Strategies of Organizational Informatization and the Diffusion of IT

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INTRODUCTION

The demand for a *strategic use of IT* is an often heard, but a rarely checked demand. Therefore some aspects should be discussed to get a more realistic view upon the 'strategic use' of IT:
- Which factors do influence the diffusion of IT in number and regarding to the real patterns of usage?
- Does the introduction of new information technology happen in accordance to strategic approaches?

This paper founds on the author's dissertation (Weissbach 2000), which analyzed the diffusion of ISDN (Integrated Services Digital Network) telephony in Germany. The results of the dissertation have been reviewed and refined regarding to some other actual trends.

THEORETICAL BACKGROUND

"Informatization"

A key term in the analysis of the strategic use of IT is the term of "*informatisation*" (Nora & Minc 1979). (The English translation, *The Computerization of Society*, differs a little from the meaning of the original term.) Informatization can be regarded as a new quality of technical rationality (Marwehe 1996) and differs from classical rationalization in overcoming the restraint upon single functions. So the organizational rationalization joins the technical rationalization.

While at first the term was used in a more general context, later it was extended to the level of the individual organization. In this research context, informatization can be defined as the process of the planned and systematical usage of IT penetrating organizational functions.

The Diffusion of IT

Technology *diffusion* means the diffusion of technology in the market. The early discussion about the diffusion of capital goods was dominated by structural aspects like the companies' size or the grade of centralization (Fantapie Altobelli 1990). Later theories focus more upon the actors: In the approach of Kotzbauer (1992), the individually perceived grade of an innovation influences the diffusion of a technology. A medium grade of innovation will be advantageous to get adopted. Rogers (1995) argues for a more dynamical approach and defines diffusion as a process by which an innovation is communicated through certain channels over the time among the members of a social system. As a network technology, the benefits of communication technologies are depending on the quantity of other (linked) users.

The aspect of communication is emphasized in the concept of the so-called *Leitbildern* (leading visions) (Marz / Dierkes 1992). These are paradigms which perform as well an agenda setting function (the leading function) as an imaging function which is establishing a community.

Evidentially, the individual adoption of a new technology influences the adoption by other actors. Professional journals and the direct communication in professional groups are the channels, in which concepts and experiences are discussed and in which the *Leitbilder* are distributed.

Management Strategies and IT

In the first decades of IT development, IT was assessed as a 'simple' technology for rationalization. But since around 1.5 decades management strategies like *Business Process Reengineering* (Hammer & Champy 1994), *Virtual Organizations* (Davidow & Malone 1993) or the paradigms of *electronic / mobile commerce* are basing on the possibilities of IT for organizational and business changes. The paradigms of electronic commerce need by definition completely IT based, integrated business process chains from the suppliers to the customers. According to the new possibilities and the new technological paradigms, the new approaches and strategies have changed the focus towards the categories of *communication* and *knowledge* beside the category of *labor*. So a direct relation between management strategies and the usage of new information technologies could be expected.

DESIGN OF THE STUDY

The study bases on the analysis of 92 case studies. 80 of them are published, 12 case studies base on own interviews. Most of the published case studies were found in management publications, congress proceedings and in marketing brochures of the carrier, the former *Deutsche Bundespost* (now: *Deutsche Telekom*). As a basic assumption, the published case studies were assessed as innovative examples for the usage of the technology. The case studies were analyzed regarding
- the ideas of the usage of ISDN (*Leitbilder*),
- the introduction of the new technology,
- the patterns of the technology's usage,
- the relation between the technological attributes and the organizational structures,
- the relation between the different groups of actors,
- the changes over the time.

The analysis of the hard facts was completed with a qualitative interpretation of the motives with a raw structure, but without a detailed scheme.

The results of the dissertation have been reviewed and refined regarding to actual technological and management trends (hardware: UMTS / WLAN, storage systems; software: CRM, general strategies: electronic commerce / mobile commerce).

INFLUENCING FACTORS ON THE IT INTRODUCTION

Strategy Or Accident?

The analysis of the case studies shows that the concrete process of IT introduction is a more complex process than discussed in the past. The management strategy is the background for the interpretation of the technology, but the strategy does not explain the process sufficiently. Strategic aspects will influence the attitude against a new technology, but the attitude will not take a direct effect on the buying decision.

The concrete process of IT introduction is influenced by
- technological attributes,
- external factors (laws, standards, the diffusion of complementary goods, ...),
- internal factors (organizational culture, economical situation, ...).

The technological quality is important, but not sufficient for the decision for a new IT product. Important supplementary factors are

- the substitution of an old product, which is influenced by the conditions of depreciation,
- breaks in the organization's development, such like acquisitions or new co-operations, and
- the concrete requirement for special technical features (in the case of ISDN: rapid file transfer, especially of image files).

In the buying act, the importance of technological attributes falls back behind the individual situation, like existing technologies, depreciation, leasing contracts, the concurrence of other projects, the compatibility to existing business processes and the personnel situation.

Also we have to consider, that an organization's strategy is not homogenous. The different (groups of) actors in an organization may have different aims, and the strategy of the technical management might differ from the strategy of the financial management or the production management. Therefore the process of informatization is reflecting the divergent strategies of the different groups in the management. These strategies can change over the process of technology introduction. "The strategy" as a single, unified strategy is a myth!

The Relationship Between Management Strategies And Technology Strategies

A direct dependence of technology strategies from business strategies should be expected, but this is an exception. An (abstract) management paradigm doesn't determine concrete decisions about IT. Even the paradigm of e-commerce is not coupled with obligatory products, only with standards. On the other side, concrete IT products can be related to various management strategies. An infrastructure technology can be set in relation to several management strategies.

The strategies of informatization are oscillating between actual business strategies on the one side and technical and economical constraints on the other side.

This weak relation between technology strategies and business strategies must be seen in a correlation with the life-cycles of IT and of management strategies. The introduction of new technologies and the substitution of old technologies in the market lasts over a longer period, often longer than a decade. So the longer the life-cycle of an (information) technology, the higher is the probability that management strategies will change over the time. Early concepts like the usage of ISDN as a LAN technology were superseded over the technology's life cycle. The possibility of a variable interpretation regarding to different management strategies allows a long-lasting modernity.

Technology Driven Implementation Versus Organizational Driven Implementation

The phrase 'organization before technology' is a 'tradition' in change management. But a technology driven implementation of information systems can catalyze new experiences and can enable innovative processes, if the implementation phase will be used for learning. So a multi-step implementation of a new technology is a common practice: In the first step, a new product will be introduced to solve a concrete problem. This problem could be for example a removal, a replacement purchase (after the end of a maintenance contract or because of higher maintenance costs for the older product) or a special new requirement. The usage patterns are often conventional. In later steps, more innovative features can be introduced.

In the case of ISDN, this technology was used at first as a replacement for older PBX (with lower maintenance costs) and for data transfer between the headquarter and branch offices respectively between suppliers and customers. Innovative applications like telephone conferencing or integrated multi media applications like the simultaneous transfer of speech and images have been the trigger for the implementation of ISDN only in a few cases.

In some business branches companies in a central function forces the diffusion of ISDN in this sector. Sometimes these companies offer special services, just like technology support or consulting.

Originality, Prototypes And Templates

In the ISDN introduction process, we see some specific qualities of the several business branches, according to specific business processes. Technology suppliers publish and offer approved solutions for specific use cases. These technical and organizational solutions will be templates for implementation processes. So a certain standardization of solutions will progress.

CONCLUSION

The results of this study show, that the processes of the ISDN implementation are complex processes which are strongly influenced by organizations' individual aspects. General management strategies have only little influence on concrete decisions and implementation processes. They will set up an interpretation and restraint frame, which has to be filled individually for each organization, but supported by common visions.

Normative approaches are not adequate to describe the real processes of informatization and technology diffusion, neither on a macro level nor on the level of individual organizations. In reality, these processes are more complex and must be analyzed with a background which reflects technological, economical and organizational factors over the life cycle of the technology.

As a consequence for the actors, the IT suppliers have to offer strategies for a 'smooth' transformation into new 'IT landscapes'. Technological compatibility in combination with migration checklists, experienced consultants and system experts are an efficient way to increase the acceptance of a new product or a new technology. Approved solutions could be published and will influence the further discussion and deciding processes.

The customers' management has to solve the problem of deciding on long-range investments without transparency about the future management strategies. So there exist two effective strategies for the customers' IT management:

(1) Introducing information systems requiring a short-range amortization. This strategy doesn't reflect potential developments, but sometimes it will be economically necessary. Typically the usage of the systems is conventional, but the technology can be the base for later developments.

(2) Introducing information systems with a special view on a flexible usage as a 'service' for different management strategies and for an innovative use of the technology. This strategy requires a high level of business skills in the information systems management and needs a close integration of business and technology management strategies.

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