our tool aware of significant levers in a typical business model. The tool should help practitioners to reduce the hurdle of business model assessment for them. However, it has to be pointed out that this framework can be only a starting point but is not able to replace a detailed assessment of the business model or professional consulting. The detailed assessment is needed in any case before changes and adoptions are made.

Now as the validation of design fields and assessment criteria is completed, a web-based application is being developed. The results of the assessment will be made available to the participants via a report function. An urgent need for action in relation to the individual building blocks of the Osterwalder Canvas will be highlighted by a colour code (red, yellow, green) in the report. In this way the web-based self-assessment is an easy and valuable tool to get first main levers in order to improve business models in the construction industry. In the future, a broader validation will be necessary. The broader validation will also allow receiving empirical data on the applicability of the presented approach.

A first version of the tool is already available on: <http://plm.iao.fraunhofer.de/newbee/HomePage1.aspx>.

In the next stage of this process the web-tool will allow to test the solution with additional stakeholders, and thereby will help to refine the solution again.

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