Deduction of Digital Transformation Strategies from Maturity Models

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Abstract. Nine out of ten business leaders plan to gradually increase their companies' digital maturity. However, many struggle to pick from a wide range of promising digital solutions, facing major uncertainties with regard to a specific digital transformation strategy. Especially, Small and Medium-Sized Enterprises, rather stick to stand-alone solutions than developing comprehensive digital strategies. The purpose of this paper is to deduce digital transformation strategies in SMEs incorporating maturity models. The latter are often starting point to determine the status-quo of digital maturity and to deduce stand-alone measures. Although the content of digital maturity models is constant, the level of majority is dependent on the company's strategy and operating model. Thus, maturity models can serve as a validation tool in an agile digital-strategy practice.

Keywords: Digital transformation · Maturity model · Digital strategy

1 Introduction

Digitalization is a major trend across all industries. Its importance is undisputed. Companies across all sectors are concerned with digital strategy, although still in its infancy at presence [1]. Many struggle to pick from a wide range of promising digital solutions, as the nature of technical, economic and social processes changed drastically with the progressively digital transformation [2]. Consequently, an appropriate assessment method is needed to cope with the huge number of digital solutions and to guide Small and Medium-Sized Enterprises (SME) out of their comfort zone [3]. Although a single digital strategy is crucial, defining target levels one has to distinguish between organizational enablers and distinctive technical capabilities serving as enablers for, and future digitized solutions. Digital maturity models are a promising approach to assess the digital as-is situation and to determine a suitable target position for the deduction of suitable digitalization projects [4]. Therefore, this paper attends the purpose to incorporate digital maturity models to address existing hurdles of current approaches for the development of digital transformation strategies.

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2 Theoretical Background

2.1 Ambiguity on Digital Transformation and Digitalization Strategies

Digital strategy and digital transformation are terms frequently used in current, predominately practice-oriented, literature [5]. However, both concepts lack a commonly accepted definition [6] and are often used interchangeably with terms such as digitalization, digitization or digital transformation [7]. Despite similarities and interrelations, it is essential to distinguish for a consistent use of terminology [8]. Digitization essentially refers to converting analogue information into a digital format, while digitalization refers to the way business and society changes through the use of digital technologies [9]. In a business related context, digitalization is about leveraging digital technologies to revise processes, products and user experiences [8] Thus, digitalization is a customer-driven process that changes technical and social aspects and therefore goes beyond a plain technical transformation [10]. The goal of digital transformation is to reach digital maturity, which defines a state of ability to achieve the desired transformation [11]. To put it in a nutshell, we digitize information, digitalize elements of business operations and digitally transform business models and strategies. A company's digitalization strategy besides digital transformation objectives contains guidelines, plans, controlling structures and most important a digital vision [12]. Therefore, many consider it to be part of a company's business strategy [13]. A digital strategy is the strategic roadmap to cope with all digitalization projects within a company and is the strategic answer to a digital transformation.

2.2 Maturity Models as a Tool to Assess Digital Maturity

The goal to reach digital maturity plays an important role for a company's digital vision and therefore for the deduction of digital strategies [14]. On the other hand, digitally maturing companies are more likely to have a clear and inherently consistent digital strategy [15]. However, to define a company's individual level of digital maturity it is essential to determine the status quo.

In general, maturity models are characterised by

- A structured manner to determine the concrete situation of valuation
- Incentives and measures to systematically improve capability levels
- Capabilities to monitor successful implementation of specified measures [16]

Consequently, maturity models do not only describe an evolutionary path to a state of perfection based on the status quo, but also act as an instrument to evaluate the degree of progress to reach maturity [17]. Because maturity models are a suitable tool to assess skill levels, to systematically, improve capability levels and to monitor these measures, they constitute a practicable instrument alongside digital transformation.

Recently maturity models became a popular tool when it comes to assess SME's digital maturity [4, 18]. As a special class of reference models, digital maturity models describe an evolutionary path to a desirable state within the context of digital transformation [11, 16]. This state is known as digital maturity representing the ultimate goal of the

transformational process [19]. Initial practice-oriented research proposed plenty scales and archetypes to assess digital maturity in SME [20]. A solid overview of the diversity is conveyed by Akdil et al. [21], Mittal et al. [4], Chanias & Hess [20] and Carolis et al. [22]. Although maturity models characteristics vary significantly, the majority relays on similar revalidated procedures and instruments.

2.3 Existing Approaches on Digital Strategies

In order to obtain clear insights on the state of the art, an extensive comparison of literature was conducted. Current literature proposes several different approaches for the development of digital strategies, which in general are composed of four generic phases.

1. Determination of initial situation
2. Definition of target picture
3. Deduction of digitalization measures
4. Implementation of digitalization projects

These four phases are often closely related to corporate strategy and linked to the guiding principle of a digital vision [14]. Both can be seen as superordinate. With regard to the four phases some generic disadvantages were identified for SME.

1. The determination of the initial situation with common analysis tools and methods is strongly dependent on evaluators' digital knowledge and experience with the evaluation method. Objectivity is a further cause of objection [2].
2. Most approaches lack a support of foresight methods and only refer to the assessors' intuition when it comes to the definition of desirable target picture.
3. Existing approaches either fail to hint on how to close the gap between initial and target situation or the methodology does not consider interdependencies and synergies in developing ways to close existing gaps.
4. Often a practicable tool to monitor the implementation, in particular of immaterial measures, is missing. By taking individual measures interdependencies and synergies between measures and future digitalization projects drop away.

Although some authors assume the digital strategy to be independent from digital maturity, the vast majority argues that there are some strong interrelations. Thus, it seems natural to involve digital maturity models into the development of digital strategies.

3 Research Approach

In order to address practical disadvantages in the development process of digital transformation strategies and to identify appropriate classes of maturity models to support this process, a multi-methodological research approach was carried out. In an initial literature review, current approaches for the development of digital transformation strategies

were analysed and examined for similarities and generic challenges. Results were discussed with representatives from 19 SME as part of the QuickCheck digitization [23]. In addition to the practice-oriented problems, requirements for maturity models in particular, were defined for the individual phases. These supplemented a cluster analyse of 38 digital maturity models. Finally, results were matched and clusters were assigned to the phases based on the requirements.

4 Incorporating Maturity Model into the Development of Digital Strategies

Many companies are struggling to develop comprehensive digital strategies, facing uncertainties, obstacles and generic challenges. The disadvantages described in Sect. 2.3 can be eliminated or mitigated by using maturity models. However, there are a number of digital maturity models with individual strengths and weaknesses [19]. These strengths and weaknesses need to be compared with the challenges of strategy development and used in a targeted manner. Accordingly, the individual models are suitable for different uses in the course of developing a digital strategy. For better understanding, clusters are formed, which can be illustrated in the model shown in Fig. 1. However, the derivation and cluster analysis should not be part of this paper. Instead, the three cluster categories are briefly explained in order to establish the relationship to the strategy development process.

In practice, maturity models are normally used to disclose as-is situation and target maturity levels. However, digital maturity models are also used to identify measures to close the gap to reach digital maturity and even to benchmark against competitors. In consequence, the following typically consecutive purposes of use are distinguished:

1. descriptive: The maturity model is used as a diagnostic tool to assess current capabilities of the functional area, department or enterprise under investigation and to assign maturity levels with respect to given criteria [16, 24].
2. prescriptive: The maturity model supports the identification of desirable maturity levels and derives concrete measures to close existing gaps between actual and target situation [16, 25].
3. comparative: The maturity model allows for internal as well as external benchmarking based on historical assessment data [24].

In addition to the field of application, the effort, i.e. the resources used in terms of time, personnel and capital, is decisive for the strategy development process in practice. For a rough classification, these are summarized in the category form of execution, bringing in the underling assessment method. Mix forms are in between.

1. Online self-assessment: Are suitable for a quick and resource-saving insight. Usually a single person answers a standardized online questionnaire addressing universal and predominantly technical aspects of digitalization.
2. Internal project: In a single day workshop, internal teams usually deal with the evaluation. Efficient processing requires a deep understanding of the capabilites to be assessed and the method itself.

3. External project: The assessment is carried out with the help of external consultants. In collaboration with internal teams, they assess the level of digital maturity within several workshops and interviews. This usually is the most costly form of execution also requiring high coordination efforts.

The remaining classification variable describes the object under investigation

1. Objects: Specific digital technologies, e.g. big data, block chain or cybersecurity, are qualitatively assessed from supply side or user perspective.
2. Division: Processes and structures of a single division are analysed for a specific topic, like Industry 4.0.
3. Enterprise: The digital maturity of an enterprise is assessed with regard to a desirable state of preparedness for digital transformation. Dimensions span from technology to culture and organizational criteria.
4. Sector: The influence of digitalization on a sector is assessed with regard to general statements from a supply side and user perspective.

Determination of Initial Situation
Digital maturity models provide a snapshot of the present level of digital maturity, representing the status quo within a company. Thus, they often serve as a starting point in the development of digital transformation strategies [18, 21]. However, a single person usually is not able to give detailed answers for all divisions. To build on a well-defined initial situation it is essential to assess processes, structures and socio-technological aspects in detail. Within several workshops and interviews a deep understanding of the as-is situation must be generated. This requires a high level of experience with the assessment methodology and a thorough understanding of the evaluation criteria [4]. Objectivity is also crucial. Many SME systematically overestimate their level of digitalization [2]. Therefore, the highest accuracy of evaluation and most comprehensive maturity models are suitable to determine the initial situation. An intensive cooperation with external experts is recommended.

Definition of Target Picture
Digital maturity usually is equated with digital readiness, which represents an enterprises state of preparedness for the digital transformation. The second dimension, representing the effect of digital transformation on the enterprise, is often neglected. Remane, et al. call this dimension digital impact [18]. However, both dimensions are crucial to define an enterprises target picture. In a first step, the digital vision is developed in accordance with corporate strategy. This is influenced by the digital impact, which results from customers and clients' expectations on the digitalization level and competitors level of digital maturity. For this purpose, a corresponding customer perspective should be taken in the qualitative assessment with maturity models. The focus is on the investigation of generalized and predominantly technological aspects of digitalization. However, it is crucial to involve clients and customers at an early stage. Intensive discussions between experts may sharpen the picture of competitor's maturity level. In addition, it can be helpful to get a picture of your own industry within a workshop and to assess its future

degree of digitization. Future potential and realistic target situations should be considered. To sharpen the own digital vision external benchmarks based on historical data are very helpful. Online self-assessments are usually suitable for this. It is recommended to discuss criteria internally, though.

Deduction of Digitalization Measures

Many SME do not dare to go beyond the previous step, because they fear to overlook essential aspects. Therefore, with a clear target position at hand, a detailed methodological approach to deduce measures to close the gap between initial and target situation is needed. Since this is a crucial step, specialist and methodological knowledge are required. Internal and external experts usually complement each other. Interrelations and synergies between technical and socio-technical criteria must be considered. Therefore, results should be brought together at divisional and enterprise level. Knowledge about previously unknown interdependencies is gained through an intensive and regular monitoring during the implementation phase. Attention should be paid, that the majority of existing maturity models neglects situational factors, such as structure, corporate culture or size, in order to reduce complexity [25]. However, these are crucial to systematically derive synergies, obstacles and interdependencies between digitalization measures and transformational strategies.

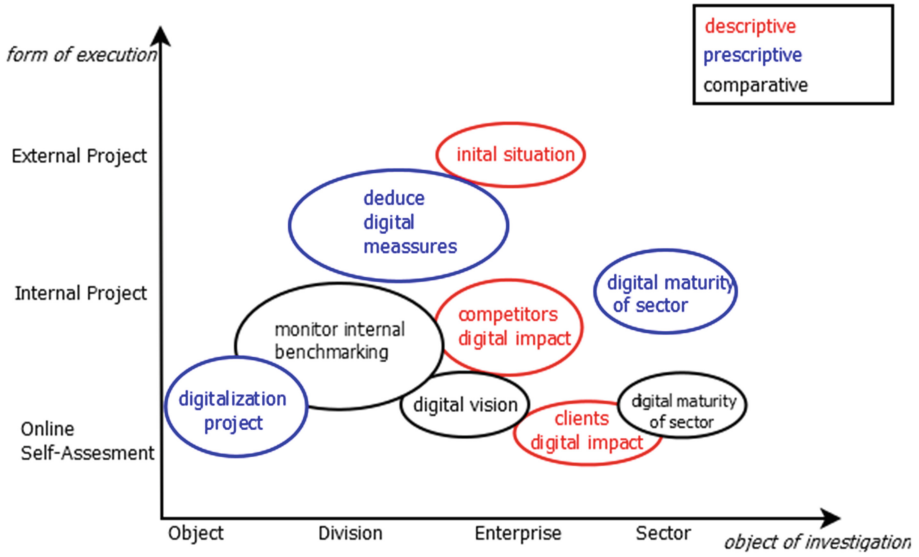

Fig. 1. Classification of the requirements for a maturity models in order to counter disadvantages of existing digital strategy approaches.

Implementation of Digitalization Projects

In order to get early indications of synergies and hurdles between the criteria when implementing measures, it is recommended to prepare implementation by evaluating the as-is and target level for the specific digitalization project. Beside the supply side

perspective taking on a user perspective is essential. Reassessing during implementation supports an agile implementation and early indication of socio-technical hurdles. Online self-assessments are suitable to gain quick and resource-saving insight. All digitalization projects must be monitored and regularly evaluated to identify unwittingly movements in maturity levels. Internal benchmarking across all digitalization projects direct the focus on urgent fields of action.

5 Conclusion

To reach a state of digital maturity, that enables an enterprise to achieve the desired transformation, plays an important role for the deduction of digital strategies. In particular, SME struggle to define a comprehensive digital strategy and a clear digital vision, facing uncertainties, obstacles and generic challenges. A growing number of practice-oriented digital maturity models, with a consecutive purpose of use, presents SME with the challenge of choosing the correct model to mitigate these generic disadvantages within the strategy development phases. Therefore, a classification of the requirements for digital maturity models is provided to support the selection process when incorporating digital maturity models into digital strategy. However, the validation of the classification and of the use within the four phases of digital strategies is still pending.

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