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Initialising customer-orientated digital transformation in enterprises

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Abstract

Digitisation forms a part of Industrie 4.0 and is both threatening, but also providing an opportunity to transform business as we know it; and can make entire business models redundant. Although companies might realise the need to digitise, many are unsure of how to start this digital transformation. This paper addresses the problems and challenges faced in digitisation, and develops a model for initialising digital transformation in enterprises. The model is based on a continuous improvement cycle, and also includes triggers for innovative and digital thinking within the enterprise. The model was successfully validated in the German service sector.

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Keywords: Industrie 4.0; digital transformation; digitisation; customer expectations; continuous improvement

1. Introduction

"*Digital is the main reason just over half of the companies on the Fortune 500 have disappeared since the year 2000*" ~ Pierre Nanterme, Accenture CEO. A recent phenomenon, *digitisation*, has gained a lot of traction and

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completely changed customer behaviour and expectations, and therefore implicitly forced the reinvention of business in order to create and keep customers.

Digitisation forms a significant part of possibly the largest world-wide trend, Industrie 4.0, and threatens to entirely transform organisations and current business models [1, 2].

Customers today no longer only expect companies to respond to their expressed demands, but implicitly expect companies to anticipate and address their future needs before they themselves have realised them. This proactive customer orientation has been found to be the most consistent driver for both customer value and gaining a competitive advantage in this digital era [3]. Manufacturers of the future should, therefore, be more focused on the consumer's needs and value creation niches within systems [4], named by many as smart service or smart production [5]. Companies that embrace these new demands will succeed, whilst others will disappear entirely. Hamish Nuttall, founder of the digital start-up 'the Naked Bus' believes that: "[…] if you don't reinvent your business, chances are somebody else will" [6]. This paper aims to identify the problems and challenges faced on the road to becoming digital and analyses a new approach for companies to initialise their digital transformation.

2. Digital transformation

Since the purpose of any company is to turn a profit by meeting customer demands, it is crucial to understand how digitisation affects the customer. Hughes [7] addresses some key changes in this changing customer behaviour. Not only are customers less forgiving of mistakes and less loyal to a single company, they are also more informed, communicate more with other customers and are forming ever higher expectations regarding digital service provision that spans across all channels and industries [7]. To add to the increased demands from customers, companies are facing ever tougher competition due to globalisation [8]. Companies in all branches are feeling the pressure to go digital, and know that they need to do so quickly before they are left behind by innovative and digitally-focused competitors and new entrants [9, 10].

2.1. Digital barriers

Although most companies have realised the need to digitise, various challenges are inhibiting them from starting or benefitting from digital transformation [8]. These challenges can occur during all three phases of the digital transformation as defined by McAfee et al. [8], namely the initiation phase, the execution phase, and the coordination phase. Typical barriers mentioned by companies themselves include insufficient IT structures, lack of technical skills, inadequate business processes and high implementation risks and costs [8, 10, 11]. Albrecht [12] addresses possibly the most important cultural barrier which is often underestimated and usually not recognised by companies. This is people's unwillingness to change, and their indifference to the necessity of a radical change such as digitisation.

The question then becomes: How can companies overcome these obstacles and become digital?

2.2. Digital maturity of an organisation

Azhari et al. [13] provides a maturity model for the digital transformation which clearly depicts the multifaceted depth of digitisation. The maturity model, as shown in Figure 1, is comprised of 8 dimensions of digitisation, namely strategy, leadership, products, operations, culture, people, governance and technology. These dimensions can be fulfilled to varying extents. Five levels of digital maturity are defined according to which companies can classify themselves.

The first level, "unaware", describes companies in which there is no strategy for digital transformation, nor are there any digital competencies available. These companies do not yet offer any digital products or services, and are missing an overall organisational awareness for the need of digital transformation. Companies classified by the "conceptual" level, are those which offer a few digital products, but are still without a digital strategy. Those with a "defined" level of digitisation, are the companies who are able to consolidate experiences gained from pilot implementations into partial strategies. At this stage, a culture of digital thinking is taking root in the company. The profitability of these partial strategies and the effects of the pilot implementations are assessed and used to develop an overall digital strategy. At this point, where a clear digital strategy is developed, the company falls into the "integrated"

maturity level. Only once this strategy has been implemented across all products and business processes, can the company be classified as "transformed". The now-defined digital strategy will have transformed the business and operations models of the company [13].

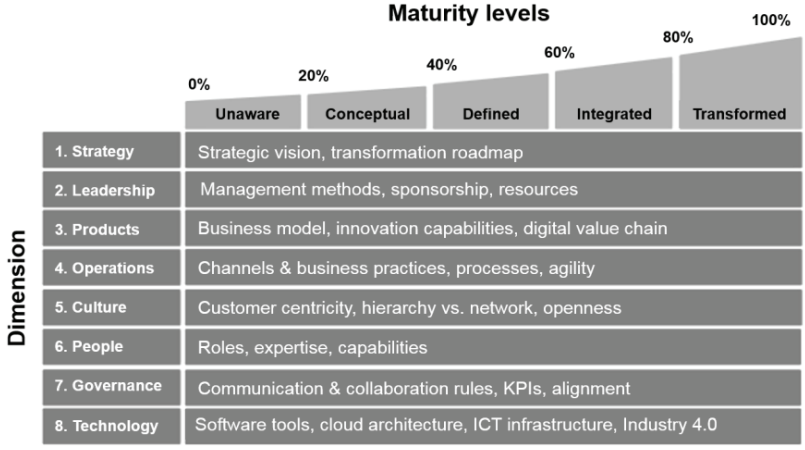

Figure 1: Digital maturity of an organisation [13]

Whilst the maturity model provides a good way for companies to classify themselves into a category of digital maturity, it provides no guidance for increasing the maturity level. Although the desire to digitise exists for many companies, a correct or clearly defined method for success does not [11, 14]. Partly this is because digitisation has taken business as we know it, to what Bessant et al. [15] define as "beyond the steady state". This realm of instability is reached when "something happens which dislocates this framework and changes the rules of the game" [15]. Since digitisation has a huge disruptive effect on all industries and makes entire business models redundant [2], it can indeed be seen as changing the rules of business as we know it. Reacting and innovating in such a dynamic environment will be anything but simple.

The problems however do not lie solely in the scale of novelty of the disruption as one would expect, but rather in the company's inability to function outside of its normal operating environment [15]. This would suggest that factors such as lacking IT structures or technical skills which are thought to be the culprits, are in fact not the main inhibitors of digitisation, but rather a lack of leadership [8] and digital agility [16] within the company.

Whilst literature fails to provide a defined method for becoming digital, experts are in agreement that digitisation is not just about technologies, but rather that it requires a radical strategic and cultural change from within the company [16, 17, 18]. Companies could therefore look towards strategic management models for a transformation method for digitisation.

3. Traditional strategic models

Many strategic planning and management models exist in the fields of process management and business planning which help companies manage business strategies and which could prove useful for digitisation. Since digitisation requires radical changes not only in terms of strategy, but also in terms of culture within the company, another branch of management models, namely radical change models, may also be considered for digital transformation.

3.1. Management models

Possibly one of the most well-known models for strategic planning and management, is the Balanced Scorecard. The Balanced Scorecard is used to provide management with a quick, but thorough overview of the company's performance on a strategic level [19]. Another management model which builds up on such a standard measurement

model, is the Performance Prism. The Performance Prism provides an implementation plan of which measures to implement into which processes in a way that optimises both the stakeholders' inputs and the stakeholder return [20].

Whilst many similar models exist and can be useful in structuring a company strategy, the guidelines are often generalised and provide only a limited practical orientation. Another commonly-noted deficit with such strategic transformation models is that they often linearise relationships which are, in reality, complex and dynamic. Interactions between different company levels (from strategic to operational), as well as between different processes within the company, are oversimplified, leaving the practical implementation suggestions as entirely unattainable theoretical goals. [21]

3.2. Implementing radical change

A radical change model takes these dynamic system interactions into account and places a greater focus on the practical implementation of a defined strategic change (as opposed to the management thereof). An example is the Matrix of Change, which was derived from the well-known House of Quality (QFD) in Quality Management. As shown in Figure 2, the Matrix of Change is comprised of four steps. Using this model, the critical processes in view of the company objective are identified. The practical interactions between the processes are then assessed and mapped in the form of a matrix. The so-called transition matrix is then created by analysing the transition (including system interactions) required to move from the current system to the target state. The final step of the model involves customer and stakeholder analyses for the selection of target processes to be implemented in a prioritised order. [22]

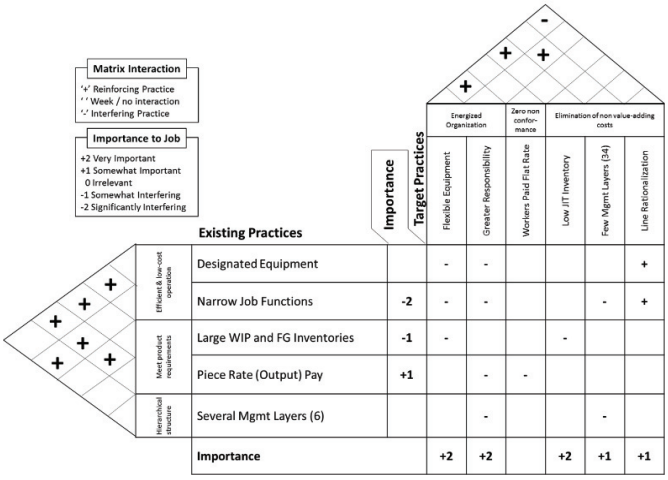

Figure 2: Matrix for implementing radical change [22]

Strategic change models such as these are, in general, comprised of a top down approach within a company. As implied in the name, a change is invoked on the strategic level of a company, and transcends down into the lower levels, using the model as a guideline. The ultimate purpose of employing such a model is driven by the need to innovatively improve processes, reduce costs, and improve customer satisfaction, with the ultimate goal of increasing market share whilst achieving a higher profit.

4. Shortcomings of strategic models

A defining characteristic of strategic change models available, is that they are built on the assumption that the company has envisioned its future state, upon which all change can be effected. A strategy, or target state of the company is required, such that initiatives and required skills can be deduced, and these changes can then be led from the top down [8].

A problem arises when a company is venturing into an entirely new branch of change, and does not yet have a solidified strategy upon which to build its change. This is a very real problem in the case of digitisation, where the full range of possibilities remains latent [17]. The question thus arises how a company can be guided towards a strategic change and implement the changes required to reach a new state of business, without having a clear, predefined strategy and goal, if this is the requirement for using a strategic change model.

It is exactly these gaps in digitisation literature, which this paper seeks to close. It aims to provide companies that lie at the dawn of digitisation and do not yet have the digital capabilities or leadership required to foresee their end-state, but feel the pressures to digitise, with a model for initialising their digital transformation.

5. A conceptual solution

Although companies are unclear about where to begin their digital transformation [11], "the focus of any transformation effort should be on the efficiency and effectiveness of the bottom line, which always connects to the customer" [23]. Digitisation should therefore always be focused on improving customer (both internal and external) experiences [16]. For a manufacturing company, this may mean automating processes to deliver better quality products to the customer at a faster pace, whilst for the service industry this may mean digitising and improving communication and contact points to the customer [24]. This notion of having customer experience at the centre of digital transformation was used as a basis for the development of the initialisation model.

Davenport [25] discusses two possibilities for approaching a change from within an organisation, as opposed to the standard strategic top-down approach. The first approach is radical innovation, and requires the company to take large jumps towards transformation. The second is continuous improvement, which is executed consistently to gradually transform the company.

Various views regarding which approach is best suited for digitisation exist. One view is that since digitisation is transcending "standard" business at such a revolutionary pace and scale [17], companies need to innovate and keep up with the pace to secure a future digital success [9]. Others argue that companies who have not yet begun their digital transformation, have a very large gap to close, and they need to do so quickly [9]. This requires them to implement quick wins, but at the same time requires a constant transformational progress until an innovative state can be reached.

Perhaps neither approach is sufficient in itself. The risk of implementing a radical change in an unknown field such as digitisation is extremely high, but progressive change without innovation is also limited since the company in question will never manage to be a market leader in such a dynamic and inevitably innovative environment. The model developed was therefore built up as a continuous improvement change process, with built in triggers of innovation to be iteratively executed until digital and innovative thinking [8] is embedded within the company culture.

Bessant [15] provides guidelines for an innovation model within an environment "beyond the steady state". The following guidelines provided for the triggering phase of innovation in an unsteady state [15] were used in the development of the initialisation model:

- Use multiple and alternative perspectives;
- Seek out potential new technologies;
- Tune in to distant market signals to detect trends early on;
- Generate ideas together with external perspectives; and
- Emphasise experimentation.

Not only is this "outside in" perspective [7, 26] of incorporating external perspectives important, but one should also look to "innovate with the ecosystem", where ideas are generated in an open innovation system [7].

The above-mentioned points were used as guidelines to design the model for initialising digitisation shown in Figure 3. The model was developed as a PDCA (Plan Do Check Act) Deming Cycle, in which iterative implementations will assist the company in developing a digital strategy and inducing a culture of change and digital thinking within the company.

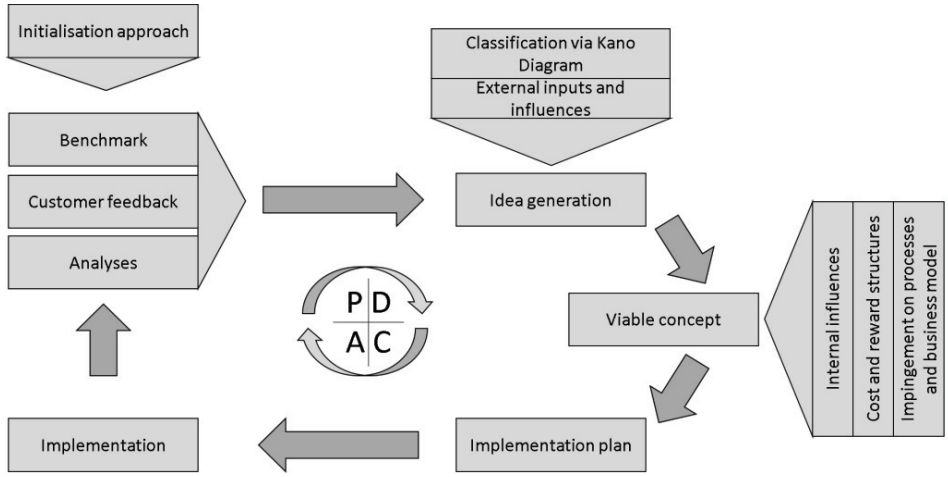

Figure 3: Conceptual model for initialising digitisation and sustaining competitiveness

As mentioned previously, the focus of digitisation should be on improving customer experiences. Since this could mean different things for different industries, the first step in the model's execution is to define the initialisation approach according to the specific industry i.e. whether to start with operational processes, the business model or the customer contact points. In the following step, multiple analyses are conducted. These include not only a customer analysis, market analysis and competitor analysis, but also an analysis of other branches. Analysing other branches is vital, since one of the new customer behaviour patterns caused by digitisation is that they expect digital services they have experienced in one industry in every other industry as well [7].

Since customer experience is the focal point of digitisation and therefore the model, conducting a VOC (Voice of the Customer) is crucial. Customers can often provide the most valuable feedback regarding current products or processes which may lead to innovative ideas.

Another important input for generating ideas, is conducting a benchmark. A benchmark can allow a company to quickly orientate itself according to competitors, and determine how far behind or ahead they are in various aspects, and thereby identify areas where improvement is highly overdue. For a benchmark to be most effective, it should include both quantitative and qualitative criteria [27]. Benchmarking on a regular basis will not only allow companies to identify their digitisation level in relation to competitors, but may also spur innovation forward [27]. Assessing oneself and best practices may lead to the identification of areas in which no one has succeeded and may, with experience, lead to the generation of innovative ideas.

The final input into the idea generation pool is that of external inputs and influences. Customers are not only valuable in the form of the feedback they give, but they could even have innovative ideas themselves. Such open innovation instances, i.e. collecting ideas from the external environment, can often add a refreshing and innovative outlook as opposed to that of the company and its employees. Other external influences which may influence the viability of ideas, include factors such as legal restrictions.

All ideas generated are then classified according to a model such as the Kano Diagram [28]. Since customer experience is the central point, such a classification helps analyse the impact of an idea on customer satisfaction, and is a very good way of understanding the VOC. In the Kano model, ideas are classified into "must-haves" (things expected by the customer which, if not fulfilled, result in customer dissatisfaction), "one-dimensional" ideas (which have a linear relationship with customer satisfaction), and "attractive attributes" (unexpected add-ons which drastically increase customer satisfaction) [28].

After each idea from the idea pool is rated in terms of costs and rewards of implementation, as well as the influences it may have on the current business model and processes of the company; internal influences such as budget, available resources and overall company vision are used to prioritise and select ideas for implementation.

In further iterations of the model, customer feedback is used for new inputs, and the benchmark as a relative measure. The company in question can assess how quickly or slowly they have progressed in their digital transformation in relation to their competitors. This again feeds back as an input: If all competitors are improving at a faster rate, the company in question needs to increase the rate of change, and if they are moving at a faster rate in comparison to competitors, they may choose to continue at this pace in the hope of overtaking competitors, or slow down and release some resources for other company tasks.

6. Case study: Service sector

As a first validation of the developed conceptual model, it was applied in a regionally-focused company in the German service sector, which has realised the pressures to digitise but is unsure where to start its transformation. Although the company has realised the need to digitise, there is no clearly formulated digital strategy for transformation yet. An in-house project group has been created to lead the transformation with the initial goal of formulating a digitisation strategy. The company does not offer a continuous range of digital products or services, although it provides customers with partially digital functions in the form of a single product completion and isolated digital service functions. These functions are not integrated in a fully digital process but still comprise of manual processing components and can thus not be classified as fully digital products or services. According to the maturity model described by Azhari et al. [13] and depicted in Figure 1, the company in question falls into the "conceptual" level of maturity.

Since the company forms part of the service industry, the approach selected was to focus on customer contact points as this is the first place where customer satisfaction can be quickly and effectively influenced.

After conducting a customer segmentation and analysis as well as a benchmark, it was established that the company in question was relatively far behind in most aspects and channels of digitisation. Customer expectations from other branches of the service industry were analysed and used to generate ideas in combination with creative idea generation methods.

The ideas generated were classified according to the Kano model, into basic must-haves, functional ideas and innovative game changers, and then prioritised in terms of a risk reward analysis. Ideas with the highest reward per risk received priority over high risk, low reward ideas.

An outcome which spoke for the validity of the idea generation process, was that basic must-haves were those with the lowest risk and lowest reward (since they are expected by customers), and those ideas classified as game changers were those with the highest reward, but to a large extent also those with the highest risk. As Henry Ford said in 1922 already: "The short successes that can be gained in a brief time and without difficulty, are not worth much" [29]. Almost 100 years later, this still rings true. In a fast-paced field such as digitisation, where the innovative ideas of yesterday become the standard of tomorrow, implementing the basics is a must, but since they do not allow for innovation, innovative ideas need to be incorporated in parallel. It is therefore vital that the company finds the best balance between catching up with the competition (best practice follower), and continuing to pursue innovation in the hope of implementing the next big game changer.

Taking into account that the company was relatively far behind the competition, it was suggested that all basic ideas with a reward:risk ratio larger than 1 be implemented at once. To avoid pursuing a "best practice follower" strategy, it was suggested that the top ideas from each of the other classifications (functional ideas and innovative game changers) also be considered in terms of the available budget.

By iteratively executing the model, it is intended that the company will learn, through customer feedback, which digital concepts appeal best to customers and which do not. With each further iteration of the model, the company will induce a culture of innovation and digital thinking, and converge towards a successful digital strategy [15] and reach the "defined" state of the maturity model, from which all further growth will be determined by the newly-defined digital strategy.

7. Conclusions and future work

In this paper, the development of a model to initialise digital transformation was discussed. The model is by no means a roadmap to complete digitisation, but instead offers companies who have no clear digital strategy or vision, with a starting point and procedure to converge to a point where a digital strategy and vision can be formulated.

The model was successfully validated on a regionally-focused company in the German service sector. For completeness, the model should also be validated in a different industry where the initialisation approach may be different to that of the service industry. Since the model was developed for an environment "beyond the steady state", it is intended for use not only for digitisation, but for any radical new environment into which a company wishes to move but does not yet have a clear strategy for. It is therefore suggested that the model be applied and tested in other environments.

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