

INNOVATION STRATEGY: CHOOSING A CENTRAL OR DECENTRAL APPROACH IN CONSTRUCTION BUSINESS?

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ABSTRACT

A construction process is often complex and requires a large number of skills and responsibilities, which can be organized in different ways. Construction companies differ in their philosophy in how to manage and control the construction processes effectively and efficiently. It seems that their organizational structure and its control systems create different organizational cultures that influence the way a company functions. In this paper a comparison is made between the organizational cultures of two Dutch construction conglomerates, and it discusses its implications for organizational learning and the ability to innovate. The analyses and outcomes are based on several in-depth interviews within both companies, companies (A) and (B).

Construction company (A) is centrally controlled; decisions are made centrally in the aim to maximize efficiency and reliability. The organization of the construction process is tightly structured in a hierarchical way, and responsibilities are well defined. The employees are judged on the way they fulfill their tasks.

Construction company (B) is organized differently, authority is decentrally organized and the headquarter merely guides and supports. Within this company, construction processes are managed by people with broad responsibilities that overlap. The organization is kept together by mutual trust and loose control, employees are highly involved by what is happening within the organization.

Both construction companies have invested in facilities to support organizational learning. The different organizational cultures result in a different organizational development and innovative opportunities. Company A's innovation activities are shed away from production activities which improves the development of specialised knowledge. Company B's decentral and integrated approach to innovation development ensures that the company as a whole develops a dynamic and innovation oriented culture.

Keywords: Culture, Centralization, Decentralization, Construction business, Innovation.

1. INTRODUCTION

This paper investigates the perspectives of two large Dutch construction contractors known for their effort to innovate. However, both firms have obtained different strategies and organizational structures to reach their innovative goals. Within the analysis, implications connected to the firm's strategic and structural decisions are uncovered.

With this paper, insight is provided into how two firms try to tackle a few basic problems of the construction industry and how they have implemented their innovation strategy. These basic problems are: innovation management, culture, functional integration, learning and competence development. These problems are longstanding and are connected with the development of the industry as a whole. The Dutch construction industry is a moderately dynamic industry. The structure of the industry is stable and changes occur relatively linear and predictable. It is for this reason that the construction industry is generally seen as a conservative one in which developments go slowly. The two Dutch construction firms that are dealt with in this paper possess a more than ordinary proactive attitude, still they face many difficulties. The firms struggle to combine a performance oriented organization with an active market stance and innovation.

Construction contractors are production driven companies that focus on efficiency and aim to control the risk of their projects. In addition, as construction principals cover a large percentage of the industry's sale and employees, they influence the way construction takes shape. The development of the construction process is an extensive and time-consuming activity that is important for the quality, and the cost and time efficiency of the industry as a whole. The relatively slow development of the construction process is deeply rooted; it is reflected in the industry's decline in construction value-added as a proportion of GDP over the last 25 years (Gann, 2000).

It is a paradox that construction contractors are often efficiency-driven organizations but do not prioritize full attention to the development of their most important process. Optimization does primarily take place within subunits responsible for only a part of a project. This results in overall sub-optimization, because successful construction process management requires the cooperation of numerous subunits, possibly from different companies, with distinct responsibilities and competences. It is the involvement of these many different competences and skills that makes development difficult. Currently knowledge-exchange processes and innovation are not stimulated within construction projects due to differing organizational cultures. Innovation within projects depends for a large part on the construction contractor's innovative competences and culture. The construction contractor is a dominant party during a construction project as it is the systems integrator and manages the process in which the construction takes place. For this reason, construction contractors are the focus of this paper.

Poor communication and ambiguous project information is a weakness of the construction industry (Jones and Saad, 2003). The construction industry is a short term, project, and result oriented industry that does not allow much slack. For this reason, innovative ideas are sometimes crippled before they reach full development.

Therefore, innovation in construction requires strategic support and involvement from management levels.

This paper provides two case-studies with contrasting perspectives of how innovation can be put on the strategic agenda of a construction conglomerate: A *central* and a *decentral* innovation-approach.

In the case-studies within this paper the organizational structures and leadership styles are described and analyzed, including learning routines of the two differently organized companies. To emphasize the findings of these case studies, theory has been blended together with insights from practice. This paper's research results are presented in the discussion-section. To accentuate the lessons from our practical research, findings are concentrated in a conclusion-section.

2. BACKGROUND AND METHODOLOGY

This paper is the result of a research project that is undertaken in the year 2005 for the Dutch research organization PSIB (PSIB, 2003). PSIB initiates and supports research on innovation in the Dutch construction industry. The organization emphasizes process and system innovations that have a profound impact on the industry's progress. Our project focused on the conditions that a construction firm should create in order to become a sustainable innovative firm. The project focused on the organizational cultures of construction firms that have shown promising innovative behavior.

The selection of case firms was a decisive step in the development of knowledge from case study research. A selection was made of fourteen cases as the population to base our research findings on. The selected cases determine the generalizability of findings and the external variation that is brought into the research (Eisenhardt, 1989). When knowledge is developed based on case study research, cases should not be chosen at random. Through a number of steps, we tried to find the best practice companies of the Dutch construction industry.

Construction companies were selected that have received recognition with International and Dutch innovation and/or construction prizes. However, we were unsure whether the prizes were awarded to the companies that possess the most innovative organization forms, because these prizes are often awarded on rather 'soft' grounds. To narrow down our population of companies, the companies were tested on six harder criteria, such as:

- *uniqueness of innovation;*
- *corporate importance of innovation;*
- *return on investment from innovation;*
- *development of innovation and strategic advantage from innovation;*
- *number of innovations;*
- *innovativeness compared to market.*

The final selection of fourteen companies was done with the help of four experts with longstanding professional experience within the Dutch construction industry. Four of the fourteen selected companies were subject of a more thorough investigation by in-

depth case-studies on company-level. This paper represents the findings of two of these case-studies, being both within large Dutch contractors. Within these two construction contractors, we conducted a number of semi-structured interviews at strategic and operational levels. The interviews were undertaken by a researcher and a scholar experienced in the industry. The interviews were preceded by document analysis on the companies' strategy and key projects that were the subjects of the interviews.

3. INNOVATION DEVELOPMENT AND COMPANY CULTURE: TWO CASE-STUDIES

Introduction of the two companies A and B

Company A is one of the largest integrated construction contractors of the Netherlands. The company is active in housing and utilities construction as well as the development and realization of infrastructure. The company is structured around over 30 subsidiary-companies, all situated in the Netherlands. Complementary, the company possesses an advice and services division that includes an advice and engineering company. Innovation is undertaken in centrally structured companies that serve the 30 subsidiaries with new knowledge and skills. The company distinguished oneself with new concepts that bring new ways for using the Netherlands' scarce land surface, such as bridge-shaped office buildings, floating greenhouses, etc.

Company B is also one of the largest construction contractors of the Netherlands; moreover it has also activities abroad. Activities are organized in a network of more than 20 independently operating development and production companies situated in the Netherlands and abroad. The company is active in housing and utilities construction. Company B manifests itself as a precursor of process developments with a decentralized innovation development approach. For a number of years, the company has invested in integral process management courses for all of its managers.

The two companies A and B are compared on the following three key-issues:

- *Innovation management;*
- *Culture and organizational integration.*
- *Organizational learning and competence development.*

Innovation management

Within construction, a strong polarization between exploitation and exploration is present. The exploitative activities of construction emphasize results, certainty, a short term orientation, and a tight schedule. The nature of these activities is in contrast with explorative activities characterized by search, variation, risk taking, experimentation, play, flexibility, discovery, and innovation.

As e.g. James March (March, 1991) believes, organizations that engage fully in exploitation and exclude exploration are likely to find themselves trapped in suboptimal stable equilibrium. Both exploration and exploitation are essential for organizations, but they compete for scarce resources. Especially for production focused construction contractors, it is hard to combine explorative activities with daily efficiency driven routines. Choices must be made between gaining new information and improving future returns which involve the allocation of resources to the search of

uncertain alternatives, and using the information currently available to improve present returns (March, 1991). Exploration will reach a higher priority when one is not satisfied with its current results.

Both company A and B have created organizations active in research and development of new knowledge and practices. However, it is especially the *evolution of new conceptual ideas*, in which company A and B differ:

- Company A has a special business development company that signals new market developments and trends. Its trendwatching function has to make sure that market-chances are detected and taken up quickly. Company A has separated its knowledge creation activities and its production activities within different organizations.

The management of the Business Development: *“Production companies are insufficiently equipped to quickly react to new developments in the market.”* And further: *“Business development is especially active in the pre-development of innovative projects with advice, analysis and research. The realization of innovative projects is done with the help of other innovation focused organizations. At the beginning of 2004, we made the decision to separate all innovative activities from the production companies.”* For the infra division, the pre-development is done by Business Development, the development of innovations that are closer to operational activities are developed within Spatial Development, and realization is done by the production companies themselves. This has resulted in a clear separation between exploration and exploitation within the total organization.

The advantage is e.g., that the ideal circumstances can be created for the specific goal of the organization. Innovation activities obviously require a different atmosphere, dynamism, culture and people, as Tijhuis described (Tijhuis, 2002a). The management of Business Development mentioned it as follows: *“It took some adjustment from the production companies; they were also used to develop some nice projects themselves. It was nice, but it cost them a lot of money to do these projects. We had to go ‘lean and mean’. When looking at the development of knowledge, culture, and dynamism, the separation proved successful. It are two completely different functional worlds.”*

- Company B, on the other hand, has a ‘Knowledge Centre’, tasked with the development of vision, strategy and guidance for the independent production companies. Knowledge Centre’s function is to stimulate innovation at operational level. Though, the organization develops new knowledge for e.g. collective purchase, performance measurement or 3D calculation and integral process management. Additionally, the organization has developed a process protocol for implementation by the production companies.

Knowledge Centre shares its knowledge through courses that are periodically held for all people within the production companies. The essence of company B’s approach is that the actual innovations that are focused on the production process, take place decentrally at the production companies. Knowledge Centre observes whether the production companies adequately assimilate the knowledge it develops and supports to narrow the gap between the actual and the aspired level of

operation. The essence of new knowledge creation is its translation to daily activities.

Knowledge Centre's managers provide courses, and strategically support the production companies; they also take care that the development of new knowledge is followed quickly by an implementation at the operational level. The implementation of innovations goes together with the development of its employees at operational level. The management of Knowledge Centre: *"It is a concern to make the aspired changes practical. The managers that play a role in the management of the construction process are properly trained. In this way we make steps forward together with the production companies."* The innovative progress that the company makes is limited to its employees at operational level. *"The innovative path that we are going through is connected to the development of our employees' consciousness."*

Results:

Company B strives for continuous innovation of the construction process at strategic and operational level, whereas company A has separated explorative activities from efficiency driven exploitative activities. Organizations that focus on exploitation and drive out variance increasing activities reduce an organization's ability to innovate and adapt outside of existing trajectories (Benner and Tushman, 2003). Innovation is a central engine of organizational adaptation. Company A's chosen innovation strategy has consequences for the cultural development of its production companies.

Culture and organizational integration

Innovation in construction requires the involvement of the entire construction process. It is through this entire process that a company creates value and can create distinguishable qualities. Different functional teams are involved in a construction process. When a construction process is adapted, it affects many people's activities. For this reason, the functions that are involved in construction need to cooperate and understand one another well, before sustainable process innovations can be created. Involvement in innovation and creativity can be facilitated by an organization's culture. Moreover, organizational culture and actively involved senior managers as visionary or mentor for innovation are primary distinguishing features for an innovative company (De Brentani, 2001).

Schein describes 'culture' as something that "manifests itself at three levels: the level of deep tacit assumptions that are the essence of the culture, the level of espoused values that often reflect what a group wishes ideally to be and the way it wants to present itself publicly, and the day-to-day behavior that represents a complex compromise among the espoused values, the deeper assumptions, and the immediate requirements of the situation" (Schein, 1996). Hofstede describes organizational culture as the collective programming of the mind which distinguishes the members of one organization from another (Hofstede, 1998).

It is very hard to get cross-functional teams to work well together, because each member has an own functional culture and, as a consequence, they have difficulty communicating with each other, reaching consensus and implementing decisions. People from different functional groups have difficulty in cooperating and learning

from each other because they have different goals, and more fundamentally, possibly assign different meanings to the same words.

Schein relates the learning problem to the lack of alignment among three cultures, two of which are based on occupational communities (Schein, 1996):

1. *the culture of operators;*
2. *the culture of engineering;*
3. *the culture of CEO's.*

1. The culture of operators: The operator culture is based on human interaction, and most line units learn through experience that high levels of communication, openness, mutual trust, understanding, and teamwork are essential to getting the job done efficiently. Most operations involve interdependencies between several elements of the process; operators must thus be able to work in cooperation (Schein, 1996).

2. The culture of engineering: An engineer represents the basic design elements of the technology underlying the work of the organization and has the knowledge of how that technology is to be utilized. Engineers often want the operators to adjust to the language and characteristics of the particular solution being implemented by them and are quite impatient with the operators' "resistance to change" (Schein, 1996).

3. The culture of CEO's: The executive worldview is built around the necessity to maintain an organization's financial health and is preoccupied with boards, investors, and the capital markets. The perception that they have to manage the organization from afar ensures that they start to think in terms of control systems and impersonal routines.

The differing worldviews of the three organizational cultures can cause ineffective communication and understanding. Operators, engineers and executives think differently and accordingly all too often do not understand each others' problems. An important consequence of this conflict is the less than efficient flow of knowledge through the organization. In construction, a number of different functions need to cooperate before innovations are fully adopted, functional integration therefore is highly important.

- Company A's central innovation and decentral production activities ensure that both organizations develop separately. The organizational cultures of these separate organizations cannot influence one another. Communication between engineers tasked with innovation, and operators' working at the production companies is only targeted to express needs for new knowledge. The functional communication prevents that the engineers from influencing the culture at operational level. As a result, the adoption of specialized knowledge at operational level is not optimal.

The executive level is involved in the innovation activities of the company. The top management invests heavily in innovation and develops an innovation vision that binds and stimulates the entire organization.

The company believes in the functioning of a free market. The production companies pay the knowledge developing organizations for the knowledge that they use and implement in projects. This strategy stimulates proactive entrepreneurship. It leads to a results oriented organizational culture. Director of

company A's engineer company: *"We have a fantastic structure and mutual internal cooperation that fits the market well. We keep each other sharp."*

The development of the employees at operational level is a bottleneck for the implementation of innovation at company A. The low level of synergy between the different functional cultures makes the cultural development at the production companies difficult. On the other hand, this functional separation does improve the efficiency and results orientation of the separate functional organizations.

- Company B's top management is convinced that the innovativeness of its daughter companies is connected with the cultural development that takes place within these organizations. In cooperation with a respected Dutch Business School, the company educates the management of its independent companies in integral construction process management. The management has the task to spread the knowledge through the operational levels of the company. The continuous development of the organization is facilitated by two-yearly excursions, organised to openly discuss operational effectiveness and problems. One of the topics discussed during these meetings is cross-functional communication.

The excursions showed that the solidarity within the company was good. Talking about one's problems in an informal and impartial environment improved camaraderie and mutual understanding. After one of these excursions, the management took the decision to cross out the role of the project leader; from that moment onwards project developer, engineer and constructor depended on each other. This led to better communication. After people learned how to deal with each other, efficiency and job satisfaction significantly improved.

This re-organization and broadening of employee roles initiated a cultural development within the daughter organizations. Not every employee accepted the organizational change with the same enthusiasm and energy. Inevitably, some people had to be replaced. At the moment, company B's independent companies have become energetic organizations that adopt innovations relatively quickly and show a proactive market stance. Company B's CEO assigns a lot of responsibility at low organizational levels: *"this is the CEO's style, this creates participation."*

Results:

Company A's (central) innovation strategy balances the development of general skills and specialised skills. Innovation and production both take place in a specific environment. Between these two functional worlds, communication is limited. The functional focus prevents people from influencing each other. Coordination of innovation and production activities is not optimal and the adoption of specialized knowledge at operational level is not easy.

Company B advocates a mix with guidance and vision from above with freedom at operational level. The (decentral) empowerment of employees at operational level and frequent communication between the different functions ensure that company B is a better integrated organization. As a result, the companies can relatively quickly implement innovations. Additionally, a greater involvement from people at the

different functions make sure that activities and newly developed ideas are well coordinated, which improved effectiveness and responsiveness of the organization.

Organizational learning and competence development

Actual innovation does only take place whenever developed ideas are profitably implemented at operational level. The market is dynamic; a sustainable innovative organization requires organizational learning. A sustainable innovative company learns and facilitates the continuous development of its employee's competences.

People can learn and improve their insight through interaction with one another. A learning organization is characterized by motivated units that are intimately connected to one another; social interaction is essential (Huber, 1991). The connection and motivation of subunits is highly important for the development of the construction processes where different competences and skills have to be combined to one effective process. Developers, designers and constructors all have their own distinct activities and communities of practice. These groups of people need one another to organize construction activities well; a better understanding of each other's activities and problems creates understanding and experiential learning through which the construction process can be improved.

Within communities of practice, groups of people are informally bound together by shared expertise and passion for a joint enterprise. These people share their experience and knowledge in informal, free-flowing, creative meetings that foster new approaches to problems (Wenger and Snyder, 2000). However, the collusion of people from different functional subunits requires effort. Without a support from the organization, the required involvement to learn from each other will not come about. Both case companies are innovative; though reach completely different levels of employee involvement.

The Hawthorn studies in the 1920's showed that employee involvement increases both productivity and motivation. Bessant and Caffyn showed that employees who receive good feedback and can monitor their own performance, are more effective (Bessant and Caffyn, 1997). For organizational learning, an effective intra-organizational transfer of knowledge and experiences is important; it is essential that people understand one another.

To sustain one's competitiveness, a company should develop learning routines to hone its employee's competences. Eisenhardt and Martin argue that experiential learning is an important learning mechanism for the development of competences, especially in moderately dynamic markets (Eisenhardt and Martin, 2000). Also in developing markets this is an essential practice, as Tijhuis described (Tijhuis, 2002b). Practice helps people to understand processes better and develop skills effectively. In this perspective, mistakes can play an important role in the evolution of skills. Experience in closely related but different situations is effective in sharpening competences.

- Within the knowledge creation companies, periodic gatherings for managers keep everyone up to date of the latest ideas and concepts. It is a way to inform everyone about innovations and create reception and enthusiasm for new directions. Generally though the company confirms that involvement in innovation is not excellent. *"Innovation touches everyone, but not everyone is yet involved. This still requires continued investment."*

Within communities of practice, several bi-monthly meetings are organized such as regional management meetings and regional commercial meetings. During the regional commercial meetings, market developments and the development of required competences are discussed. But during these meetings, regional managers also discuss their experiences with their current and past projects and talk about how managers can help one another.

Company A's executives believe that their separation of innovation focused activities has resulted in more effective competence development. *"Because of the separation, competence development is now structurally realised, but primarily at individual level."*

Strategically, the company develops its competences through cooperation with companies that internationally possess specialised knowledge. *"We do not have to develop everything ourselves. To sharpen our knowledge in new construction contracts we cooperated with a Spanish part that has extensive experience in this field."*

- Company B has organized its organizational learning at the level of the individual daughter companies. Four times a year organize the organizations sessions during which experiences from projects are shared and discussed. *"In this way the discussion with each other is stimulated and people can learn from each other."* With these sessions, the management tries to show that performances can be improved when people cooperate closely. Also, engineers and constructors are stimulated to become involved early to arouse cross-functional sharing of experience and insight. Cooperation between developers, engineers and constructors has needed time, but now people meet up with each other very frequently and informally. *"Some conversations are very short, others can be very intensive."*

To create a feeling of trust and corporate understanding, the management discusses and explains organizational changes twice a year. *"You have to talk to your employees and convince them of the changes. A behavioral change demands a conscious development."* Learning and proactive involvement is stimulated by the management. When an employee has developed him or herself or has had an above average input into the innovativeness of the organization, a bonus is given.

The knowledge and experience from the daughter companies is shared with a central database. This database is consulted by employees when they require more insight into an unknown topic. The digital system has to improve the prediction and calculation of costs and improve the quality of the end product. Little knowledge is centrally developed. Only highly specialized knowledge, such as 3D calculation, is centrally developed before employees at operational levels are educated during internally organized courses.

Within the organizations, communities of practice have been created at small scale. Engineers have their informal meetings and developers meet every Friday to discuss market developments and trends.

Results:

Company A organizes organization wide gatherings to improve the diffusion of new knowledge. Though, learning at operational level is not optimal as the development of specialized knowledge happens at a higher level within the organization. Operators are inspired with innovative ideas, but at the same time they are hampered in their development by an orientation on tasks and efficiency and possess a limited degree of freedom. It will be hard to implement process innovations.

Company B consciously aims at the development of its operational employees. Through open communication, stimulating management and a freedom to act, employees have been empowered to innovate the construction process of the organization. Frequent meetings ensure that experiential learning takes place within individual organizations.

4. DISCUSSION

The two cases described showed typical organizational cultures and examples of progressive operational development. Besides, the selected companies were willing to provide honest and unrestrained insight into their strategic and daily operation. The overall research included 14 companies and showed us that different strategies can lead to an innovative construction company. A few findings of the overall research deserve attention for further discussion:

- *Innovative construction companies are characterized by an organizational culture that involves its employees in the creation of added value through innovation. Key values are: market and customer focus, a long term orientation, and a participative leadership style aimed at empowerment.*
- *Innovative companies acknowledge a multidisciplinary approach. This approach helps them to develop competences to integrate concept development, design and realization.*
- *Competence development is stimulated by matrix-like organizational structures that stimulate inter-organizational cooperation and knowledge sharing between different disciplines.*
- *Innovative construction companies constantly develop their skills to structure and control their approach of integral product and process design.*

The two construction contractors described in this paper show pronounced visions to develop their culture and organize change. Investment in knowledge creation and innovation is a prerequisite for organizational development. However, it proves more difficult to arouse employees to implement innovations quickly and develop their competences. It requires a lot of effort before a company becomes a learning entity at different organizational levels. The case studies showed that it is highly important to invest in meetings and communication structures to get people at operational level together, understand one another, share experiences and learn how to improve the construction process.

5. CONCLUSIONS

This paper has investigated how two large Dutch construction companies have executed their innovation strategy. The case-studies showed a few things:

1. *Cultural development at operational level is crucial for the adoption and implementation of innovation.*
2. *Cultural differences between the innovation- and production-aimed organizations disturb communication and a quick implementation of new ideas and knowledge.*

Company A displays a control and efficiency focused strategy where new knowledge is created centrally in specifically created organizations. This creates good cultural conditions for the organization's different functions. The centrally organized innovation-activities (which are separated from production-activities) create strong focused organizations, where economies of scale are utilized. On the other hand, Company B's strategy is focused at employee development; which stimulates a quick adoption of new ideas and knowledge. Centrally, the company develops vision and conceptual ideas for innovation that have a guiding function for the development of the organization.

3. *Frequent communication arouses participation in innovation and stimulates knowledge development. In relationship to this, it often means that the culture of the people involved has to change; otherwise innovative developments hardly can be sustained.*

With the guidance and support from the top management, the independent companies are charged with the implementation and fruition of innovation. The management involves everyone in innovation through frequent communication, open discussions and education. Regular meetings (where people can freely share their experiences and voice their problems and concerns) facilitate the personal development and improve job satisfaction.

4. *The integration of the different functions decentrally in the organization creates a dynamic and energetic environment, that allows the individual companies to respond quickly to market changes.*
5. *The person-oriented culture provides an organization the ability to continuously learn and develop over time. This requires the active involvement of the employees, and a well developed organizational structure and leadership.*

To conclude, both *central* and *decentral* approaches for an innovation strategy display organizational advantages (e.g. efficiency innovation development vs. market responsiveness) that have long-term effects on the company's operation and development. This comparison between two typical innovation management strategies shows that a number of basics should be implemented to ensure the developed innovations are implemented effectively. The underlining idea is that it will be hard to implement innovations without also developing your organizational culture. Furthermore, companies A and B show practices that will stimulate the implementation of any innovation strategy. Company B shows that careful attention to employee development, together with employee empowerment, arouses employees to

implement ideas much faster. But, you cannot empower all innovation initiatives. Company A shows that basic innovation ideas are best developed at a higher, strategic organizational level. The company also shows that a strongly developed innovation vision is stimulating and provides a necessary alignment of goals.

The two construction companies that have been studied in this paper have both been innovative in the past few years. Company A has been able to develop a number of innovative business concepts such as floating houses. Additionally, the company gained publicity with a number of innovative asphalt types. A few new asphalt types are asphalt on a roller and a new noise reducing asphalt. Company B is known for its well developed construction processes, supported by 3D modulation systems. The company did receive an award for its harmoniously organized construction processes that did dramatically improve job satisfaction over the years.

Our research findings are based on a study of two Dutch construction companies. The small number of cases analyzed in this paper makes it hard to generalize its findings for a large number of Dutch construction companies. However, this research displays two cases where a central and a decentral organization of innovation are transparently observable and clearly shows the consequences of these choices. It are typical cases that show that these organizational decisions can have a long term impact on a company's development path. It are these consequences that provide construction companies with essential insight on how to develop an innovation strategy that can be effectively implemented.

6. ACKNOWLEDGMENT

The paper is based on a large explorative research undertaken in the year 2005: "Best practices of innovative behavior". This research is part of the national Dutch PSIB-Programme on Revaluing Construction (PSIB, 2003). The aim of the research was to investigate practices of innovative behavior. During the research, a number of conditions for innovations were identified and investigated more closely at four companies. Two of those companies are the subject of this paper. The research is limited to the Dutch construction industry. The authors wish to thank the PSIB and the companies involved for their willingness to participate into this research project. The Dutch reports can be obtained by contacting the authors.

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