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Martin Prater

How to identify and verify best practices in an evolving (information technology) area?

Supervised by Dr. Mark Esposito

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A Methodology for Establishing Best Practices

Abstract

When new ideas or technologies arrive, potential practitioners regularly seek guidance on how to successfully apply these. Often success will depend less on the technology selected but rather on how well the technology is implemented and used. This report describes a research methodology developed to identify best practices for new disciplines in the domain of information technology. By nature the methodology is applicable beyond information technology wherever similar challenges are faced.

ABOUT THE AUTHOR(S)

Martin Prater, Director of Integration Technologies at Credit Suisse in Switzerland has 18 years experience in the financial services industry and in information technology companies. Martin holds a Swiss federal diploma in computer science, an MBA from the University of Hagen (Germany), and a post-graduate certificate in advanced business research from the University of Southern Queensland. He is studying for a Doctorate in Business Administration at Swiss Management Center. martin.prater@credit-suisse.com

Mark Esposito, Ph.D. is Associate Professor of Management and Strategic Leadership at Swiss Management Center and he has supervised Martin Prater during the Strategic Leadership doctoral course, from where this research paper has originated. m.esposito@swissmc.ch

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1 Executive Summary

In the increasingly competitive business world companies are challenged to introduce new technologies very early in the life-cycle. Not only selecting the right technologies poses a challenge but also how to implement and use these technologies. To rise to this challenge companies regularly seek advice from best practices. This report describes a methodology to develop best practices in new technology areas. The methodology proposed is based on qualitative research and a multiple case studies approach. It proposes to start with a literature review and to develop a theoretical framework from there. The next step is to derive a questionnaire from the framework. This is used to interview qualified industry experts so as to derive emerging practices. This serves as a platform to develop a further questionnaire to collect evidenced based practices from practitioners. In this way essentially two multiple case studies with two different participant groups can be cross analysed both within the participant group and across the two groups. Combining both evidenced based best practices and emerging practices with the underlying theoretical analysis offers a first set of best practices supported by formal research and with potential for a high level of acceptance, thus fulfilling the relevant criteria for best practices.

This approach requires additional considerations regarding the validity and reliability of the results. An alternative approach to ascertain these qualities is proposed as part of the methodology.

2 Introduction

Technology life-cycles are getting shorter and shorter. The frequency with which new technologies arrive on the horizon of innovative companies is constantly increasing. Next to the selection of appropriate technologies to apply within a company the decisions on how to

apply these technologies are crucial. The window of opportunity for gaining a competitive advantage through the new technology on the other hand is declining. In this situation companies are seeking guidance on how to best apply these new technologies. This guidance is based on what is believed to be successful, known as best practices.

The following report describes a methodology for identifying and verifying best practices for applying new technologies within a company. The methodology was developed to identify best practices for business activity monitoring (BAM) as part of a dissertation. To some extent the methodology should be adaptable to allow for the identification of best practices outside of the technology domain.

3 Literature Review

The literature review first explores best practices. Then the literature in respect to how technology and innovation is diffused within an organization is analysed.

3.1 Best Practices

Identifying best practices requires that a common understanding of the meaning of best practices is developed. Myers and Smith (2004, p. 4) conclude that this common understanding and definition of best practices has not yet been developed. There are many notions of best practices. Myers & Smith (2004, p. 6-7) distillate three characteristics best practices should hold in common. Best practices should constitute practices which are outstanding in their qualities, be applicable to many situations and can serve as a starting point for developing a new theoretical foundation. Best practices research has a number of methodological issues. The problems and risks associated with best practices studies include the lack of a theoretical model and the questionable potential for generalization of findings (Myers & Smith, 2004, p. 8). The qualitative case study appears to be an accepted model for

conducting best practice research (Bretschneider, Marc-Aurele & Wu 2001). Myers and Smith (2004, p. 14) arrive at three types of best practices.

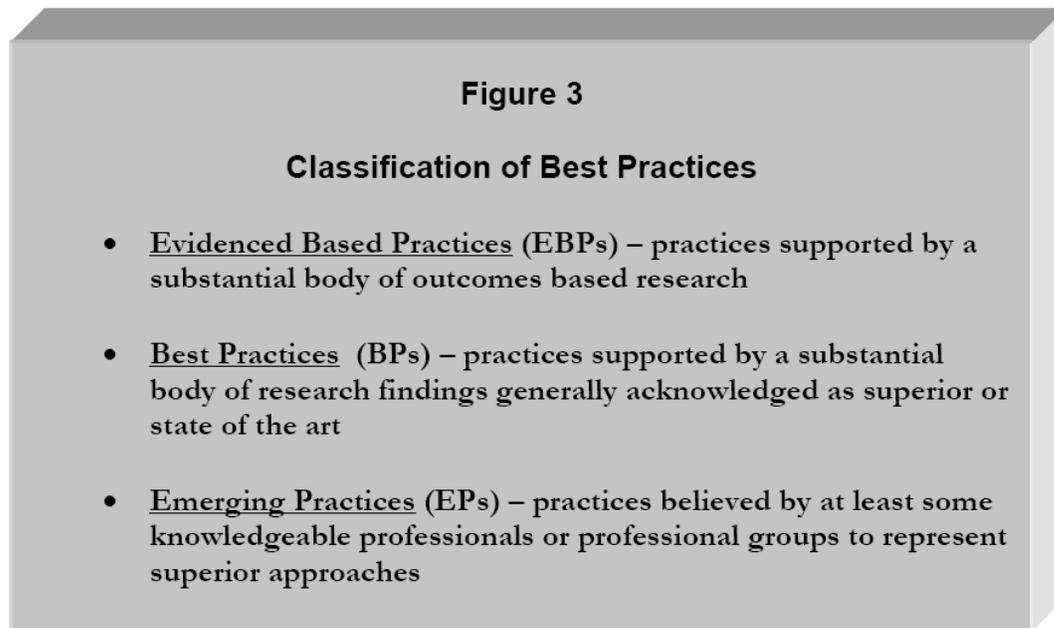


Figure 1. Types of Best Practices. Source Myers and Smith (2004, p. 14).

3.2 Diffusion and Acceptance of Technology

Diffusion of Innovation

The technologies in scope are by nature at a very early stage of adoption. Starting from the *Diffusion of Innovation* theory (Rogers 1995) the first adopters of innovation are venturesome, educated and well informed through multiple information sources. Early adopters being the second group to employ the innovation are characterized as being social leaders, popular and also educated.

This is a strong indication that companies that have already implemented the new technology in question at such an early stage fall into one of these two categories. Learning from these companies experience is likely to reveal best practices.

Technology Acceptance Model

New technologies must achieve a high level of user acceptance to demonstrate success. The technology acceptance model states that the user must perceive usefulness and ease of use to accept the new technology (Davis, 1986).

Best Practices will require that the users of the new technology perceive the value thereof.

4 Methodology

The methodology combines induction and deduction. It takes interest in areas where best practices as defined above do not yet exist. To start emerging practices are compiled through interviewing industry experts. In a second step evidenced based best practices are collected from practitioners. The data collected in the interviews is enriched through data collected by the means of documentation and direct observation, so as to allow for triangulation. The results are synthesized to form an initial version of best practices.

The methodology outlined below is based on the following assumptions:

- Best Practices for this discipline have not yet evolved.
- There are a small number of practitioners using the new technology.
- There are industry experts who have help develop the new technology or have gained expert status by other means.

4.1 Approach

Qualitative Research

At this early stage of adoption little literature or previous research is available. The number of practitioners is still very small. Therefore quantitative research methods are not applicable.

Gaining a detailed understanding of the cases of the early adopters through qualitative research is the method of choice in this methodology.

Multiple Case Studies

The proposed method for researching the existing practitioner cases is the case study. The methodology proposes to select more than one case to allow for a cross-case analysis. Therefore a multiple case studies approach is selected.

Collecting Emerging Practices

First a thorough literature review of the technology in question is conducted. Based on this a theoretical framework is developed. The framework is then used to develop an initial set of questions to collect emerging practices from industry expert opinions. This is done in interviews based on a questionnaire containing questions derived from the theoretical framework. The results are analysed and a new set of questions is developed to use for the practitioner interviews.

Collecting Evidenced Based Practices

The new set of questions is the basis for collecting evidenced based practices in practitioner interviews. The results from these interviews are analysed and compared to the results from the industry expert interviews. In this way essentially two multiple case studies with two different participant groups can be cross analysed both within the participant group and across the two groups. Combining both evidenced based best practices and emerging practices with the underlying theoretical analysis offers a first set of best practices supported by formal research and with potential for a high level of acceptance, thus fulfilling the relevant criteria for best practices.

4.2 Interviewing Techniques

Successful interviewing techniques will enhance the reliability of the study and thus contribute to the overall value. Various guidelines in respect to preparing and conducting an interview are available. Preparation and well-mannered behaviour are valid but also obvious hints (McDowell 1999). Crawford (1997) offers an in-depth description of both the design of questionnaires and the personal interview. He includes a number of review questions that can be applied to ensure the quality of the design. Crawford recommends recording interviews, potentially even to engage a scribe. Specifically for in-depth interviews documenting answers while leading through questions is normally not possible. Crawford (1997) outlines nine steps for successful questionnaires:

1. decide on the information required
2. define the target respondents
3. select the method(s) of reaching the respondents
4. determine question content
5. word the questions
6. sequence the questions
7. check questionnaire length
8. pre-test the questionnaire
9. develop the final questionnaire

Even though these steps were developed for conducting marketing research they can be applied here.

4.3 Selection of Participants

Selecting the participants in both the industry expert and the practitioner group is crucial for the quality of the best practices. Criteria must be defined to establish that the industry experts qualify for this role and that the practitioners enjoy a successful implementation of the

technology in question. Typically criteria for industry experts include the number of reports published, years of experience, etc. Practitioners should have an implementation of a certain size which has been productive for a reasonable amount of time. Often the industry experts or vendors can make recommendations on successful practitioners. On the practitioner side it is important to include both the specialists and the end users of the solution. As discussed in the technology acceptance model the end user satisfaction is a clear indicator of success.

4.4 Data Collection Strategies

The data is primarily collected from in-depth interviews. The interviews are based on a standard questionnaire. The questionnaire for the industry experts is developed based on the theoretical framework. The questionnaire for the practitioners is developed based on the results from the industry expert interviews.

It is recommended to collect as much background information as possible on the cases prior to conducting the interviews. This will allow for a better comparison of the participants. As a preparation for the interviews the project and system documentation should be requested up-front to prepare for the interviews. A direct observation of the implementation is another possibility to gain additional data.

4.5 Data Analysis Strategies

The validated data needs to be categorized and structured. The analysis is conducted relying on the theoretical propositions identified as the starting point (Yin 2003, p. 111-112). The inclusion of multiple cases and the two domains of practitioners and industry experts allows for a multi-dimensional cross-case synthesis.

The answers from both interview groups should be categorized. A sample coding scheme is described in Table 1. Coding Scheme.

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Code	Meaning
0	Indifferent
++	Mandatory
+	Supportive
-	Endangering
--	Prohibitive

Table 1. Coding Scheme.

4.6 Methods of Achieving Validity

It is appropriate at the very early stage in the diffusion of a new technology to focus on a small number of cases and explore these in detail. By nature this approach sacrifices some of the potential for generalization of the results. A careful review of the available techniques for ensuring validity and reliability suggests not relying on the classic methods testing construct, internal and, external validity, as well as reliability.

The notion of reliability refers to the repeatability of the results. This strongly depends on the quality of the measurement instruments, measurement process or in general the collection of data. The disadvantage of a case study heavily relying on in-depth interviews is that the answers will to some extent depend on external factors. Minor variations in the answers from individuals could occur at different times even if the same interviewer would ask the same questions in the same context. The reliability depends on the applied measurement tool. The proposed measurement tool for this case study is the questionnaire which will be used for the interviews plus the interviewing techniques. This will follow the principles identified above to ensure the reliability of the instrument. This can be mitigated by running a pilot case study. This will allow for reviewing the questionnaire if necessary.

The results should be validated using the alternative criteria for qualitative research proposed by Guba and Lincoln (Lincoln 1985) listed in Table 2.

Traditional Criteria for Judging Quantitative Research	Alternative Criteria for Judging Qualitative Research
internal validity	credibility
external validity	transferability
Reliability	dependability
Objectivity	confirmability

Table 2. Alternative Criteria for Validating Qualitative Research. Source Trochim (2002).

To ensure credibility, which means that the participants in the interviews can identify with the collected data and the drawn conclusions, a draft report is submitted to the participants for reviewing. The transferability, as the external validity, is normally limited due to the small population. The dependability substitutes the reliability attribute used within quantitative research. One method to enhance dependability is triangulation. The same data should be collected from multiple sources. In this methodology the responses collected in the interviews are compared to the available documentation. A direct observation can contribute additional aspects. To address confirmation the report can be exposed to a peer review. Re-conduction of the interviews most likely will not be feasible due to anticipated resource constraints on the participant's side.

These measures should also satisfy the requirements for establishing construct validity.

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