



Toolbox of Methods for the Digital Business Transformation

A Blueprint for the Education and Training of Service Engineers

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Abstract. Modern business models are increasingly seen as a source of outstanding organizational performance and competitive advantage that either synergizes with the previous business model or completely replaces the previous strategy. For enabling this transition the paper describes an advanced model to master the digital business transformation. Based on a large literature review the paper will identify useful methods and tools which are used in modern industrial companies. By this the findings serve as blueprint for the education and training of future service engineers and deliver the basis for the elaboration and design of according skill cards.

Keywords: Service · Education · Tools · Digital business transformation

1 Introduction – Business Models and Trends

1.1 A Subsection Sample

Today's trends such as lean supply chain, smart manufacturing, cloud platforms, big data management, artificial intelligence, augmented and virtual reality, mobility, smart e2e transparency, additive manufacturing, customization, service-orientated business models and outsourcing etc. are all based on the changes of customer mentality and technological advancements. Through the faster means of communication caused by the introduction of worldwide accessible internet, trends form and can spread much faster than ever before in history. Figure 1 shows the different driving factors on business model trends.

Shorter product life cycles, continuous changes of business processes and higher customer expectations lead to a new kind of relationship between the customer and business partners within the value chain. Customers expect faster business transactions, one-stop-shop solutions and transparency in the supply chain. This is only possible, if companies can digitalise information and data about products, customers, processes and services and thereby digitally transform their business model. With this new working method, a high amount of data is collected about business procedures and

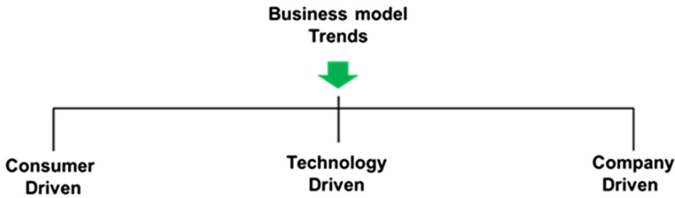


Fig. 1. Business model trends

production processes, customer demands, as well as data about internal and external communication, requiring a high amount of management and data analysis.

Digital transformation means a reorientation of products, services, processes and business models towards the continuously digitalised world and results in faster transactions and more reliability through quality and security and therefore leads to higher customer satisfaction [1]. The digital transformation of business models can be implemented in three general phases (see also Fig. 2):

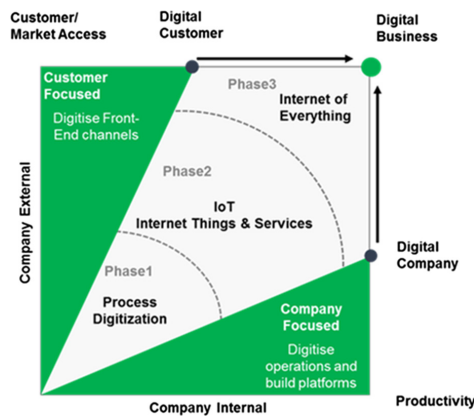


Fig. 2. Digital transformation (modified and enhanced according to [2])

- Phase 1: Digitise the current business and build a platform for digital processes.
- Phase 2: Integrate Internet of Things (IoT) functionalities into the platform and develop digital services.
- Phase 3: Close e2e loop of the entire business operations and modularize platform services [2].

Figure 2 depicts the journey from the traditional to the digital business. The model is divided into company internal and external elements, as the digitalisation of a business model can only work, if both the customer side and the own company can be “digitalised”. This begins through the digitalisation of the channels and processes used to create or provide value. Afterwards, the digitalisation of products, services and other

objects included in the value chain. Finally, full digitalisation of all transactions and procedures with a high automation level leads to a fully digitalised business model [3].

2 Transition from Traditional to Modern Business Models

Modern business models are increasingly seen as a source of outstanding organizational performance and competitive advantage that either synergizes with the previous business model or completely replaces the previous strategy.

New business models such as pay-per-use (usage-based payment e.g.: Car2go), peer-to-peer (trade between private individuals e.g.: Airbnb) or performance-based contracting (payment for the final performance e.g.: Rolls Royce) have revolutionised entire industries. Therefore, many companies have changed their model to move from pure product sales to the sale of problem solutions and services. When servitization moves a manufacturer all the way to becoming a solution provider there are major changes on the business model (Fig. 3).

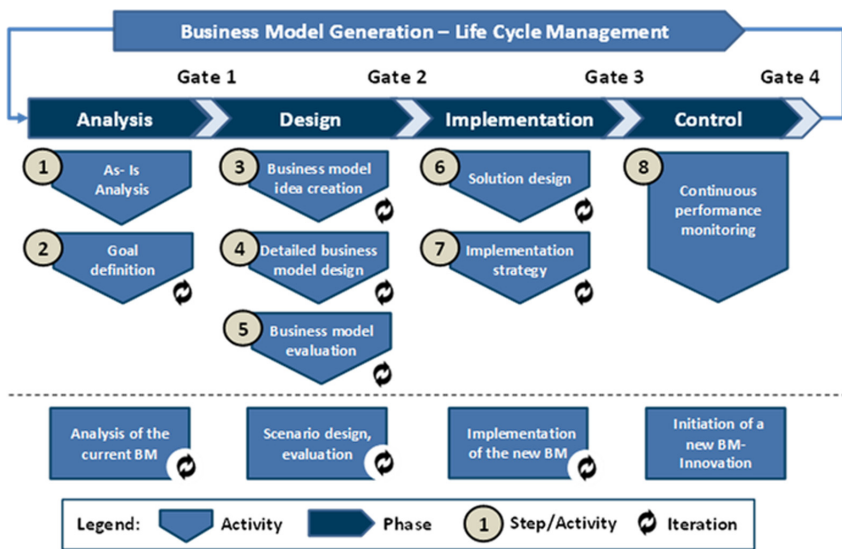


Fig. 3. Process model for business model innovation (modified and enhanced according to [6])

For enabling this transition, several frameworks are described in the literature [4, 5]. Figure 4 shows a modified and advanced model based on Bucherer which is applied for the development of a new business model on the basis of an existing model. It consists of several phases in which different activities are proposed. After each phase there is a gate which requires a verification, if the planned solutions and the meaningfulness of the concepts are given. When this is fulfilled the next phase starts, otherwise there is a need to start from scratch with the previous phase. This model is to be understood as a cycle and should serve to question and optimize the business model during the entire life cycle.

		Steps	Explanation	Proposed Methods
Analysis	①	As-Is-Analysis	The current state of the company is analysed to find out what issues exist and what the best practises are. The goal is to ensure common understanding on why a new business model is necessary and to find out what went wrong.	1. SWOT analysis 2. Benchmark 3. Ishikawa
	②	Goal Definition	Before developing ideas, the enterprise must decide which direction should be taken and what the goals are.	1. GAP analysis 2. Goal Pyramid 3. Scenario analysis

Fig. 4. Analysis – steps and tools

3 Methodology for Transformation

To develop a new business model and to transform the current business model, numerous methods exist to support the process. To provide extensive applicability to any kind of business sector, the stepwise approach presented was based on a combination of methodologies from various authors.

A methodology is defined as “a system of broad principles or rules from which specific methods or procedures may be derived to interpret or solve different problems within the scope of a particular discipline. Unlike an algorithm, a methodology is not a formula but a set of practices” [7]. The following chapters will explain the created methodology and shows the recommended methods that can be used. The set of methods in use have been selected based on a literature research and interviews with practitioners from industrial companies [8–13].

However, this process and its tools must be followed and used by a competent team with a suitable set of skills. The selection of the team members is highly important, as the business model they will find could be crucial to success. The aim of the business model transformation is to improve the existing business or change it with the result of success and higher profitability. One of the keys to success is not only the team, but also the dedication of the top management to increase innovation and change [9].

3.1 Phase of Business Analysis

Companies are a complex of various elements and interdependencies. Three main parts of the company should be analysed: The own business model (customers, value proposition, value chain and profit model), the stakeholder (customer incentives, partners, competitors) and the external influences on the business (ecosystem) [14].

Questions to be answered during the as-is-analysis of the business are:

- What can my company provide to be attractive and accepted in the future?
- What must change to ensure sustainable survival and competitiveness?
- What mechanisms must be implemented to recognise opportunities, risks and the need for change early on? [15]

Step 1 - As-Is Analysis

The As-Is-analysis includes all functions and departments of a company, the product spectrum, technology, production depth, quantity framework, financial data, customer and supplier data, organization data, all methods and tools used, as well as the employees and their relationships toward each other and the company. During the As-Is-analysis deficits will be found, which are a result of various reasons. For example, wastage of resources or potential of the employees or not seizing opportunities by acting in a non-future orientated way [15]. A literature review shows that the methods have been listed to be the most suitable and applicable in operational business:

- SWOT [4, 5, 8]
- Benchmarking [9, 15]
- Ishikawa diagram [4, 5, 16].

Step 2 - Goal Definition

The highest level of a company goal is the vision. The vision is the long-term goal of a company that describes the general purpose of the company [8]. An example for a vision from Procter & Gamble is the following:

“We will provide branded products and services of superior quality and value that improve the lives of the world’s consumers, now and for generations to come. As a result, consumers will reward us with leadership sales, profit and value creation, allowing our people, our shareholders and the communities in which we live and work to prosper” [17].

When developing goals the company should decide what they want to achieve, where they want to stand in the future and in which amount of time the goal should be achieved. According to a literature review the following tools are essential in practical use:

- Goal pyramid [4, 8]
- Gap analysis [4, 8]
- Scenario analysis [4, 5, 8].

3.2 Phase of Design

In this phase ideas for the new business model will be systematically developed. This is mainly done by work groups applying creativity techniques (Fig. 5).

The identified business models will then be designed and evaluated according to the company goals and capabilities. Figure 6 shows the single steps.

Step 3 - Business Model Idea Creation

The idea finding phase marks the beginning of the business model development process. The goals have been defined and the development direction set. Either an existing product or service is to be improved or a completely new idea is to be developed. In either case a key aspect is to take the customers into account. It is crucial to understand what the customer needs and where his inconveniences lie, as well as what the customer expects from the company. Another question to be answered is, how the company can position itself in a way to satisfy the customers need in the best manner in

	Steps	Explanation	Proposed Methods
Design	3 Business model idea creation	Ideas are collected in groups and systematically developed. This phase lays the foundation for the further steps	1. Destroy your business 2. Empathy Map 3. St. Galler business model navigator
	4 Detailed business model design	The ideas are transformed into business models and described in detail.	1. Canvas 2. SIPOC
	5 Business model evaluation	The new-found business models are evaluated to enable a comparison and also to help decide on the most suitable one.	1. PESTEL Model 2. Porters Five Forces 3. Value Benefit

Fig. 5. Design – steps and tools

	Steps	Explanation	Proposed Methods
Implementation	6 Solution design	Considering all relevant details of the new-found business model on which the planning and implementation phase is based	1. Detailed Process design 2. Resource planning 3. Investment planning 4. Business Case
	7 Implementation strategy	Definition and development of the implementation strategy. Setup of a transformation plan regarding change management aspects	1. Project Charter 2. Action plan 3. RACI plan 4. Project Plan 5. Transformation Plan

Fig. 6. Implementation – steps and tools

comparison to the competition. All methods to develop creative ideas and to emphasise creativity underlie the same principles: understanding of the challenge, loosening of transfixed stereotypes and assumptions, recombining existing approaches and solutions and refining of ideas through criticism and improvement [18].

This phase helps to create new ideas through creative thinking, without being influenced by existing business models and ideas, as well as the current business model in place [19]. The following sections will explain some methods to develop creative, innovative ideas. The most commonly used idea generation methods are mind mapping and brainstorming. However, these will not be looked at further, as they are very simple and well known. For operational business applications the literature references the following tools:

- Destroy your business [11]
- The empathy map [13]
- St. Galler business model navigator [14].

Step 4 - Detailed Business Model Design

After some ideas have been gathered, they should be thought through systematically. All aspects should be considered, to enable a holistic perspective of the business model and to ensure its functionality. For this the most proven tools used in practice are

- Business Canvas [1, 13]
- SIPOC [9, 20].

Step 5 - Business Model Evaluation

Having described the business models through the canvas and SIPOC method, the business models can now be evaluated. However, this can be a difficult task due to incomparability or through incomplete perspectives on the business models. Therefore, first of all an environmental analysis for each business model that is estimated to be promising should be made and then an objective evaluation with a systematic procedure and reasonable evaluation criteria should be followed. Literature reports to apply the following tools:

- PESTEL [19]
- Porters five forces [19]
- Value benefit analysis [21].

3.3 Phase of Implementation

In this phase the solution starts the design for the new found business model. All relevant aspects and details have to be considered and included into the new solution.

After the final approval of the solution design the business model has to be implemented into the daily operation and business routines. For this a detailed implementation strategy has to be elaborated to master this transition with regard to all kinds of management aspects.

Step 6 - Solution Design

This step focuses on the business model that is planned to be used and helps to prepare and consider all aspects that are relevant for the implementation of the new business model. According to several authors this step is being performed by the application of the following tools.

- Detailed process design [4, 5, 9]
- Resource & investment plan [4, 5, 9, 22]
- Business case [9, 22–25]
- Performance management [12, 26, 27].

Step 7 - Implementation Strategy

When all the framework has been set, the implementation strategy can be developed. The goal of the implementation strategy, is that the current processes can be transformed without major delays and downtimes. Furthermore, the resource availability is to be considered and the influence on the running operations or departments before setting up a project. It is recommended to start a pilot first, to stabilise the processes and find gaps and potentials for improvement. The old and the new process should be operated in parallel, so that the new process can gain maturity and stability [9]. The implementation of a new business model within a firm should be done through a project. Beforehand, some planning must be done to define the framework. Therefore, project management elements will be used to support the transformation [19].

Beginning with the project charter, that defines all important elements of the project a second important document will be presented, that is used throughout the entire transformation phase: the project plan. Furthermore, a RACI plan is put together, to define the roles and responsibilities during the transformation project. Finally, a budget plan for the project is set up. Applicable tools to finish this step are:

- Project charter [9].
- Action plan [9].
- RACI matrix [9, 28].
- Project plan [9, 28].
- Transformation plan [11, 12, 29–32].

3.4 Phase of Control

The final phase aims at the continuous evaluation of the newly implemented business model. For this the operational performance figures have to continuously monitored and controlled in a structured manner (Fig. 7).

	Steps	Explanation	Proposed Methods
Control 8	Continuous performance monitoring	Continuous evaluation of business model performance. In case of deviations activation of measures to keep business on track	<ol style="list-style-type: none"> 1. Balanced scorecard 2. Break-even analysis 3. Rolling forecast

Fig. 7. Control – steps and tools

Step 8 - Continuous Performance Monitoring

The objective of this final step is to ensure a durable and sustainable development of the new business model. Therefore the current operational performance is permanently monitored and benchmarked against previously defined key performance figures. By this deviations and according counter measures can be taken at an early stage. Various authors recommend the following tools to master this step:

- Balance scorecard [12, 14, 32, 36, 37]
- Break even analysis [12, 14, 32–37]
- Rolling forecast [12, 14, 32, 36, 37].

4 Summary and Outlook

The paper describes a process and a toolbox of methods for the digital business transformation. The single phases have been subdivided into smaller single steps. To master the steps a literature review has been performed to identify useful methods for the practical execution. This toolbox of methods can be used as a blueprint for the education and training of future service engineers. Therefore it is recommended to integrate the identified methods and tools into the curriculum and elaborate according skill cards for training and education.

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