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## **Designing and testing an OD intervention**

### ***Reporting Intellectual Capital to Develop Organizations***

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## **Designing and testing an OD intervention**

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This paper presents a design-based research study on the reporting of intellectual capital in firms. It combines the designing of an organizational development (OD) intervention with the testing of the intervention using an action research methodology. A growing gap between theory-based research and practice has been identified as one of the reasons for a lack of renewal in the field of OD. Design-based research (DBR) has been proposed as a methodology that can help bridge the gap between research and practice. The purpose of the paper is to illustrate what a comprehensive methodology for design-based research can look like and to demonstrate the type of OD knowledge this research can produce. The design approach is used to design and test a tool for the reporting of intellectual capital within firms as an OD intervention into the individual and collective sensemaking of managers.

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Organizational development (OD) seems to be in a midlife crisis (Bradford & Burke, 2004). Greiner and Cummings' (2004) history of the field shows a proliferation of topics, approaches and techniques that has blurred the boundaries of the field and made OD difficult to describe. They propose that OD redirects itself towards strategic problem solving in organizations by inventing new methods for attacking complex financial, operational, marketing, and competitive issues. At the same time there seems to be a lack of new ideas and methods. The well has gone dry and one of the reasons is a growing gap between theory-based research and practice (Bunker, Alban, & Lewicki, 2004; Heracleous & DeVoge, 1998).

Design-based research (DBR) has been proposed as a methodology that can help bridge the gap between research and practice (Romme, 2003; Van Aken, 2004). Advocates of DBR claim that this research can contribute to the development of organizational theory development and the enhancement of professional practice (Romme, 2003; Van Aken, 2005).

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In DBR the researcher designs and tests interventions and develops knowledge about the application domain of these interventions as well as knowledge about the underlying generative mechanisms for change. In designing the interventions the researcher can make use of the theories of theory-based research. Testing of the design will lead to practical results as well as a deeper insight into the validity and viability of the theory.

However, design-based research is not yet widely applied in OD studies and little empirical research has been done on its effectiveness. The purpose of the paper is to illustrate what a comprehensive methodology for design-based research can look like and to demonstrate the type of OD knowledge this research can produce. The paper describes a study in which I used design-based research to design and test a method for the reporting of the intellectual capital of firms. The method is an OD intervention into the individual and collective sensemaking of managers.

My argument is structured as follows. First, I describe the nature of design-based research. Second, I portray intellectual capital as a field that is closely related to OD. Third, I describe the paradigm that was used in the study. This paradigm consists of an ontology that combines embodied realism and social constructivism, an epistemology of pragmatism, and a methodology that involves action research. Then I present the key steps in the study to illustrate how the methodology works in practice and to demonstrate the kind of knowledge it produces. Finally, I draw conclusions about the benefits of the methodology.

## **THE NATURE OF DESIGN-BASED RESEARCH**

Authors use various terms to describe design-based research, including *design science* (Van Aken, 2004; Van Aken, 2005), *design research* (Collins, Joseph, & Bielaczyc, 2004; Romme, 2003), *design experiments* (McCanliss, Kalchman, & Bryant, 2002), and *design studies* (Shavelson, Phillips, Town, & Feuer, 2003). I follow The Design-Based Research

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Collective (2003) and prefer the term *design-based research* to avoid confusion with studies of designers.

Design-based research has been portrayed as a research methodology (Collins et al., 2004), a research dialect (Kelly, 2003), a mode of research (Romme, 2003), and a research paradigm (Van Aken, 2004; The Design-Based Research Collective, 2003). These authors have in common the scientific ideal of creating prescriptive knowledge in order to improve professional practice. This prescriptive knowledge should contribute to practice in the form of general solutions for real world problems; solutions Van Aken (2005) refers to as *solution concepts*. The prescriptive knowledge should also contribute to theory by highlighting the *generative mechanisms* that make the solution concept work. A generative mechanism is the answer to the question, “Why does this intervention produce this outcome?” (Van Aken, 2005). These authors also have in common that they adopt the metaphor of “design” to emphasize three elements of the research: (a) the researcher acts like a “designer” who uses existing knowledge about the way organizations work to create a “blueprint” of a solution, (b) these solution concepts are like designs that *consciously* and *explicitly* have been “designed” before they are used and that are “redesigned” several times to improve them, (c) these designs are tested to check their validity.

Is design-based research a paradigm or a research methodology? According to Denzin and Lincoln (Denzin & Lincoln, 2000) a paradigm includes: (a) ethics, (b) ontology, (c) epistemology, and (d) methodology. Advocates of design-based research share an epistemology rooted in pragmatism (Romme, 2003; Wicks & Freeman, 1998). However, they may differ in their ontological point of view. I believe in the ontology of embodied realism (Lakoff & Johnson, 1999) but alternative positions may include critical realism, historical realism, and relativism (Lincoln & Guba, 2000). In addition, Van Aken and Romme (2005) argue that researchers can draw from several different research methods to test the validity of the design, ranging from more positivistic quasi-experiments (Cook, 1983) to action research

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type interventions (Susman & Evered, 1978). This implies that design-based research may make use of a variety of methodologies.

This leads me to conclude that design-based research is neither a paradigm nor a methodology. Instead, I suggest design-based research can best be positioned as research aimed at answering a particular type of research problem: the *design problem*. Based on a review of literature, Oost (1999) identifies five possible research problems in scientific research. Each of these five types of problem can be constructed in two ways. A research problem can be constructed as an open, explorative question or it can be constructed as a closed question aimed at testing of a hypothesis. Table 1 provides an illustration of each of the 10 combinations of research problems.

----- Table 1 about here -----

Design-based research is research aimed at providing answers to design problems. A design problem can be phrased as an explorative question (How can we improve situation Z?) or a question aimed at hypothesis testing (If we do X, will it improve situation Z?) According to Oost a design problem is not a separate type of research problem but a combination of an evaluation problem and an explanation problem. Methodologically speaking a design is a prediction that can be written as:  $d: X \rightarrow Y$  (For domain d it is true that X will lead to Y) which is in fact an untested explanation: Y is caused by X. This prediction is an answer to an evaluation problem: what is a good solution for this problem?, or, what is the best means to this end? In design-research, the researcher needs to answer an explanation problem (Can X cause Y?) and an evaluation problem (Is Y a good solution for Z?)

From this it follows that in design-based research there are three possible design questions: (a)  $d: X \rightarrow ?$  (What are the effects of intervention X in situation d?); (b)  $d: ? \rightarrow Y$  (How can we achieve Y in situation d?); (c)  $d: X \rightarrow Y?$  (Is it true that intervention X leads to Y in situation d?) The first question calls for an explorative research approach to discover the

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impact of a particular intervention. The second and third questions are part of a research approach aimed at developing and testing solution concepts. In this case the question  $d: ? \rightarrow Y$  is answered by developing a tentative solution concept in the design phase and the question  $d: X \rightarrow Y ?$  is answered in the testing phase. Design-based research is a particular type of research that (a) is aimed at answering design questions, (b) that can be based on a variety of conceptions of reality, (c) that is based on a pragmatic epistemology, (d) and that can make use of different research methodologies.

## **THE INTELLECTUAL CAPITAL PERSPECTIVE AND OD**

The intellectual capital perspective builds on the resource-based view (Penrose, 1959) and the knowledge-based view (Grant, 1996) of the firm. It's origins can be found in the work of Sveiby (1989; 1997) and Edvinsson (1997). Both authors emphasize the role of people in organizations and the importance of releasing the human potential. Sveiby focuses on 'know-how companies', which have a different business model and risk profile and require a different management approach than industrial companies. Edvinsson looks at ways that 'human capital' can be leveraged through the 'structural capital' of the organization. Both build on the idea that in order to change the mindset of managers one needs to change the dominant instruments managers use to look at companies: the internal and external financial reporting mechanisms.

From the work of Sveiby and Edvinsson a genuine intellectual capital movement arose. The intellectual capital movement and the organizational development movement have at least three things in common. Both movements are driven by a dedication to create healthy, sustainable organizations (Porrás & Bradford, 2004; Edvinsson, 2002). Both are concerned about releasing the human potential in organizations (Bradford & Burke, 2004; Sveiby, 1997). And both apply a holistic view to organizations (Pike & Roos, 2000; Wirtenberg, Abrams, & Ott, 2004) to create sustainable solutions.

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The intellectual capital movement adds to OD a focus on influencing managerial and stakeholder sensemaking through the identification, measurement and reporting of intellectual capital. It is by using the language of numbers and money that managers, analysts, shareholders, and banks will understand that healthy and sustainable organizations are important. Traditional financial reporting only highlights the tangible and financial capital of a firm and encourages short-term thinking. By developing additional reporting mechanisms that highlight the hidden intellectual capital of a firm, companies can create insight into their future potential and long term sustainability, and redirect the focus towards the importance of human resource management and knowledge management.

Many methods have been proposed to report intellectual capital (Andriessen, 2003; Bontis, 1999; Bontis, 2001). However, little empirical research has been done into the effects of implementing these methods in practice. This study was set up to develop a tool for reporting intellectual capital, to test the tool in practice, and to make improvements of the tool in order to increase its effectiveness.

## **PARADIGM OF THE STUDY**

In this section, I describe the elements of the paradigm used in this study. First, I explain the ontology, epistemology and ethics applied in the research. Second, I lay out the methodology, which serves as an illustration of a research strategy for design-based research in which action research is used to test the solution concept.

### **Ontology, Epistemology and Ethics**

I believe there is a real world that exists independently of me and of which I can only have imperfect and incomplete knowledge. This world cannot be interpreted directly, but only subjectively through a process of sensemaking (Weick, 1979; 1995). Sensemaking is about making distinctions with words and their rules for use (Maturana & Varela, 1998) and using

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conceptual metaphors. Conceptual metaphors are crucial in sensemaking as they help to conceptualize our experiences with mental imagery from other domains, especially the domains of the sensor and motor functions of our body (Lakoff & Johnson, 1999; Richardson, 2000). Often we use several different, and sometimes contradictory, metaphors to conceptualize a particular concept. For example, the phenomenon of light is both conceptualized using the metaphor of “particles” and “waves”. The process of conceptualization can be seen as a process of mapping elements from a source domain (particle) onto a target domain (light).

The role of metaphor in our understanding of the real world is much wider than simply expressing literal similarity. Not only similarities and features are transferred from the source to the target domain but the target domain often gets its structure from the source domain. The application of conceptual metaphor often happens out-of-awareness (Lakoff & Johnson, 1999) and is part of the unconscious mental operations concerned with conceptual systems, meaning, inference, and language. Conceptual metaphors are what makes most abstract thought possible. However, all conceptualizations we use are bounded by our body because our fundamental forms of inference arise from our sensorimotor and other body-based forms of inference. Hence the term *embodied realism* for this ontology (Lakoff & Johnson, 1999).

The social world of human action and interaction, including the world of organizations, is different from the physical world of nature. The social world is the array of nonphysical phenomena produced by interacting human beings constantly involved in a process of sensemaking. Therefore, the social world does not behave according to general laws, and the interpretation of its behavior is a problem of *equivocality* (Weick, 1995). Furthermore, the social world, as such, does not “exist”; human beings continuously recreate it through language (Mumby & Clair, 1997). The social world can take almost any shape, depending on how one chooses to look at it (Gergen, 1999). Consequently, the social world can be conceptualized by a large number of sets of distinctions and metaphors.



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This ontological standpoint of embodied realism and social construction has consequences for epistemology. Because we only can know reality through conceptualization, the correspondence theory of truth does not hold (Lakoff & Johnson, 1999; Smith & Deemer, 2000). We cannot judge whether a particular conceptualization of the world is true by looking at that world and checking whether there is correspondence. What we *can* do is act upon our conceptualization of the world and check whether this produces expected or desired outcomes, using a pragmatic criterion of truth (Wicks & Freeman, 1998; Worren, Moore, & Elliot, 2002). This is in line with Perkins' (1986) idea of *knowledge as design*. He describes knowledge as a tool to get something done. We can check the validity of this tool by checking whether the knowledge creates the results we expect. We can do this by using the knowledge to design a solution to a problem and test the solution in practice to see if it works.

I agree with Wicks and Freeman (1998) that ethics play a crucial role in organization studies. I believe that scholars in organization studies should use inquiry as a vehicle to help people lead better lives. Developing prescriptive knowledge requires ethical considerations. As Wicks and Freeman state "Any attempt to provide direction to corporations (e.g. firms should do x and not y) are at some level moral endeavors" (p. 124).

## **Methodology**

Figure 1 gives an overview of the methodology of the research. The dual purpose of design-based research of contributing to theory and practice materializes in two distinctive but interwoven streams of inquiry. The objective of the *knowledge stream* is to develop generalizable knowledge that can help create desired situations (Romme, 2003), preferably in a way that contributes to theory (Collins et al., 2004; Eden & Huxham, 1996). The objective of the *practice stream* is to contribute to the practical concerns of people in problematic situations, by solving particular problems in specific circumstances and creating healthy organizations.

----- Figure 1 about here -----

In this study I used the action research approach as described by Susman and Everet (1978) to test a solution concept. There are many different types of action research (Kemmis & McTaggart, 2000). Susman and Everet adopt a specific interpretation of action research that fits the purpose of testing solution concepts. They state that action research has six characteristics: a) Action research is future oriented, aimed at creating a more desirable future. b) Action research is collaborative, creating interdependence between the researcher and the client system. c) Action research implies system development, generating mechanisms for problem solving in the client system. d) Action research generates theory grounded in action by applying theory in diagnosing situations and developing interventions, and by evaluating interventions to test the underlying theory. e) Action research is agnostic, acknowledging that every situation is unique and may require reformulation of previously developed interventions. f) Action research is situational. Susman and Everet propose a cyclical process of action research as shown in the practice stream of figure 1.

The steps in the methodology were as follows (see figure 1):

1. Theorizing. I employed theory to develop a conceptual framework about the intellectual capital of organizations.
2. Agenda Setting. I drew on this framework to define a research problem, which I phrased as a design problem: how can we determine and report the value of the intellectual capital of an organization in such a way that this information helps to solve organizational problems?
3. Designing. A design team, of which I was a member, developed an initial solution concept applying the design cycle. The design circle consists of four steps (Andriessen, 2003): (a) specifying the intended application domain that consists of the class of problems the solution concept needs to address and the class of contexts to which it

should be applicable, (b) listing the requirements for the solution concept (functional requirements, operational requirements, limitations, and limiting conditions), (c) designing a draft solution concept, and (d) evaluating the draft against the application domain and requirements.

Implementation teams tested this solution concept in the practice stream and applied progressive refinement to the design (Collins et al., 2004) using a multiple developing case-study approach (Van Aken, 2004). In four cases, I was a member of the implementation team and in two cases I was not. This helped to check whether the quality of implementation of the solution concept depended on the knowledge of the designer of the concept. Van Aken (2004) refers to this procedure as  $\beta$ -testing.

----- Table 2 about here -----

I selected three cases that fitted the intended application domain of the solution concept: small and medium sized knowledge-intensive businesses covering three industries. Three other cases functioned as *polar types* (Eisenhardt, 1989) to the small and medium sized businesses that highlighted contrast and provided additional information about the application domain: a large professional services firm and two departments within larger firms. Table 2 provides an overview of cases. The testing phase of the study started with step four.

4. Diagnosing. A crucial phase in the practice stream is diagnosing the practice problem. The problem of a case in the practice stream is different from the research problem in the knowledge stream. The practice problem is a problematization of the situation in a particular case for which the solution concept is a possible solution. For example, for one of the case study firms (Bank Ltd.) the problem was how to give the holding company of the bank insight into the bank's intellectual capital so that a nonintervention policy on behalf of the holding company could be agreed upon. This practice problem called for a specific solution that could solve a particular problem, while the research problem of the

study asked for a solution concept that is applicable in a range of situations. The implementation team used the conceptual framework of intellectual capital to structure an intake-interview with the manager of the subject organization (the client) in order to diagnose the situation. At this stage, it was important to check whether the practice problem matched the application domain for which the solution concept was designed.

5. Action planning. In each case the action-planning phase involved identifying specific requirements and developing a specific design in a reflective conversation with the situation (Schön, 1983). The aim was to develop a tailor-made solution.
6. Action taking. In the action-taking phase, the implementation team implemented the specific design and presented the results to the client. In most cases, the explicit result was a report describing the value of the intellectual capital of the client. During the implementation process, the team gathered research data using interviews, participatory observation, and document analysis.
7. Evaluating. The implementation team evaluated the process and outcome of the project with the client. I was able to evaluate again after two years in four cases, in order to assess the long-term impact of the solution concept.
8. Specifying learning. At the end of each case, the team evaluated the project within the team to specify the lessons learned.

The practice stream ends with step eight. In some cases the implementation team needed to go back to step four or five to change the diagnosis or alter the specific design. After step eight, I continued with the knowledge stream, reflecting on the implications of the case for the solution concept (step 9).

9. Reflecting. The next step was to reflect on the results of a particular case using within-cases analysis (Eisenhardt, 1989) in terms of the success of the solution concept and the possibilities to improve it through redesign. Most cases led to alterations of or additions

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to the solution concept. Implementation teams tested each redesign in the next case, except for the alterations that resulted from the last case.

10. Developing knowledge. The final step was to do a cross-case analysis (Eisenhardt, 1989) to analyze the indications and contra-indications of the solution concept. In addition I used a cross-case analysis to identify underlying generative mechanisms for change, in an attempt to contribute to theory development (Eden & Huxham, 1996).

Ideally, steps 3 to 10 are repeated several times with adding new cases until the point of theoretical saturation is reached (Eisenhardt, 1989). However, because of time and resource constraints this level of saturation was not achieved in this study.

## **FINDINGS**

In this section, I present the findings of my study to illustrate three distinct stages in design-based research: designing the solution concept (steps 1-3), testing the solution concept (steps 4-8), and developing design knowledge (steps 9-10).

### **Designing**

The concept of intellectual capital is based on the metaphor of “knowledge as a resource” and “knowledge as capital” (Andriessen, 2006). Using this metaphor allows one to treat knowledge, and other intangibles, as “physical” resources. It is then possible to control, manipulate and manage these resources. The design team developed a tool to help managers view their company as a “stock” of (valuable) intangibles, with the intent to use this tool to influence managerial sensemaking and contribute to organizational learning (Akgün, Lynn, & Byrne, 2003). The idea was that a change in managerial sensemaking would result in better and more sustainable management of these intangible resources.

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This type of intervention is not of the stimulus-response variety. Instead, members of the target organization are considered sensemaking individuals who determine their own actions, based on their individual interpretation of the situation, and their personal and collective aspirations. As Susman and Evered (1978) phrase it:

The interventions of concern ... are acts of communication between two or more self reflecting subjects, requiring mutual understanding of the meaning of the acts and common consent as to their presumed consequences. Such interventions have an element of surprise or unexpectedness to them so that they are unlike other actions routinely undertaken within the organization.... The element of surprise evoked by an intervention results when the change agent offers members of the target organization a new way to conceptualize an old problem and offers it in a language or framework that differs from that by which members of the organization define their present situation. (p. 593)

In this study the purpose was to develop an intervention in the form of a cognitive tool (Worren et al., 2002) aimed at influencing the way managers make sense of their company. I did this by offering managers new concepts and new information, based on an intellectual capital perspective of the firm. The intellectual capital perspective was thus used as a symbolic construct (Astley, 1984) to help balance traditional management accounting information, which focuses on the past, the short term, and on the tangible and financial assets of a firm, and to create a long-term, holistic perspective on the firm.

The solution concept itself was comprised of an object design and a realization design (Van Aken, 2004). An object design is the design of the tool itself and the realization design is the plan for its implementation. The object design consisted of five elements. The first element was a way to identify the strategically important intangibles of a firm by identifying the firm's core competencies (Leonard-Barton, 1992; 1995) and separating them into their

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underlying stocks of intangibles: skills and tacit knowledge, collective values and norms, technology and explicit knowledge; primary and management processes, and endowments like brands and networks. The second element was a way to assess the value of these core competencies by looking at their added value, competitiveness, potential, sustainability, and robustness. This checklist was based on Hamel and Prahalad's (1994) criteria for a core competence. The results of the checklist were presented as "traffic lights" with red indicating a low score and green indicating a high score. The third element was a financial valuation of the core competences. The design team used an income approach (Reilly & Schweih, 1999) that estimated the expected contribution margin of each core competence. The fourth and fifth elements were a *management agenda* highlighting potential improvements to the management of the intangibles and a *value dashboard* summarizing the results.

The design team also developed a realization design that was used to implement the object design. This design consisted of a series of interviews with members of the client organization, two workshops with members of the management team, and a presentation of the report to the management team.

## **Testing**

Six implementation teams subsequently tested the solution concept at six different cases. The success of the tool in solving the practice problems of the firms involved was limited (see table 3). In two cases the limited success was the result of poor implementation by the implementation team. At Bank Ltd. the implementation team stopped the implementation process before it was finished because the team ran out of funding. Although the process was never finished, the end report *was* used in the decision-making process about Bank Ltd.'s independence. According to the CEO of Bank Ltd., the contribution of the report to the decision of the holding company to sustain the independence of the subsidiary was limited. At Automotive Ltd., the manager/owner of the company stopped the process because of other

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priorities. He did not feel the implementation process produced enough useful results. Here the implementation team failed to produce enough concrete results in time to maintain the owner's sponsorship.

-----Insert Table 3 somewhere here-----

In four cases the implementation was successful. However, only in the case of Consulting Department the practice problem was solved. There was a management buy-out and the department became a successful, sustainable, independent company. The manager of Consulting Department acknowledged the value of the tool by indicating that it had been very important in facilitating the discussion about independence. The implementation team and the tool had helped to make explicit important considerations for the management buy-out. In three other cases where the implementation was successful, the problem was not solved. Although the general manager of Electro Ltd. had been very satisfied with the results of the test at the time of the final presentation, circumstances beyond the implementation team's control changed the situation completely. It turned out Electro Ltd. had a severe cash flow problem. This problem became urgent just after the project was finished. This cash flow problem was never solved and the company went bankrupt. The implementation team had not noticed this problem in the diagnosing phase and, in a sense, used the reporting tool to solve the wrong problem. At Logistics Services BU, a similar thing happened. The reporting tool contributed to the decision to effect a management buyout. However, in the end, key players decided not to join the new company and the buyout was canceled. According to two participants, the tool contributed to the decision to do a buy-out. The process created enthusiasm and energy within the group. The reporting tool helped to develop a proper business case because it created insight into the core competencies of the business unit and their strengths and weaknesses. At Professional Services LLP, the implementation was successful but the implementation team discovered that the tool did not produce the right information about the intangible resources of the firm to report externally. The information



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was too complicated to report to a non-informed audience and lacked robustness. Despite the intention, the data was never part of Professional Services LLP's annual report.

### **Developing OD knowledge**

This study generated OD knowledge in three areas. First, it provided indications about where the reporting tool works and where it does not work. These indications and contra-indications (Van Aken, 2004) both limit and extend the application domain of the solution concept. Second, the study illustrated what type of interventions can be useful when reporting intellectual capital in a firm. It also provided insight into the generative mechanisms for change that make these interventions work. Third, the study provided clues as to how the solution concept itself can be improved further. Given the purpose of this paper I think it is important to focus on the first two points. I present the results as hypotheses that require further testing because in this study the point of theoretical saturation was not reached. The purpose is to illustrate the type of OD knowledge DBR can produce.

#### ***Indications and Contra-indication for the Application Domain***

The study provided insight into the application domain of the solution concept. The application domain is the class of problems for which the solution concept can be a potential solution and the class of contexts in which it is likely to work. In three cases, I found that the tool was a useful instrument for helping improve the way a company is managed. What these cases all had in common was that all three companies were reconsidering their position and that management wanted to develop a sustainable and healthy future for the company based on the strengths of the company's intangible resources. However, management of these companies did not precisely know the strengths of the company and wanted insight into the company's future potential. In this situation, it proved useful to identify the intangible

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resources, assess their strengths, and determine and report their value. This leads me to formulate the following hypothesis about the class of problems the tool addresses:

Hypothesis 1 (class of problems): The tool can help in solving problems of future orientation and strategy development by helping to create resource-based strategies for companies that lack insight into, or are insecure about, the intangible resources that make these companies successful and help to determine their future potential.

The tests showed that the tool works for knowledge-intensive, middle-size companies employing from 50 to 1,000 employees. The tool also seemed to work with smaller units within larger organizations. Tests also illustrated the tool can be used within companies bigger than 1,000 employees, providing that the analyst focuses on the core competencies of the company that different departments have in common.

The tests in which the tool failed to produce a result provided indications that the following conditions must be fulfilled to ensure a successful implementation: The company must have an issue about its future direction. Management of the company must have a certain willingness to reflect on the organization and to critically review the organization's strengths and weaknesses. Management must have enough time to participate—at least be able to join in the interviews and visit the presentation of the final report. Finally, management must have the willingness, as well as the mental ability, to look at the company from an intangible perspective. These findings lead to the following hypothesis about the class of contexts of the method:

Hypothesis 2 (class of contexts): The tool is especially suited for knowledge-intensive, middle-size companies (regardless of their industry) that have an issue about their future direction, and whose management has the time, the mental capacity, and the willingness to review critically the company's strengths and weaknesses using an intangible perspective.

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The tool can be used with smaller units within larger organizations. It can also be used at bigger companies, providing the analyst focuses on the overall core competencies of the firm.

### ***Interventions and Generative Mechanisms***

The study produced a number of insights into designing interventions around the reporting of intangibles and the generative mechanisms for change that make these interventions work. To illustrate these insights I highlight three findings that are of particular interest from an OD perspective. The first is about the positive energy that the tool can produce in a management team through a process of appreciative framing. The second finding is about the role of financial valuations in attracting management attention. The third is about the power of visualizations.

#### APPRECIATIVE FRAMING

As previous OD research has shown, highlighting the positive, constructive aspects of organizational life instead of the problems can be a powerful tool for change (Akin & Schultheiss, 1990; Bushe & Kassam, 2005; Cooperrider & Srivastva, 1987; Watkins & Mohr, 2001). In appreciative inquiry highlighting the positive is used as a way to facilitate conversations. The solution concept in this study is a form of appreciative *framing*. Appreciative framing is a way to frame and present reality in a positive way. The solution concept helps to emphasize the things that make a company unique and successful. The tool helps managers to search for the combined power of intangible resources. It helps conclude the way individual intangible resources contribute to a company's uniqueness and cumulative capabilities. It helps identify which resources are important and how they contribute to company success. In the study, discovering core competencies created energy among the participants, evoked a sense of pride and opened up the mind of participants for new opportunities. The list of core competencies provided a common language to the members

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with which to discuss the future of their company in a new light. When I interviewed managers at Bank Ltd. and Consulting Department two years after the event, I could still hear elements of that new language. These findings lead to the following hypothesis about the instrument as a tool for appreciative framing:

Hypothesis 3 (Generative mechanism): The tool is successful in creating energy with members of an organization because it uses a mechanism of appreciative framing to provide a new and positive view of the company, to develop a common language that can explain the company's success, to install a sense of pride, to boost self-confidence, and to identify new opportunities.

Manning and Binzagr (1996) formulate the mechanism of appreciative framing as “What we assume to be real and possible in organizations becomes the organizational reality that we create” (p. 280). However, they also highlight a condition for success: “To do so requires that individuals in an organization be willing to re-examine their operating paradigm and redefine organizing assumptions” (pp. 280-281). At Automotive Ltd this condition for success became apparent when the implementation process stopped because the owner/director was not willing to re-examine his view on the organization.

#### ATTRACTING MANAGEMENT ATTENTION WITH FINANCIAL VALUATIONS

The financial valuation of the intellectual capital of the firm highlights the importance of these intangibles. Financial numbers resonate within the sensemaking system of managers. Both the CEO of Bank Ltd. and the manager of Consulting Department acknowledged the importance of the monetary value figure in conveying the significance of intellectual capital to other stakeholders. The manager of Consulting Department phrased it as follows: “Within the financial services industry, people speak the language of money. If something has no monetary value attached to it, it is not considered important” (R. Van der Weijden, personal communication, October 28, 2002).

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The added value of financial valuation of intellectual capital lies in the fact that numbers attract management attention. This finding is in line with the view of Mouritsen et al. (2001) about the importance of indicators in intellectual capital statements. They state that these indicators are especially important because they demonstrate seriousness on the part of top management. These findings lead to the following hypothesis about the mechanisms that make the financial valuation work:

Hypothesis 4 (Generative mechanism): The financial valuation of intellectual capital contributes to the success of the tool because the monetary value of intellectual capital emphasizes the absolute importance of these resources to company success and helps to attract management attention.

#### POWER OF VISUALIZATIONS

Warren et al. (2002) argue that knowledge can be represented in three modes: propositional, narrative or visual. The solution concept in this study used the propositional mode but also contained a visual value dashboard whose comprehensiveness helps to convey the outcome of the tool in one picture. This picture presents the value of the core competencies and the total value of the strategically important intangibles. In the picture “traffic lights” highlight the strengths and weaknesses of the core competencies. These findings lead to the following hypothesis about the mechanisms that make the value dashboard work:

Hypothesis 5 (Generative mechanism): The value dashboard contributes to the success of the tool because it helps to communicate the findings in an effective and comprehensive way by providing insight into the strengths, weaknesses, and value drivers of core competencies in one comprehensive picture.

This hypothesis is in line with findings from Smith and Taffler (Smith & Taffler, 1996) who found that participants in an experiment made quicker, and more accurate decisions

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about companies if accounting information was accompanied by facial features which helped to illustrate “healthy” or “distressed” companies.

## CONCLUSION

This study confirms earlier findings by Halman and Keizer (1994), Weggeman (1995), and Verweij (1997) that a methodology combining design-based research with action research testing, can be a useful way to create business knowledge that is both relevant and rigorous. DBR can help bridge the gap between theory-based research and practice in OD. To create this bridge it is helpful to distinguish between the knowledge stream, in which the solution concept is designed and reflected upon and that is aimed at developing generalizable OD knowledge, and the practice stream, in which the solution concept is tested and that is aimed at creating healthy organizations.

Design-based research combined with action research testing can produce knowledge that is relevant for both practice and OD theory. It can develop general solution concepts that OD professionals may use to develop specific solutions in specific situations. These solution concepts have been tested in real life situations and are “reality proof”. Testing of solution concepts can produce OD knowledge about the circumstances under which the concept works or does not work, especially when one or more test cases fail to produce expected results, like in this study. Knowing when a solution concept does not work is especially important because it reminds us that the social world does not behave according to general laws and it keeps us from developing generic, one-size-fits-all solutions. The contribution of design-based research to OD theory may lie in the identification of important variables and relationships that are missing in theoretical models and the further specification of the validity domain of causal relations. Thus, design-based research can serve as a complementary mode of research to positivistic approaches and help to increase the relevance and viability of organizational development research.

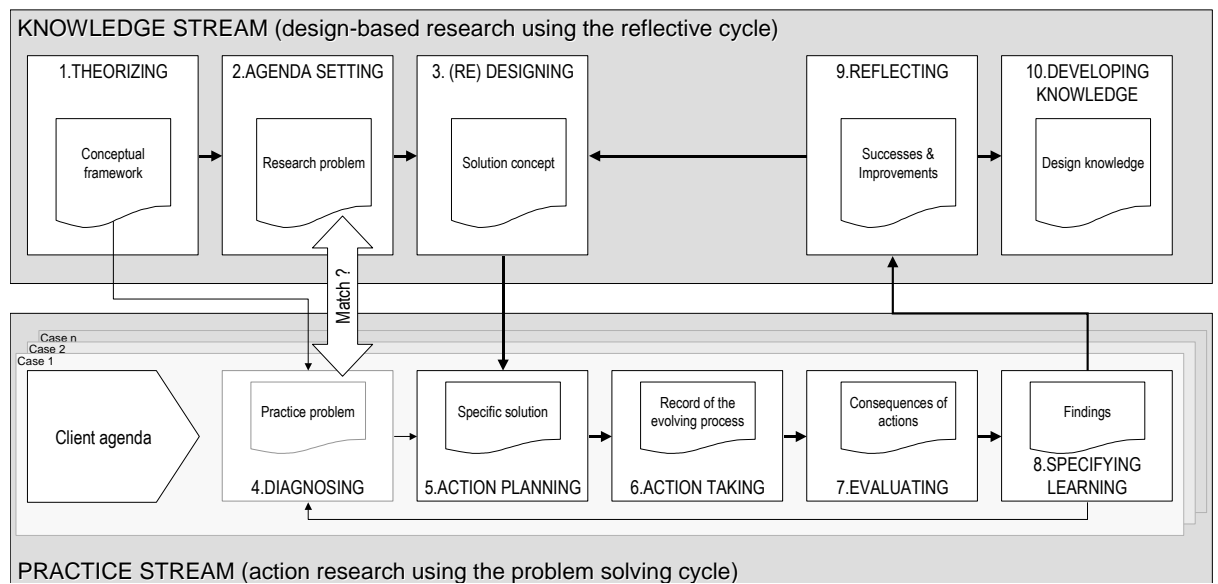


Figure 1. Research methodology of a design-based research study using action research

Table 1  
*Overview of Scientific Research Questions*

Type of research problem	Example of explorative problem	Example of hypothesis testing
a) Description problem	What are the characteristics of X?	Does X have these characteristics?
b) Comparison problem	What are the differences between X and Y?	Are X and Y different?
c) Definition problem	To what class of phenomena does this belong?	Is this phenomenon part of this class?
d) Evaluation problem	How successful is this intervention?	Is this intervention a success?
e) Explanation problem	Why Y?	Is it true that X explains Y?

Note. Based on (Oost, 1999).

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Table 2

*Overview of Cases Used in this Study*

Case Study	Timeframe	Industry	Type of Organization
Bank Ltd.	September 1998– February 1999	Banking	Subsidiary of listed company
Electro Ltd.	October 1998– February 1999	Engineering	Subsidiary of listed company
Automotive Ltd.	October 1998– February 1999	Automotive	Private company
Logistic Services BU	June 99	Logistics	Department of listed company
Professional Services LLP	November 1999– June 2000	Professional Services	Professional partnership
Consulting Department	January 2000	Banking	Department of subsidiary of listed company

Table 3

*Appraisal of the Success of the Solution Concept in Six Case Studies*

Problem Type	Case	Problem Definition	Successful Implementation?	Problem Solved?	Contribution of Method?
Internal management	Electro Ltd.	Develop a strategy based on available technologies and skills	Yes	Wrong problem	Not available
	Logistic Services BU	Create a future for Logistic Services Ltd.	Yes	No	Limited
	Consulting Department	Create a future for Consulting Department	Yes	Yes	Large
	Automotive Ltd.	Improve strategy-making process	No	No	None
External reporting	Bank Ltd.	Remain independent within holding company	No	Yes	Limited



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Professional Services LLP	Report on intangibles	Yes	No	Not available
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