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Success factors for information logistics strategy — An empirical investigation

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ABSTRACT

Providing analytical information to all stakeholders in a timely manner remains, in the face of current challenges, a key issue in organizations. Information logistics (IL) extends present concepts of decision support like business intelligence by focusing on enterprise-wide information supply and the exploitation of synergies. The article investigates which factors play critical roles in the success of IL strategies. An empirical study by means of a causal analysis provides evidence for significant relationships between those factors and organizational performance. The study identifies comprehensiveness, flexibility, support, communication, IT strategy orientation, business/IT partnership, and project collaboration as influencing factors for IL strategy success. Not all success factors, however, validated in related strategy research can be confirmed in the IL context.

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1. Introduction

Analytical information systems (AIS) represent an essential component of the enterprise application landscape. Current trends like compliance management, the need for cost reduction, and globalization demand increasingly the delivery of the right information to the right people at the right time for decision-making purposes. Up to now, concepts like business intelligence (BI) and data warehousing (DWH) have been dedicated to the systematic and purposeful analysis of an organization and its competitive environment. Therefore, they are of ongoing high relevance for an organization's information management [5,86]. Current studies confirm this observation. Luftman and Ben-Zvi, for example, have identified BI as the most important key issue for CIOs [61].

Increasingly, persons in charge of providing analytical information have to consider the entirety of decision support initiatives in a comprehensive and superior manner; as well as the long investment cycles and the infrastructure character of these projects. These requirements are in particular addressed by the information logistics (IL) approach [22,23]. IL is intended to serve as a conceptual foundation for supporting a large variety of decisions in an organization and across organizational boundaries, thereby focusing on the exploitation of synergies rather than on 'local' processes and user specific decision support. It can be seen as an extension to 'traditional' decision support approaches like BI and DWH.

Both the previous approaches and the new paradigm of IL require the overall, superior, and long range planning, implementation, and control of all related activities in order to reach the specified goals — by doing the right things (effectiveness) and doing things right (efficiency). In other words, a strategy (and according governance structures) is needed. Based on the IL understanding (cf. Section 2.1) and on Earl's definition of information technology (IT) strategy [24], IL strategy is understood as a concept to systematically pursue long-range, enterprise-wide, aggregate goals for IL in sync with IT strategy and business strategy [22]. It is widely accepted that a strategy is characterized by two perspectives [e.g. 67]. Introduced by Chandler [11], Ansoff [4], and Andrews [3], the distinction between strategy content and strategy process research represents a leading division of the discipline, with far-reaching implications even today [54]. The content-related perspective specifies the strategic positioning by defining goals. However, a workable strategy should by no means be limited to the mere statements on goals — it must also show concrete development paths and ways to achieve those goals. This perspective is addressed by the strategy process. Strategy process research deals primarily with the actions that lead to and support strategy [54]. The Harvard Business School, and in particular Andrews [3], developed a model of strategy process and introduced the influential two-stage distinction of strategy formulation and strategy implementation.

IL strategy aims at coordinating the diversity and multitude of 'local' goals (of different organizational units or functions), at harmonizing solution 'islands' technically and/or from a business point of view, and at aligning short-terms targets with long-term planning. It has to be permanently reviewed and be adapted if necessary to business strategy amendments, IT strategy updates, and technology innovations, since

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the business environment is quite volatile [22]. Many organizations are currently faced with implementing an IL strategy or BI strategy, respectively. According to Dinter and Winter [22], only 9.3% of the organizations have already implemented a dedicated IL/BI strategy, 43.7% are currently implementing, and 37.1% plan to implement such a strategy. These figures underline the need for methodological guidance when planning and implementing IL/BI strategies. Advice regarding the strategy content and regarding the strategy process (cf. above) is not enough; organizations also need assistance in determining which factors might influence the success of such an implementation. However, there have been very few contributions to IL/BI strategy from the scientific community (cf. Section 2.2). In particular, to the best of our knowledge there are no publications that address the success factors for IL/BI strategy explicitly and comprehensively. The paper at hand aims at closing this research gap and answering the following research question by means of empirical analyses:

> *What are the predominant critical success factors of IL strategy, i.e. which factors have significant impact on the success of an IL strategy within real-world organizations?*

The gain in insight with respect to this research question may be beneficial to both the scientific community and real-world organizations. The results also provide guidance which factors should be considered when thinking about analytics holistically, i.e. when broadening the perspective from single instances of BI projects to an enterprise IL strategy. Finally, we might — as a side-effect — gain insight if the IL concept contributes to organizational performance.

The remainder of this article is structured as follows: The second section provides an introduction to the concept of information logistics, an overview of the state of the art regarding IL/BI strategy, and an overview of success factors for various strategy research streams. In Section 3 the research model and its hypotheses are presented. The design and procedure of an empirical analysis that was conducted by means of structural equation modeling in order to address the research question is outlined in the forth section. Section 5 includes the results of the analysis, i.e. the success factors for IL strategy. These findings are interpreted and discussed, and the need for further research is identified in the sixth section, which concludes the article.

2. Conceptual foundations

2.1. Concept of information logistics

AIS projects might be driven by isolated and rather local information requirements resulting from 'local' tasks and/or roles and might be characterized by short-term considerations. The awareness and effort for synchronizing and integrating those independent project activities is limited. The IL concept aims at overcoming these deficits and extends the concepts of decision support like BI and DWH by emphasizing the enterprise-wide, synergy oriented information provision. In particular, IL supersedes isolated, process- and user-specific initiatives in favor of global solutions with a global maximum business value.

Abstracting from technically oriented differentiations of information supply (data warehouse systems, data marts, OLAP, etc.), and focusing on conceptual aspects, IL can be defined as the planning, implementation, and control of the entirety of cross-unit data flows as well as the storage and provision of such data [22]. It is characterized by:

- A broader focus that not only emphasizes IS (and corresponding IT) aspects, but also examines the strategic, organizational, and implementation aspects in an integrated way [2,17].
- Explicitly encompassing the basic functions of management (planning, implementing, and controlling) in contrast with traditional BI/DWH approaches which focus primarily on requirements and solutions engineering. As a consequence, IL also considers the continuous evolution of AIS and their operations.
- Specific organizational structures that ensure effective coordination among the participating organizational units in order to generate synergy effects and to make sure that enterprise-wide goals are attained. Consequently, IL has to be aligned with the organization's overall goals (i.e. the business strategy) and has to address business needs and interests.

The last characteristic describes the demand for a holistic approach which is similar to general logistics. It originates from the total system concept and its system theoretical principles, described e.g. in ref. [15]. It is based on two major assumptions: first, in complex systems the results of decisions and/or activities of subsystems affect the remaining subsystems and/or the overall system, respectively; i.e. the subsystems are not acting independently. The second issue addresses the synergy effects, as introduced e.g. in ref. [4]. The term 'synergy' is mainly used for the phenomenon if the whole is greater than the sum of the parts.

Both aspects are relevant in the context of IL as well and address the issue of a holistic enterprise-wide (or even cross-company) view instead of isolated projects. In an organizational context, synergies are created if the output of one organizational unit can be used as intermediate input for another one, or if organizational units bundle their competencies and thereby reduce costs or create added value [53]. Particularly the bundling of products, the combination of competencies, and the integration of (e.g. customer) knowledge necessitates data transfers between organizational units — this is the 'business case' (i.e. economic justification) of IL.

2.2. IL and BI strategy — state of the art

As already mentioned, we define IL strategy as a concept to systematically pursue long-range, enterprise-wide, aggregate goals for IL in sync with IT strategy and business strategy [22]. As the IL concept is quite new, there is very little scientific contribution explicitly addressing IL strategy [22]. More practical experiences and scientific publications can be found when regarding the related concepts of BI strategy (more often used) and DWH strategy (less often used and mainly technically oriented). Nevertheless, due to consistency reasons, we use the term 'IL strategy' for the remainder of the article. By analogy with the aforementioned IL definition, the IL strategy extends a BI strategy by pursuing IL-specific goals, in particular, generating synergy effects and enhancing cross-unit and cross-functional provision of analytical information in organizations.

Although a wide range of (also scientific) publications about IT strategy in general exists, not much has been contributed on the transfer of such concepts to BI and DWH — which is remarkable, taking the long tradition of BI and DWH research into account. Publications mainly focusing on the strategy (development) process (cf. Section 1) are mostly practitioner-oriented [e.g. 8,30,88]. They address methodologies for the IL strategy definition process and usually adapt the generic strategy development process by adding practice-oriented suggestions for the IL context. Many authors point out that IL strategy should be aligned with business strategy and that its goals have to be derived 'top down' [e.g. 48,59].

Other contributions focus on particular issues like DWH architecture [e.g. 10] or organizational issues [e.g. 26,93,95]. Several practitioner publications propose IL strategy components [e.g. 33,38,59]. Different artefact types are mixed and declared as strategy components, without any evidence of completeness or correctness. Finally, another class of contributions present findings about IL strategy by means of case studies and case examples [e.g. 63,88].

Publications that emphasize and detail the role of AIS to support the business strategy and the strategic management process [e.g. 78,85] do also not address the IL strategy in particular.

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