

FROM MANAGEMENT RE-SEARCH TO 'FORWARD-SEARCH'

DESIGNING AND TESTING A DESIGN
APPROACH TO MANAGEMENT RESEARCH

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Full paper for:
European Academy of Management conference 2005
Track 28 Design, Collaboration and Relevance in Management Research

Abstract

The problem of the practical relevance of management research has been around for many years. Recently practicing management research based on the paradigm of the design sciences has been promoted to bridge the gap between rigor and relevance (Van Aken, 2004, 2005). The design approach is aimed at diagnosing, problematizing and improving situations and is therefore distinctly different from the traditional explanatory approach with its focus on describing, explaining and predicting phenomena. The explanatory approach can be seen as management 'research', explaining existing situations. In contrast, the design approach can be seen as 'forward-search', improving the future.

In this paper a new version of the design approach to management research is developed and tested in the field of intellectual capital valuation. It is concluded that the design approach can produce results that are both rigorous and relevant. However, the analyst faces methodological difficulties regarding operationalization and multicollinearity that are similar to the methodological difficulties in the explanatory approach.

Introduction

The growth of complexity in business and the decreasing level of order, control and predictability in a globalizing economy (Nowotny et al. 2001) have increased the demand for relevant management research. At the same time the field of management research is involved in a process of 'scientization' (Van Aken, 2005) with a strong emphasis on the rigor of its results. There is an increasing gap between knowledge needed in the practice of business and knowledge produced in the academic field.

Modern managers need to deal with complex situations in which current and future positions are uncertain and many, often unknown, variables play a role. Developments are non-linear in nature and the success of management action is highly contextual. Best practices cannot easily be copied and the risks involved in making decisions, both in terms of the chance of things going wrong and the impact of mistakes, often are enormous.

In this situation the product of the mainstream explanatory approach to management research is no longer sufficient to solve real-life problems. The explanatory approach is inspired by the natural sciences and aims for describing, explaining and predicting business phenomena. Its focus is on the development of generalizable, context-independent knowledge that can be applied in different circumstances. It is description-oriented and aims at shared understanding (Van Aken, 2005). It is reductionistic; as it tries to develop causal models with a minimum of variables, in which independent variables explain the behavior of a depended variable. It is 're-search', looking at the past, trying to understand with hindsight phenomena that have already happened.

Van Aken (1994, 1996, 2004, 2005) has proposed the design approach as an alternative to the explanatory approach. The term 'design approach' stems from an analogy to the design sciences, such as the engineering sciences, medical science and modern psychotherapy (Van Aken, 2004). "The mission of the design sciences is to develop knowledge for the design and realization of artifacts that can help solve construction or improvement problems" (p.224).

This paper describes an application of the design methodology aimed at identifying how the design approach works in practice, checking whether it can deliver knowledge that is both relevant and rigorous, and highlighting some of the methodological difficulties and how they can be overcome. Applying the concept of 'practice what you preach' the paper follows the logic of the design approach, showing how the design methodology was designed and evaluated in study of intellectual capital measurement. The methodology used in this paper is also the subject of investigation; therefore the paper does not contain a separate section on methodology and the description of the methodology is covered in the next section. The paper first describes the specific design of the design methodology that was used in the intellectual capital study. Then it describes the testing of the methodology in a six case study research project. The findings are used to draw conclusions about the success of the methodology and its methodological and practical difficulties.

Designing the design methodology

Problem definition

In a complex and uncertain world there is a need for contextualized knowledge (Nowotny et al., 2001) that helps managers to problemize their state of affairs in a useful way and to develop solutions that are tailor-made to their specific situation.

With the growing importance of knowledge as a business resource it is important to assure the quality of the business knowledge being used (Arbnor and Bjerke, 1997). According to Van Aken (2005) this knowledge must have been tested in practice, the dependent variable must describe something of value to the organization, and the independent variables must describe something that can be changed.

However, managers need more than that, they need guidance on how the independent variables can be changed given a specific situation. The knowledge must be suitable to guide an intervention in the existing situation and in addition it must be clear what the application domain of the knowledge is. It must be known for what class of problems this knowledge can provide a solution and in what class of contexts it is likely to be successful. Also the knowledge must be grounded. It must be clear why a certain intervention produces a certain outcome.

Requirements for the methodology

A methodology for creating business knowledge that can provide the practical and high quality knowledge that is needed in the knowledge economy must fulfill the following requirements (based on Van Weert and Andriessen, 2005):

1. The methodology needs to start with a problem that comes out of business practice instead of a researcher's own curiosity.
2. The methodology must pay special attention to the way these practical problems are defined. Problems ontologically speaking are not phenomena in reality waiting to be observed. Problems are conceptualizations of situations identifying a difference between a 'soll' and an 'ist' situation. Therefore there can be useful and less useful ways to define problems.

3. In the knowledge economy products, services and processes have a short half-life; therefore the methodology must generate business knowledge relatively fast.
4. The methodology has to be future and solution-oriented, helping in solving real life business problems to improve future situations. The creation of business knowledge requires a methodology for management 'forward-search' instead of management 're-search'.
5. The methodology must generate explicit 'generative mechanisms' (Pawson and Tilley, 1997) or 'solution concept' (Van Aken, 2005): generic solutions that can be used to create tailor-made solutions in a specific situation.
6. The methodology must not only support the relevance but also the rigor of the research, therefore it must be structured, internally consistent, and aimed at testing the validity of solutions.

Design of the methodology

The design approach is a methodology that fulfills these six requirements. It is based on the reflective cycle as described by Van Aken (1994, see figure 1). This reflective cycle consists of the following steps: selection of the class of problems that will be researched; selection of an individual case; using the regulative cycle to solve this problem in the individual case; reflection on results; generation and documentation of the design knowledge that has been used, and selection of a new case from the application domain.

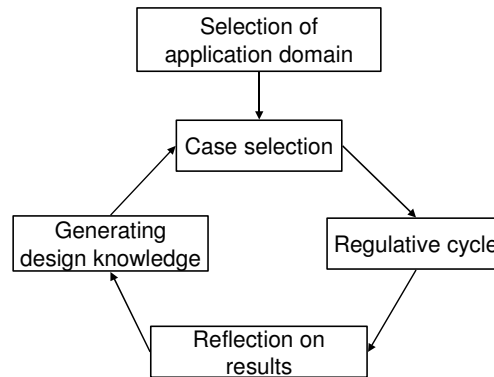


Figure 1 Reflective Cycle (Van Aken, 1994)

In the subject study Van Aken's reflective cycle has been transformed into a more detailed design approach that identifies six steps and a total of 13 activities (see figure 2). The design approach starts with a general diagnosis and description of a practical problem. This problem can be identified through literature research, case study research or interviews with managers. However, problems are not phenomena that exist independent of our view of the world. Instead they are subjective conceptualizations that depend on the concepts and distinctions that are used by the observer. Problem definitions are theory-driven and this theory is strongly influenced by the concepts and theories embedded in the proposed solution to the problem. Therefore the problem diagnosis (step 1) and the design of the solution (step 2) will often intertwine.

Step 2 is using the design cycle to develop a first draft of a business method that can help to solve the problem. This step consists of the following four activities. First, the application domain of the method is determined based on the results of step 1. The application domain describes the class of problems the method needs to address and the class of contexts to which it must be applicable. Second, the requirements for the method are determined based on the class of problems and the

class of contexts, as well as demands from clients, from users, and from the environment. Third, based on these requirements and on available (causal) theories, a first draft of the new method is created. Fourth, through ‘desk tests’ it is checked whether this design meets the requirements. This evaluation may lead to changes in the design, but also to changes in the problem definition and the requirements. This concludes the design cycle, a process that a researcher should continue until an adequate theoretical design is created (Van Aken, 1996).

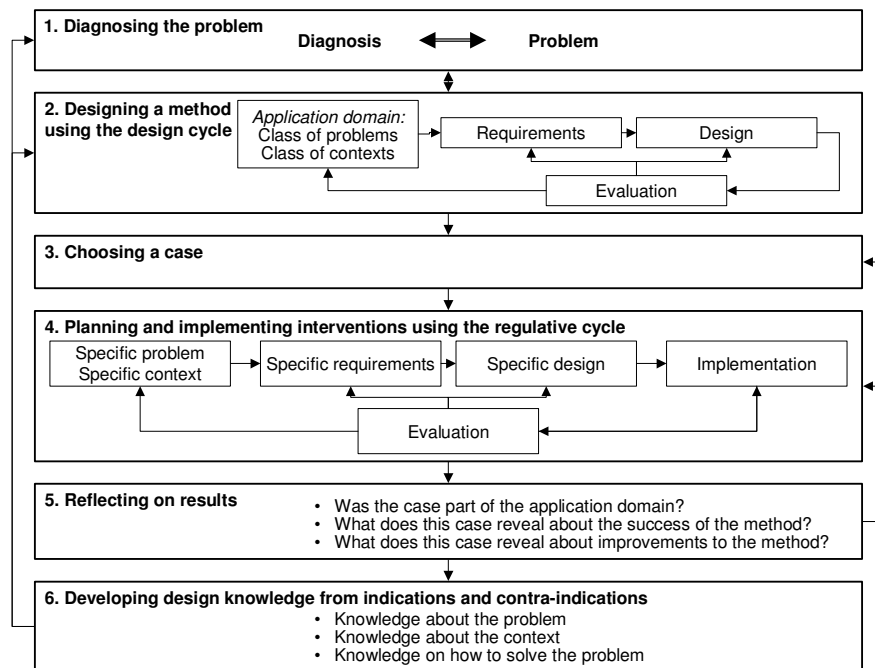


Figure 2 The design approach (Andriessen, 2004).

The third step in the design approach is the selection of a case to test the draft method. The specific problem of the case has to fit the class of problems for which the method was created. In addition, the specific context of the case has to match the criteria describing the class of contexts for which the method was designed. In practice, every context is unique and therefore every problem is unique. When we start to test a method we may discover that the specific problem in that specific

situation is different from the ones for which the method was designed. If this is true, then we cannot use the case to test the success of the method. The case can however produce valuable insight into the limitations to the application domain of the method.

The fourth step in the design approach is to use the method to solve the case-specific problem applying the regulative cycle (Van Strien, 1997). The regulative cycle consists of five activities. First, diagnosing the specific situation to define the problem in its context; second, identifying whether there are specific requirements that supplement the general requirements; third, making amendments to the method if needed; fourth, implementing the method; and fifth, evaluating the outcome of the method. This evaluation may lead to further modifications to the design, but also to changes in the way the problem is perceived and in the set of requirements.

The fifth step in the design approach is to reflect on the results using three evaluation questions: Was the case part of the application domain? What did this case reveal about the success of the method? And what did this case reveal about improvements to the method? The answers to these questions are used in step 6, in which design knowledge is developed in three areas. First, knowledge is developed about the class of problems for which the method was designed. This may lead to further refinement of the problem definition. Second, knowledge is developed about the class of contexts for which the method is applicable. The indications and contraindications demonstrate under what circumstances the method produces proper results – they are the conditions for success that need to be fulfilled. Third, insight is generated into the means–end relationships used to solve the problem. This is where the grounding takes place by looking at the underlying mechanisms

that produce the results. It is checked whether the expected mechanisms – that for example were predicted by causal theories – were present.

The researcher should go through the six steps a number of times. By cross-case analysis he can refine the method based on the design knowledge generated in previous cases. In this way more and more indications and contraindications for the use of the method are acquired. In the ideal case, the method should no longer need adjustments after being tested in x number of cases. At that point theoretical saturation (Van Aken, 2004) is achieved. By then it should be clear in what context the method can be used, and how it can be adjusted to local circumstances.

Addressing specific methodological difficulties

In applying the design approach three methodological difficulties need to be addressed. The first difficulty occurs when the method is put into practice and fails. Then the researcher needs to determine the cause of failure and find out what or who is to blame – was the problem poorly diagnosed, was the method not right, or was the method inadequately implemented? The second problem has to do with the impact of external variables on the outcome of the method. The researcher needs to find a way to isolate the effect of the business method from other factors. The third difficulty arises when the researcher and the designer/implementer of the method is the same person. In this circumstance, it may be difficult for the researcher to keep an independent view of the process and its results. Each difficulty will be discussed below and a solution will be proposed.

Difficulty #1: excluding the effect of poor implementation

The implementation of a business method in the design approach can be compared with the operationalization of variables in the explanatory approach. In both

approaches the researcher wants to identify and rule out the quality of the implementation / operationalization as a disturbing factor in the testing of the method / hypotheses. Four errors can be made applying the design approach that may cause a method to be unsuccessful. One, if we find the problem is not solved, it could be that we did not diagnose the situation correctly and identified the wrong problem. Two, it could be that the case did not match the application domain of the method – in other words, we selected the wrong tool for the job. Three, it could be that we implemented the method poorly. Four, we used a poor method and we need to fix it. Figure 3 summarizes the errors, but they are redefined as necessary conditions for a successful implementation of a business method.

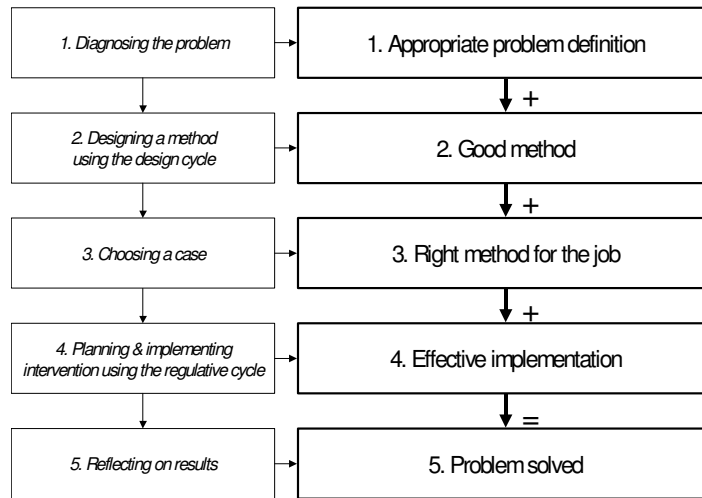


Figure 3 Necessary conditions for a successful intervention

Of the four errors, three are of interest when we want to create design knowledge. We want to gain knowledge about the way problems can be wrongly diagnosed using the method (error 1), we want to learn about flaws in the method (error 2), and we want to learn in what situations the method is not the right method for the job (error 3). The one factor we want to eliminate is the quality of the implementation. We need

to find a way to check whether poor implementation (error 4) has influenced the outcome of the method.

To rule out the effect of poor implementation we need to check the quality of the implementation in each case, for which the work of De Caluwé and Stoppelenburg (2003) on the effectiveness of consultancy can be used. They studied the effectiveness of external consultants working for the Dutch government. They asked clients and consultants which criteria they found important in assessing the effectiveness of consultants. Table 1 shows the results.

De Caluwé and Stoppelenburg make a distinction between three types of criteria for the effectiveness of external consultants: formal criteria, criteria regarding content, and process criteria. The first two reflect the extent to which a predefined problem is solved. The process criteria reflect the quality of the implementation and these are of special interest for the design approach. They identify six process criteria.

Table 1. Ranking of Importance of Criteria for the Effectiveness of Consultants

From De Caluwé and Stoppelenburg (2003), translated by D. Andriessen.

Rank	Criterion	Type
1	Level of goal achievement	Formal criterion
2	Level of involvement of the consultant and the client system with the assignment	Process criterion
3	Intensity of communication between the consultant and the client system	Process criterion
4	Degree to which a solution was found for the problem	Formal criterion
5	Level of expertise provided by consultant	Formal criterion
6	Extent to which the client system came closer to making a decision	Content criterion
7	Degree to which the client system learned from the assignment	Content criterion
8	Level of participation by the client system in the assignment	Formal criterion
9	Extent to which the client system has broadened its way of thinking	Content criterion
10	Degree to which actual project budget equals the budget originally estimated	Formal criterion
11	Degree to which actual time requirements equal the time originally estimated	Formal criterion
12	Extent to which cooperation and communication has been improved	Content criterion
13	Degree to which the approach is being developed along the way	Process criterion
14	Extent to which the consultant provides concrete directions to the client system	Process criterion
15	Level of equivalence between the consultant and the client system	Process criterion
16	Extent to which the client system improved its effectiveness	Content criterion
17	Degree to which all agreed tasks were executed	Formal criterion
18	Extent to which the required resources were used	Formal criterion
19	Extent to which a specific method was used	Process criterion

Governmental clients in The Netherlands see the level of involvement of the consultant and the client system as well as the intensity of the communication as important criteria for the effectiveness of a consultant assignment. The other four process criteria rank lower on the scale: the degree to which the approach is being developed along the way, the extent to which the consultant provides concrete directions to the client system, the level of equivalence between the consultant and the client system, and the extent to which a specific method was used.

The process criteria are indicators of the quality of the consulting process, from the perspective of both the client and the consultant. De Caluwé and Stoppelenburg (2003) did not test whether these factors influenced the success of the engagement, yet we can assume that process elements considered essential by both clients and consultants will be important intervening variables. They will be necessary (although probably not sufficient) requirements for success. Therefore, these six process criteria can be used to check the quality of the implementation of the designed method. By determining whether the conditions for success are fulfilled one can identify a possible intervening influence from the quality of the implementation on the success of the method.

Difficulty #2: Separating external factors

The second problem with the design approach is that it may be difficult to separate the four errors in figure 2 from *external* factors that influence the solving of the problem. If, for example, we design a method to improve the sales capability of a company and we find that sales indeed go up, it may be that this is caused by a change in the environment and not by the implementation of the method. This is a problem of multicollinearity that is also common in explanatory management

research. To cope with this problem the work of Phillips (2000) can be used. He presents eight methods to isolate the effects of a consulting intervention from other factors (see Table 2). He suggests that at least three different methods are used to identify the effects of the intervention.

Table 2 Methods to isolate the effects of a consulting intervention from other factors

From Phillips (2000).

	Method	Description
1	Control group of similar companies	Use a control group of similar companies where no consulting intervention took place
2	Trend line analysis	Do a trend line analysis. Any improvement of performance after the intervention over the levels predicted by the trend line can be reasonably attributed to the intervention
3	Forecasting method	Similar to the trend line analysis; however, this method forecasts the influence based on a trend line of external factors
4	Use the participants' estimate of the impact of the intervention	Participants in the process are asked to determine the impact of the consultant.
5	Asks managers for an estimate	The same technique but with the use of managers
6	Solicit input directly from customers	Ask customers whether they have noticed any changes
7	Calculate the impact of factors other than consulting	Calculate the impact of factors other than consulting that influence a portion of the improvement and credit the intervention with the remaining portion
8	Ask an external or internal expert	Ask for the opinion of an expert

Difficulty # 3: avoiding designer/implementer bias

The third difficulty with the design approach arises when the researcher and the designer/implementer of the method are the same person. In this circumstance it may be difficult for the researcher to keep an unbiased view of the process and its results. Researchers may have a tendency to underestimate or overestimate the method's level of success. They may underestimate or overestimate the importance of the quality of the implementation as an intervening variable. In addition, it may be that the designer's tacit knowledge of the method plays a crucial role in the success of the implementation. To mitigate this problem one can built in safeguards. First, the implementation of the method can be made a team effort in order to alleviate bias. Second, the method can be tested by people that were not involved in the design the method or the analysis of the results. This is what Van Aken (2005) calls *beta testing*. Third, through a series of interviews with people in the organization where the

method has been tested, one can ask specific questions regarding the role and quality of the consultant to determine the way this may have influenced the results. Fourth, further safeguards against bias can be added by having two observers instead of one to analyze and evaluate the success of the method.

Only by testing the design in a number of different contexts can the researcher mitigate these three methodological problems of the design approach. After having experienced both success and failure in implementing the design in different contexts, the researcher can identify the causes of a failing method, the impact of external variables on the outcome of the method, and the potential bias of the designer/implementer. As Pawson (2002, p. 345) puts it: "The reviewer's basic task is to sift through the mixed fortunes of the programme (...) attempting to discover the contexts (...) that have produced the solid and successful outcomes (...) from those contexts (...) that induce failure".

Testing the design methodology

The design methodology as described above was tested in a study on the valuation of intangible resources conducted between 1998 and 2000 (Andriessen, 2004). This case is presented below, structured according to the six steps in the design approach.

Step 1: Diagnosing the Problem

The research objective of this study was to develop knowledge about the valuation of intangible resources and the use of valuation methods. The problem of valuation and reporting of intangible resources has been a topic of interest for many years for the accounting community (Lev, 2001), the human resources community (Sackman et

al., 1989), and the intellectual capital community (Edvinsson and Malone, 1997; Stewart, 1997). The general view is that a lack of information about the value of these resources is causing misallocation of resources, both inside companies and by the financial markets. Therefore the objective of the study was to develop and test a method for the valuation of the intangible resources of an organization, as well as a plan for its implementation.

Step 2: Designing the Method

The design phase started with a review of 25 existing methods for the measurement or valuation of intangible resources. An analysis of strengths and weakness was performed to identify elements that could be used in the new method and to recognize pitfalls. A design team defined the class of problems that the method had to address, as well as the class of contexts for which it should be applicable. Then a set of requirements was developed describing functional and operational requirements as well as limiting conditions and limitations. In the design of the method, Hamel and Prahalad's (1995) theory on the identification of core companies was combined with asset valuation theory, especially the income approach (Reilly and Schweih, 1999). In a series of four iterations of the design cycle the method was developed and 'desk-tested' by the design team and by outsiders until it theoretically met all requirements defined at the beginning of the process. The result was the Weightless Wealth Toolkit, a tool to identify, assess, and value strategically important intangibles.

Step 3: Choosing Cases

Six cases were selected to test the method in a period between September 1998 and June 2000 (see table 3). Three companies were invited to join; three others

approached the researcher with a specific problem. In one case it turned out that the method was the wrong tool for the job, which gave valuable insight into the application domain of the method.

Table 3. Overview of Case Studies

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

Step 4: Planning and Implementing Interventions

In each case, an implementation team used the regulative cycle to plan and implement interventions. The longest implementation took 6 months; the shortest took half a day. The latter involved a strongly modified version of the general method to accommodate the requirement of a 'half-a-day workshop'. The case studies were executed in succession in a developing multiple case setup to allow for subsequent improvement of the general method, based on the results of each case.

Step 5: Reflecting On Results

In the six case studies the success of the method was limited (see table 4). In two cases the limited success was the result of poor implementation, which could be identified using the process criteria of De Caluwé and Stoppelenburg (2003). When the implementation was successful, in only one case the problem was solved. In three other cases, the problem was not solved. In two cases the circumstances changed drastically making the problem impossible to solve. In one case all the necessary conditions for successful implementation were met, however, the team discovered that the method did not produce the results needed.

Table 4. Appraisal of the Success of the method 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	Some
	Consulting Department	Create a future for Consulting Department	Yes	Yes	Big
	Automotive Ltd.	Improve strategy-making process	No	No	None
External reporting	Bank Ltd.	Remain independent within holding company	No	Yes	Limited
	Professional Services LLP	Report on intangibles	Yes	No	Not available

In order to exclude external factors, in three cases managers were interviewed about the impact of the method on their organization. In one case, participants were asked. In two cases it was not possible to use any of the methods suggested by Phillips (2000). Unfortunately it was not feasible in any of the cases to work with control groups, trend line analysis, or forecasting techniques to exclude external factors. Neither was it possible to solicit customers, isolate other factors, or ask experts.

Step 6: Developing Design Knowledge

The study produced design knowledge about the indications and contra-indications of the method, about its strengths and weaknesses and about its mechanisms. It was possible to further refine the method after each test and to create insight into the indications and contra-indications for its use because the method was not successful in every case. As a result, a number of hypotheses were developed about the application domain of the method.

Hypotheses were developed about the strengths of the method and there was a successful attempt to ground these results by analyzing *why* the method worked. For example, one of the findings was that the use of core competencies in the Weightless

Wealth Toolkit to identify intangible resources provides a new and positive view on a company, and a common language that can explain the company's success, install a sense of pride, boost its self-confidence, and identify new opportunities.

Further hypotheses were developed about the weaknesses of the method. One of the weaknesses of the tested version of the method was a lack of a diagnosis phase to diagnose the problem in its context. On this basis some final (untested) modification to the method were made.

Findings

The success of the Design Approach

In the study about the financial valuation of intangible resources the design approach produced a method that managers can use to put a value on their strategically important intangibles. This method is field-tested and may be applied to specific problems in certain contexts. The final method contains a problem definition phase that helps managers to problemize their situation and check whether the method is 'the right tool for the job'.

The method is a general solution, a *solution concept* (Van Aken, 2005), which can be adjusted to accommodate specific contexts. It is based on activities that influence a depended variable (insight into the value of intangibles) using a series of steps, procedures and questionnaires. The design approach resulted in clear indications and contra-indications for the use of the method in which the failure of the method in three cases was very instrumental. In addition it helped to highlight the underlying mechanisms that can explain why it worked and did not work, thereby contributing to

the grounding of the results. However, six cases were not enough to reach the point of theoretical saturation, so more testing of the Weightless Wealth Toolkit is needed.

Determining the Effect of the Implementation

In three cases the method was unsuccessful, so the question became relevant whether this was caused by the method or by a poor implementation of the method. In the analysis of these cases the process criteria provided by De Caluwé and Stoppelenburg (2003) were used and from interviews it became clear that in the case of Bank Ltd. two conditions had not been fulfilled: the implementation team had not involved important members of the client system at crucial stages of the implementation, and there was a lack of communication. In the case of Professional Services LLP the results were different. Here, all conditions had been met, yet the results of the Weightless Wealth Toolkit were never used. The conclusion was that this was because the method was not the appropriate tool for the job at hand. In the case of Logistic Services BU all conditions for a successful implementation were met, yet the problem was not solved due to a drastic change in external circumstances.

These findings indicate that De Caluwé and Stoppelenburg's (2003) necessary conditions for success can help to determine the effect of the implementation in a test on the outcome of the method. If the conditions are not met, then the quality of the implementation plays an interfering role. If the conditions are met, then this is an indication that the implementation plays a minor role. However, there still may be other conditions that are not included in the list. Further research is needed to determine factors that influence the quality of the implementation to mitigate this problem of implementation quality.

Determining the Contribution of the Method

The difficulty of determining the contribution of the method to the outcome was addressed using two of the approaches offered by Phillips (2000) for isolating the effects of a consulting intervention: 1) asking managers or 2) asking participants involved about the impact of the method. With both methods, it was found that interviewees were able to express whether they were satisfied with the way the method worked and with its outcome. However, satisfaction is not the same as effect, although it may be a good proxy measure for the method's contribution and success. To get more evidence, it is necessary to combine more than two of the approaches. To obtain sufficient evidence for the contribution of the method to the outcome of the implementation, the researcher needs to combine at least three of the approaches offered by Phillips.

The Analyst versus the Researcher

In design studies, there can be a problem of a bias in observation as it may be difficult for the researcher to keep an independent view on the process and its results. In this study, the researcher and the person that designed and implemented the method have in most cases been the same person. To mitigate potential bias two safeguards were applied: the implementation of the method had always been a team effort, and the researcher/ designer of the method was not involved in two of the six tests. In both cases implementation of the method was successful. This indicates that a successful implementation of the Weightless Wealth Toolkit does not depend on the tacit knowledge of the designer of the method. In one of the two cases the wrong problem was addressed showing the need for a diagnostic tool as part of the toolkit. In the other case the circumstances changed and the problem became unsolvable.

Conclusions

This study confirms earlier findings by Halman and Keizer (1994), Weggeman (1995), and Verweij (1997) that the design approach can be a useful way to create business knowledge that is both relevant and rigorous. However, there are three methodological issues that need to be addressed in any application of the design approach. The first is how to identify and rule out the quality of the implementation of the business method as a disturbing factor in testing the method. In the study six process criteria were used effectively to identify implementation issues, however, a more comprehensive set of quality criteria is needed. The second issue is the problem of determining the contribution of the method to the outcome of the test. Here a combination of observation techniques as proposed by Phillips (2000) is helpful, although for practical reasons it may be difficult to apply more than two in a particular situation. The third issue is the risk of bias from the part of the designer of the method. Beta testing turned out to be useful to check for bias. According to Van Aken (2004, p. 232), this kind of beta testing "can counteract the 'unrecognized defenses' of the originator of the method, which may blind him or her for possible flaws in its use", however, the number of cases in this study has been insufficient to rule this out completely.

Discussion

The design approach seems to be a promising way to increase the relevance of management research. To develop the approach further three issues can be addressed. The first issue has to do with the application domain of the design methodology. The design approach is only applicable in situations where the researcher can make interventions in organizations and observe the effects. The

subject organization needs to actively cooperate, be prepared to solve the problem at hand, and be ready to experiment. The researcher cannot guarantee that the problem will be solved, especially not if the method is in its initial stages of testing and development. Furthermore, the design approach also requires consulting skills not normally associated with management research and this may limit its applicability. This study only involved one test of the design approach, so more testing is needed to acquire insight into the application domain of the design approach, the skills required and the way these can best be acquired in academic training.

The second issue has to do with the underlying assumptions of the design approach regarding epistemology and ontology. Arbnor and Bjerke (1997) distinguish between three methodological approaches in management research: the analytical approaches, in this paper referred to as the explanatory approach; the systems approaches; and the actor approaches. The authors show that each approach is based on different epistemological and ontological paradigms. The design approach is not compatible with the analytical approach as it is aimed at improving situations through interventions while the analytical approach is aimed at descriptions and explanations of reality which are general and absolute. The design approach seems to be compatible with both the systems and the actor approach, which would indicate that there are two possible versions of the design approach. In the systems-design-approach the researcher analyses the organizational situation as a system and creates business methods to influence the finality relations of the system. In the actor-design-approach the researcher analyses the organizational situation as a socially constructed reality that consists of different levels of meaning structures and designs business methods to influence the sensemaking processes of actors. It

would be interesting to further explore the possible epistemological and ontological roots of the design approach and see how these different roots can create different types of business methods using different methodological procedures.

The third issue concerns the assumption that underlies the design approach that organizations can be purposefully changed for the better. This especially seems to be the case in a systems-design-approach, which ties in closely with the origins of design approach. Design sciences like engineering, medical sciences and modern psychotherapy also view their subject of investigation as a system of elements and they assume that these systems can purposefully be manipulated to produce a desired outcome. De De Caluwé and Vermaak (1999) refer to this view on change management as the 'blueprint paradigm'. They distinguish between five paradigms for thinking about organizational change and give each paradigm a different color. The blueprint paradigm is based on the rational design and implementation of change. This paradigm assumes that organizations can change if there are clear and measurable end goals, if there is a good implementation plan, if the various steps are monitored and controlled, and if complexity is reduced. The paradigm favors measurement, planning, control, and rationality. It believes that organizations can plan and control transformation. The blueprint paradigm for organizational change is clearly reflected in the design approach as this is based on the belief that organizational problems can be solved using methods that are based on grounded and tested rules. Researchers who use this approach carefully design the change method they want to use. The change method includes the design of the intervention and a plan for its implementation. Then the researcher tests the method in a series of case studies to develop knowledge about the application domain, mechanisms, and effectiveness of the method. This leads to modifications to the method to cope with

unaccommodated contexts and unexpected results in future applications and results in design knowledge. These assumptions about organizational change embedded in the design approach should be further explored and challenged in order to increase the robustness and credibility of this promising way to turn management re-search into management forward search.

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