Digital Transformation

Operationalization in Practice

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Company Information

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Preface

Digitalization has caused a considerable shift in the economy and society. To prevent being left behind by these developments, companies must actively work to shape them - regardless of their industry. Of course, there are clear differences between the individual industries: In some cases, for example, telecommunications providers and utilities companies have already made greater progress than banks or insurance companies. Taking a backseat is not an option for anyone. "Short fuse, big bang" - that is many people's credo when it comes to risk.

Digitalization has resulted in the appearance of new competitors on the scene, such as Google, Apple, Amazon and Facebook. They are pros at digital business transactions and with such proximity to customers they are also able to offer their users products that allow them to quickly compete with companies from a variety of industries who have not yet made the move to digitalization. Whether the self-driving vehicles that Google is currently working on or insurance products through Amazon, this means they pose a threat to established companies and should not be underestimated. In doing so, however, they also provide opportunities for new business models and new fields of business.

How can companies deal with this? Our customers usually say, "Digital transformation: sure, but how?" We are absolutely convinced that: Employing the right method is the key to success in this case. The whitepaper at hand presents the "digital transformation cycle", a concrete approach model for how you, as a company, can effectively implement digitalization on an operational level - from the initial idea to the sustainable solution - as part of your enterprise architecture.

In our opinion, digitalization means first and foremost making the customer's perspective your focus. Meaning, the customer experience becomes a digital and innovative customer journey. In the future, business models will have to be more closely aligned with customer benefits and a new type of customer behavior. Effectively capturing the customer perspective can be very challenging for companies at times. Yet, doing so is necessary to advancing one's own business model. The digital transformation cycle describes how companies can develop a digital vision for a product or service as part of an interdisciplinary transformation project and then actually realize that vision with the support of IT.

This is an approach we have already successfully used and implemented in a variety of use case scenarios and projects. That is why we decided to introduce the digital transformation cycle to a wider audience and in doing so, providing assistance in the concrete realization of digital transformation. Do not wait any longer! Those who embrace digital transformation now will have the chance to grow with it!

We hope you find this paper inspiring!

Frank Plechinger
Member of the Board of Directors at msg

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Executive Summary

Digital transformation is in full swing. Over the mid to long term, companies that fail to embrace it will be pushed out by newcomers and digitalized competitors. However, those that do embrace it have laid the groundwork for remaining competitive into the future and will likely be able to penetrate new fields of business as well.

Ensuring the optimal focus for digital transformation is not always easy: on the one hand, digital transformation awareness must be instilled throughout the company, starting with the uppermost management, who must live it by example and demand it of others, while on the other hand, companies must recognize their own digital maturity.

The key driver of digital transformation is the customer experience as that is the most important factor that sets products and companies apart from the competition. As a result, it is customer experience management that forms the basis for digital transformation. The customer experience impacts all levels of digital transformation and requires a radical change in the approach most companies tend to take.

As a process that involves integral changes, digital transformation takes place on both the organizational and the operational level. With the digital transformation cycle, we have developed an approach for digital transformation that is based on three fundamental theories. The approach is incorporated into an organizational transformation that then manifests itself in the operational level. During this process, the digital transformation cycle explicitly addresses the needs of traditional enterprises and not start-up companies.

The foundation behind the effectiveness of the digital transformation cycle is the so-called “customer experience”, which employs new technologies to align the business perspective with the customer perspective. Digital, Internet-linked business models emerge that require the existing IT structure to be examined. The digital transformation cycle provides new methodical approaches for the fundamental and very necessary change in the way business is thought about.

It breaks digital transformation down into six disciplines, each of which has a well-defined approach and a party that is responsible for it, while each also requires special skills and generates a specific result. The disciplines are the result of the fundamental theories, which they then put into practice. In doing so, the customer experience influences each and every discipline in the cycle. In addition, the digital transformation cycle enables and promotes collaboration in interdisciplinary teams with a digital focus.

Examples from a variety of industries illustrate the approach using concrete use case scenarios and an actual project. Let us go down the road of digital transformation together. We will successfully guide you to your destination.

> You've got to start with the customer experience and work back toward the technology – not the other way around.
>
> Steve Jobs

The Digital Triple

1

Digital Customer Experiences

Products and services are strongly oriented around actual, perceptible customer benefits and the new type of customer behavior. The consequent integration of customer-oriented technologies produces digital customer experiences.

2

Digital Business Models

The technological and functional connection to the customer enables new digital business models that offer fast access to products and services and that can be easily adjusted to changes in the market.

3

Digital Companies

The cloud is forcing the traditional limits of corporate IT wide open and is enabling a global link to customers, new partners and new technologies. Well-aligned IT governance is the key to creating a successful digital company.

> Change before you have to.
>
> Jack Welch

Companies in Transition

Industrial Revolutions

The first industrial revolution led to mechanical machinery and mass production (1760-1840). It was shortly followed by steam engines and electricity (1840-1870). The third revolution was seen with the emergence of digital technology and the introduction of computers (1955-1975). The revolution that is currently taking place began around 1990 and produced things like the Internet, the PC and Smart devices. This revolution is still in full swing today and is nowhere near finished.

Each new technical opportunity also meant a decisive move toward the industrial production of projects. With each of these moves came a strong transition in established professional and private lives.

The first two industrial revolutions allowed, first and foremost, a mechanical and at times the automated mass production of products. Everyone was able to purchase large quantities of goods at affordable prices.

The third industrial revolution, the so-called “digital revolution”, finally introduced electronic data processing (EDP) to the economic system. Now, machines could be operated by computers instead of people and business processes could be handled electronically instead of on paper. This enabled even greater precision and a much higher rate at which machines could be operated and information could be processed.

For the past 20 years we have been experiencing the fourth industrial revolution first hand: The worldwide Internet, that connects desktop PCs, Smartphones and - not least of all - Smart watches, business life and even everyday personal life are now exposed to a type of communication and collaboration never seen before, which grows in intensity by the day.

> **The one who does not want to change will lose what he wants to preserve, too.**
>
> Gustav Heinemann

Digital Transformation

Whereas the generation of "digital skeptics" still takes a hesitant view of new technologies and channels of communication and collaboration, the generation of "digital natives" has grown up with it.

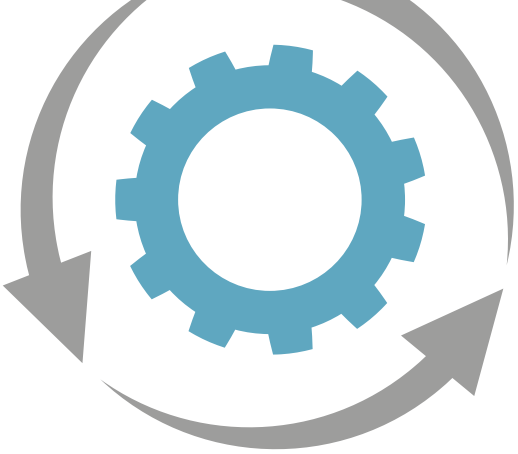
Use Facebook to stay permanently informed about what friends are up to, LinkedIn to maintain contact to acquaintances and business partners, Twitter to publicly voice opinions and feelings, Instagram to share selfies, eBay to buy or sell on a whim, Skype to communicate worldwide at no cost and Google Mail for your central communication headquarters: for young people, these are all part of everyday life now and are even considered by some to be essential.

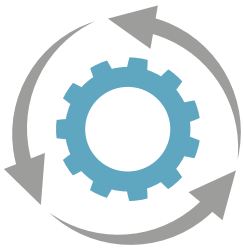
Although the fading private sphere, loss of protective anonymity and ability to withdraw from social life, as well as the demand for constant availability and a blurring of the lines between professional and personal time affiliated with these technologies do face some critical discussion and scrutiny in our society, the majority of people tend to see these side effects as an acceptable part of the transition our era is undergoing.

Regardless of how the social influences of the fourth industrial revolution are viewed, companies and even individuals still have to come to terms with the social changes it has generated.

Individuals can make their own choices about when and to what extent they wish to adapt. Companies, on the other hand, are feeling the pressure to convert: half of their customers are now digital natives and they expect integrated online communication, customized offers, online payment options and much more.

In today's business world, companies are not merely looking at ensuring proper and efficient use of EDP; instead, they must now embrace the end-to-end digitalization of their own business, while ensuring a strong focus on the changing needs and wishes of the modern customer. The majority of companies must undergo a so-called "digital transformation" if they hope to remain successful in this new kind of market.





Disruptive Market Players

As Uber, the online broker for driver services, became more and more popular in 2014, especially in the USA, fearful taxi drivers across Europe protested against the “disruptive” competitor. Another example is AirBnB, a community market place for private booking and rental of lodging, which has seen unmitigated success and created massive turmoil in the entire traditional tourism industry.

The reasons are similar to numerous other “disruptive” market players: these types of companies ignore the traditional business model and even some of their rules, steam-rolling industries even as newcomers with their extreme digital business approach, even ousting established players.

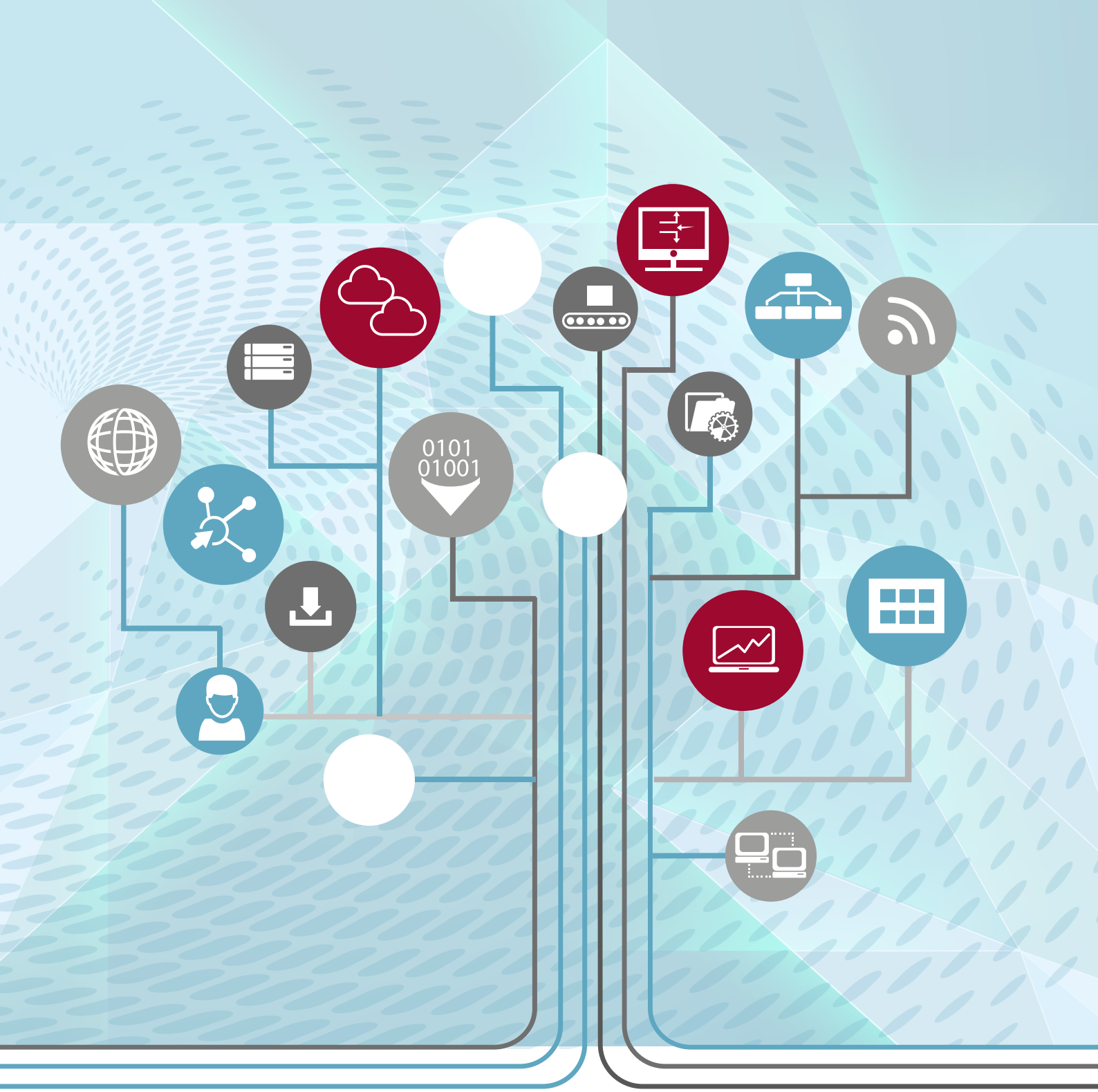
Yet, it is not just start-ups who are forcing their way into existing markets, but companies with financial strength are also becoming a risk in foreign markets. In the past, Google and Apple did not offer insurances, Allianz did not sell cars and BMW was not in the IT product market. However, that was primarily due to their business interests and not on the commercial options available to them. That these situations can change in the blink of an eye is exhibited by the latest examples: both Google and Apple are actively working on a vehicle.

Corporate consultants agree: companies that fail to address the challenge of digitally transforming their business will, in the mid to long term, be pushed out of the market by newcomers and digital competitors.

Opportunities through Proactive Action

The digital transformation that has become necessary for companies from all industries does not have to be a mere reaction. Quite the contrary: many companies are turning the situation to their advantage. They are rising to the new challenges the market is posing in order to retain their existing customers and to enhance customer loyalty. At the same time, they are also expanding their business model by offering new products and services that were not even possible before due to a lack of technical feasibility.

This has even allowed some companies to become “disruptive” players themselves by taking advantage of new opportunities and even penetrating secondary markets - similar to how Amazon has been doing business for years.



> **I believe fundamental honesty is the keystone of business.**
>
> Harvey S. Firestone

Creating a Sound Basis

Thinking Digitally

In order to effectively implement a digital transformation, awareness of the transformation must exist throughout the entire company. This must be true for both the uppermost management, as well as for every single employee in every single department. It is of particular importance for the management's acceptance of the digital transformation to be outwardly visible and clearly recognizable. It takes time to think in and actively use digital channels and doing so does require change. This process of change can be positively supported through workshops and consulting.

Assessing Digital Maturity

When it comes to digital maturity, considerable differences can be seen between different industries as well as between different companies in the same industry. Take the retail, automotive and telecommunications industries for example, which are ranked right up top in terms of digital maturity, while insurance and banking bring up the rear[1]. In order to define the proper fields of action, companies must be able to identify their status quo in respect to digital transformation. Digital Maturity Model[2] or Digital Master Model[3] can be used to determine digital maturity. The results can be used to develop concrete transformation potential for the company.

Installing Customer Experience Management

The customer and their experiences are at the center of digital transformation. The focus shifts from an internal company point of view to an outward customer view, since in today's market, the customer experience is the key factor that sets companies apart from the competition. Enthusiastic customers are loyal customers and promoters of their favorite products and the companies offering them. Customer experience management (CEM) helps companies capture the customer perspective and make good use of it. The "customer journey map" is one element of customer experience management and shows the touchpoints between the customer and the product or service. This map can demonstrate the current state with the individual touchpoints or can even illustrate future touchpoints - and in doing so create the new and improved customer experience of the future, i.e. the target state.

> Practice puts brains in your muscles.
>
> Sam Snead

Focus on Operational Transformation

Digital transformation is a holistic transformation on the organizational and operational level. On the organizational level the transformation comprises changes involving management, people and culture and provides a template for a company-wide vision and strategy. On the operational level, the changes to the processes, methods and technologies are part of the transformation that take place within the company. Both transformation processes are important and must be perfectly aligned with one another. When doing so, organizational transformation has top priority. That is because an operational transformation cannot be successfully realized until a company-wide vision and strategy is in place.

With the digital transformation cycle (DTC) we have developed an approach model for operationalizing digital transformation. During the operationalization, the impact of the organizational transformation is examined during each phase of the approach. This allows the digitalization of existing and new products to be promoted, for both existing and new markets. Furthermore, product development also focuses on creating a new, unique and exciting customer experience.

Customer-Oriented Technologies

Technological trends can affect customers and companies. Only technologies that affect customers are of interest to the digital transformation cycle, as they are the only ones that have a direct impact on the customer experience.

Mobile, social media, the Internet of Things, big data and analytics are all technological trends that are already part of customers' everyday lives; they affect customers and are thus covered by our approach model.

Enterprise 2.0 is digitalizing the business world, changing how collaboration is accomplished and altering company cultures. Enterprise 2.0 is among the technologies that tend to have a greater impact on companies, which is why it is only partially covered by our approach model.

Industry 4.0 is not only limited to operational excellence and production within a company, but also extends to the results of production - the products, such as smart cars or M2M communication. Those, in turn, have a direct impact on customers. Thus, Industry 4.0 is included in our approach model.

Digital Transformation for Enterprises

The processes seen in this new, digital world are fast and dynamic, while people and entities are almost always connected. Start-up companies are using lean innovation to drive the new economy. The "old business world", on the other hand, employs processes that are slow and static, with hardly any networking. Enterprises, meaning the traditional company, are taking great pains to optimize their existing business processes. At present, both worlds are still very much justified, since business processes must exist in order to achieve innovation. Even digitally transformed companies will need to maintain both worlds for the foreseeable future and will need to ensure they are optimally aligned. This fact is taken into consideration in the digital transformation cycle. However, the approach model is not explicitly designed for start-up companies, but for traditional enterprises and has been optimized to meet their needs.

Expansion of the System Landscape

This “new” business world calls for the development of new system landscapes. To realize digital transformation, it is important to recognize the considerable role that the altered IT system landscape plays. It consists of two classes of systems: the systems of record (SoR) and the systems of engagement (SoE). These systems map the numerous requirements imposed on companies’ IT architectures.

> **There is a constant need for new systems and new software.**
>
> Marc Andreessen

Systems of Record

The systems of record represent the existing business processes. They are mapped using familiar IT resources (ERP, CRM, HR etc.). The users of an SoR include the employees who use information systems to execute business processes, as well as the suppliers who are involved in the business processes and the IT systems that are integrated into the business processes. The IT systems used in systems of record are rather slow, static and set up to be long-running.

Systems of Engagement

The systems of engagement represent the new digital business processes. They are mapped using brand new IT resources (cloud, mobile, platforms). Users of a SoE include customers that wish to use their end devices to take advantage of new offers, as well as the partners who are involved in the new business models and customer-oriented technological trends that are integrated into the business processes, such as cell phones, the Internet of Things, big data, etc. The IT systems used in systems of engagement are primarily fast, dynamic and designed for change.

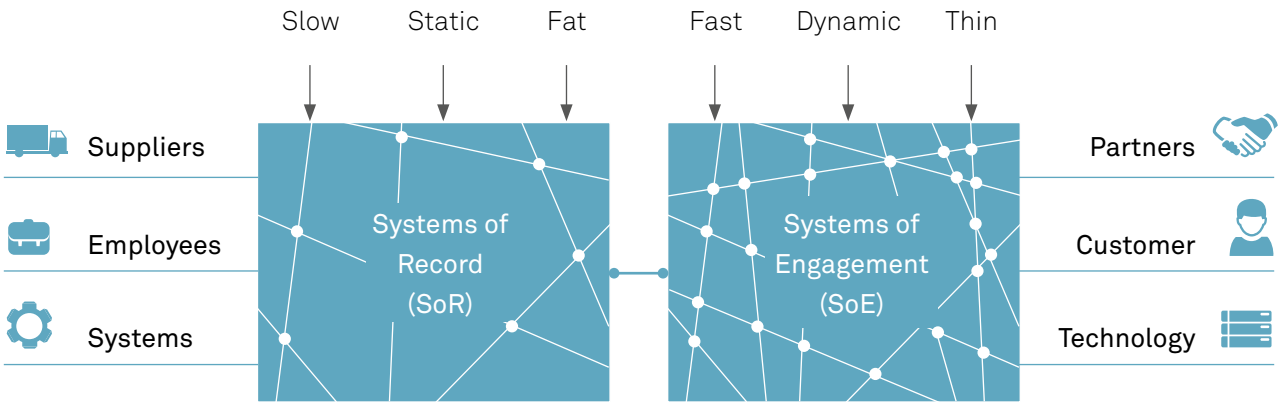


Figure 1: Presentation of the New Application Landscape Consisting of Systems of Record (SoRs) and Systems of Engagement (SoEs) and the Stakeholders

The Method: Digital Transformation Cycle

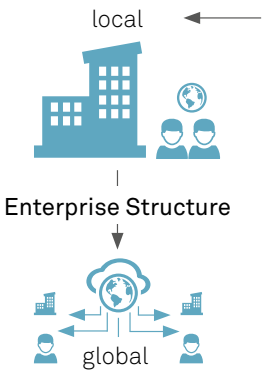
Theories Behind the Method

Transform from In-Out to Out-In

The customer experience is the key driver behind digital transformation and places the customer at the center of product development. Satisfied customers become loyal and enthusiastic customers who promote the products themselves. However, this transformation requires a change in perspective from in-out to out-in. The in-out perspective focuses on available processes, systems and tools and development follows the company's vision of what products it wants its customers to have. The goal is efficient processes. The out-in perspective focuses on the customer and develops the product the customer wants, using the processes, systems and tools necessary to provide it. The topmost goal is providing an excellent customer experience. Doing so is only possible with professional customer experience management. This type of management is decisively responsible for the success of the product each step of the way - from prospective customers to the sale to evaluation.

Transform from Offline to Online

The customer experience can only be transformed if the business model is connected to the Internet, both technologically and functionally. Existing business models are expanded to include digital business models, with the unique feature that services are only provided using technologies customers employ day in and day out. Linking providers, customers and technologies creates a space for new innovations and the design of that space results in new, digital business models that also mean new requirements for digital products: They must be readily available and must be easily adjustable and scalable to changes in the market. This requires agile approaches in all areas of product development.



Transform from Local to Global

The transformation leading to digital business processes makes certain changes to IT governance, which is responsible for the implementation of the business processes into IT, necessary. On an operational level, it is necessary to modify the enterprise architecture management. The enterprise architecture, which is currently designed around local business processes, must be expanded to include global, digital business processes.

> We stand by our methodology.
>
> Nate Bailey

Development of the Method

Part of the Overall Digital Transformation within the Company

Realizing digital transformation on an organizational level is generally achieved in the form of change management programs (CMPs). They concentrate on the creation and implementation of a global digital vision for the organization.

The digital transformation cycle provides the systematic basis for operationalizing digital transformation and is realized in the form of a DTC project. Multiple, well-coordinated IT projects are performed as part of the implementation of the global vision that are based on the methodical approach used in the DTC project.

The realization of the IT projects, on the other hand, is supported by effective, project-specific change management that is in tune with employee needs and that is an integral part of the change management program and the overall communication thereof.

The results achieved by completed IT projects are compared to the digital global vision on a regular basis and any necessary adjustments then made to the CMP. As a result, the digital transformation cycle is embedded into the overall concept on which the organizational transformation is based.

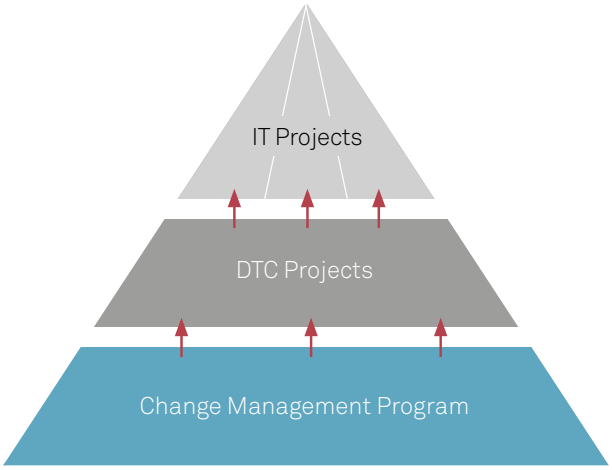


Figure 2: Presentation of the Dependencies between Change Management Programs, DTC Projects and IT Projects

The Six Disciplines of Digital Transformation

Digital transformation is divided into six disciplines. These include both conceptual and technical disciplines. The disciplines are selected based on the theories surrounding digital transformation and convert them into practice. Each discipline employs a set approach, is assigned a specific owner, requires special skills and generates a specific result. The digital transformation cycle begins with the digital vision and finalizes the user experience and digital experience on that level. It maps the business side using the business architecture and the technical side using the application architecture and enterprise architecture. Each discipline is clearly delimited from the organizational transformation and is only responsible for the operational area: For example, discipline "Digital Vision" is not responsible for the company's global digital vision, but only for the operational component, meaning the product development.

The customer experience affects each discipline in the cycle. Each discipline picks up on the specific impact of the customer experience and incorporates it optimally. It is the close interlocking of the customer experience and the cycle in particular that makes the method so useful.

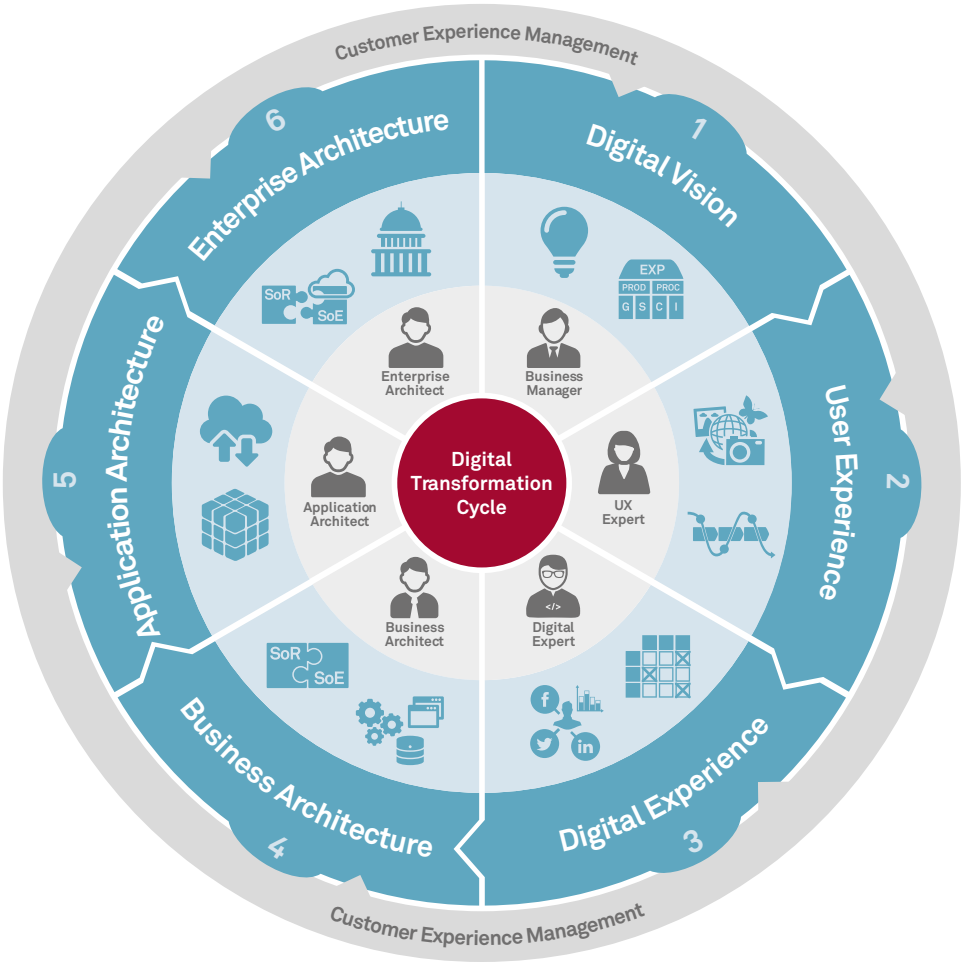


Figure 4: Digital Transformation Cycle

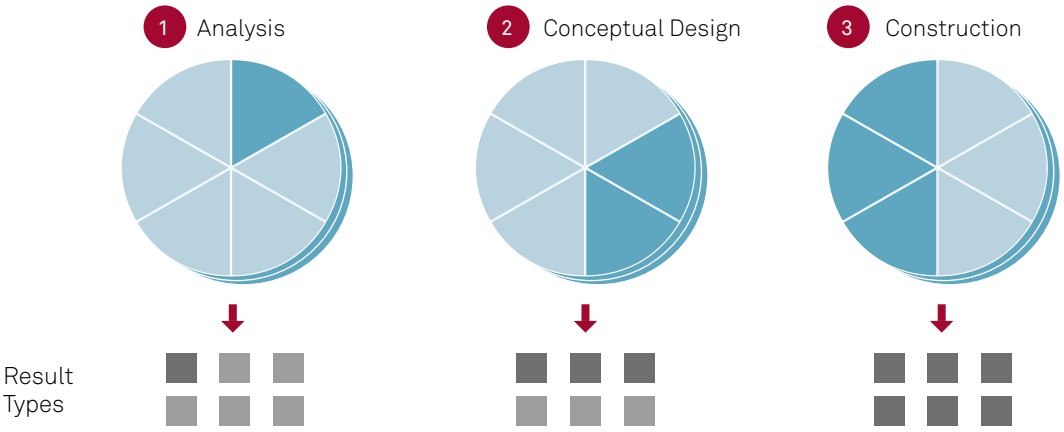


Figure 5: Phases and Iterations of the Cycle

Radical Rethinking Is Required

With their diametrical system properties, systems of record and systems of engagement mean the traditional way of thinking about things must undergo a radical change in order to realize the disciplines found in the cycle. The goals of previously valid principles, patterns and methods are negated and new principles, patterns and methods arise. This requires an awareness of and commitment to fundamental changes, and with that, of and to the design and development of new competences.

Interdisciplinary Collaboration

Digital transformation requires collaboration in interdisciplinary teams with a digital focus. There are six roles with different qualifications and competences and together they form the interdisciplinary team. Since the disciplines influence and inspire one another, every role is involved in the realization at all times and to varying degrees.

In Small Steps

The digital transformation cycle is an incremental and iterative process and can include as many iterations as necessary. The iterations go through three phases: analysis, conceptual design and construction. During the analysis phase, the focus is on the development of a digital vision. The design phase focuses on the development of the user experience and the digital experience. Finally, the construction phase focuses on the technical implementation of the business, application and enterprise architectures.

There is a defined result for each discipline in the cycle that consists of a set of result types. The sum of all the results from each discipline forms the end result. An iteration is composed of a set of increments. The content of the increments is defined during the configuration phase in which the end result is configured. Since the increments contain the individual aspects of the configuration and since together they form an iteration, it follows that it is the iteration itself that produces the final configuration.

Due to its iterative and incremental approach, the digital transformation cycle can be easily mapped using agile approach models, such as scrum or Kanban.

Discipline of DIGITAL VISION

Elevator Pitch

The discipline of digital vision describes the strategy the company will employ to refine its existing products and services, establish new products and services and conquer new markets.

Focus

On the operational level, the discipline of digital vision is responsible for the development of a product vision. Within that context, the integral, strategic alignment within the company has a significant impact on the product vision and this is taken into consideration in the discipline.

Method

The Digital Business Model

The purpose of the digital vision is to enable the development of the digital business model. At the same time, a digital business model is also an expression of a traditional business model. What is unique about it is that the service provision relies upon the use of information technology and the benefit for the customer is usually the provision of a digital product.

A special form of the business model canvas is used when designing digital business models, the so-called "digital business model canvas", which takes the specific requirements of the customer experience into consideration.

Innovative tools such as the Business Model Brainstorm Kit[4] or conventional techniques like mind mapping can be used to develop, document and communicate the digital business model.

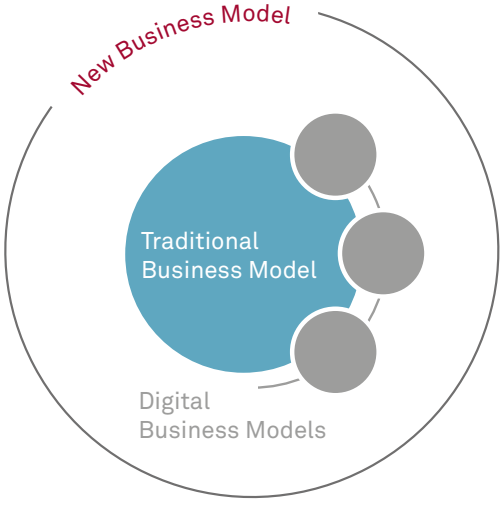


Figure 3: New Business Model

> **Creativity is intelligence having fun.**
>
> Albert Einstein

Brainstorming

The digital business model starts with a brainstorming session. Finding a business idea is a creative process. Digital business models take their inspiration from three different directions: The technological inspiration comes from technological trends and hype. This creative process is facilitated by msg's own "business meets technology" method, which provides decision makers with a clear understanding of the technologies, and the "digital innovation model", which is used to structure and visualize the technical options that are available. The inspiration for the customer experience comes from the customer journey map. The map contains a description of what each type of customer will expect from the digitized product. Finally, the inspiration for the business model itself comes from business opportunities, but also takes the costs and risks affiliated with the opportunities into account.

Evaluation

At the end of the brainstorming process the group should have one or more digital models. A wide range of evaluation criteria can be employed to evaluate the models, although benefit and feasibility should be at the forefront.

The benefit is primary derived based on the extent to which the model satisfies the requirements in the customer journey map. Decisive for determining the feasibility are mainly the situation in the digital market and the technological options that are already available.

Further, more detailed evaluation criteria can be defined as part of the differentiated scoring model, for which a series of select digital evaluation criteria is provided.

Results

Once defined, the digital vision provides a description of the digital business model, an evaluation and the benefits and feasibility that is based on scoring methods, and the definition of the project framework that is required to realize the vision.

Discipline of USER EXPERIENCE

Elevator Pitch

The term “user experience”, or UX for short, is used to describe everything a person perceives and experiences when interacting with a process, a product or a service. The UX discipline is thus concerned with developing an interface between the person and the system that ensures user experiences are positive. During the digital transformation, UX experts are faced with the particular challenge of taking the latest technological features and using them to create an added benefit for the end user, as well as factors that will leave the end user excited about the experience.

Focus

The customer experience (CX) and the user experience both have in common that they focus on the person and how the person experiences the product. Whereas the CX configures every area, or touchpoint, that exists between the customer and the product, the UX discipline, on the other hand, limits its focus to touchpoints where the customer uses a product and interacts with it. The user experience is thus a subset of the customer experience. However, the user experience is also divided into various aspects, one of those being optimizing usability, or to state it more simply, user friendliness.

Method

When designing specific user interfaces and interactions, one of the key challenges of the UX discipline is not to lose sight of the customer journey, meaning the customer’s overall experience with the product. That is because there is a direct correlation between the customer journey and the work that is performed as part of the UX discipline. The activities performed within the UX discipline can be divided into three main phases: analysis, design, and testing and evaluation. These are described in the following.

Analysis

The key to an excellent user experience is a sound knowledge of the customer activities, including their needs and their skills. To that end, the following information is collected during the analysis phase:

- Work tasks: Which tasks do customers want the product to perform for them? What information do they need to do so? When? These workflows are directly related to the identified touchpoints.
- Usage context: In which environment will the product be used: on the go or in an office, at work or for personal tasks?
- User: What sort of experience, demands and skills do the users bring with them? What is the motivation behind their usage?

> **As far as the customer is concerned, the interface is the product.**
>
> Jef Raskin

Design
The latest user behavior described in the use case scenarios is used to develop a vision about what future use should look like. The result is a detailed description of the user interface.

During this process, in-depth and frequent exchanges with other disciplines about the digital vision and about the digital experience in particular, are especially important, in order to ensure all functional and technical options are sounded out. Quickly drafted sketches, wireframes or simple prototypes allow ideas for new products or functions to be explored and experienced early on.

Test & Evaluate
The user experience a product will offer can never be finalized at the drawing board alone; instead, the reality of it can only be ascertained by actual user testing. Thus, it is crucial to test products as early on in the development process as possible, using prototypes and representative users in real conditions as part of so-called "usability tests".

Results

The results of the user experience include a description of the use case scenarios and the properties of a typical user, as well as sketches, wireframes and prototypes for designing the user experience and the test protocols and findings from the usability tests.

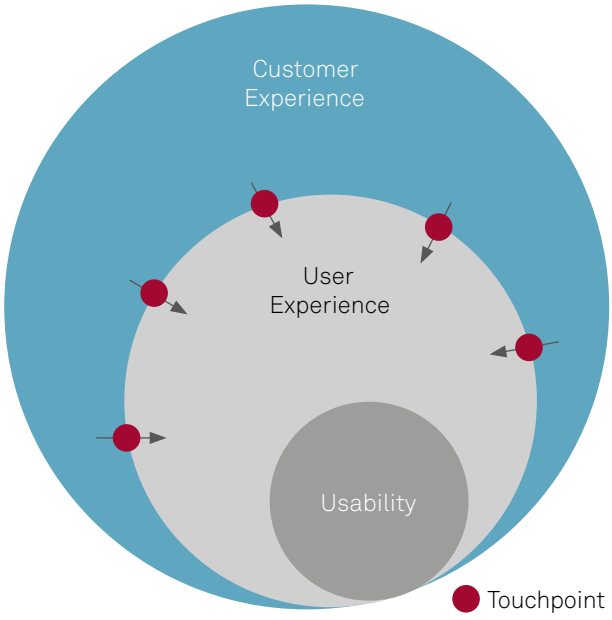
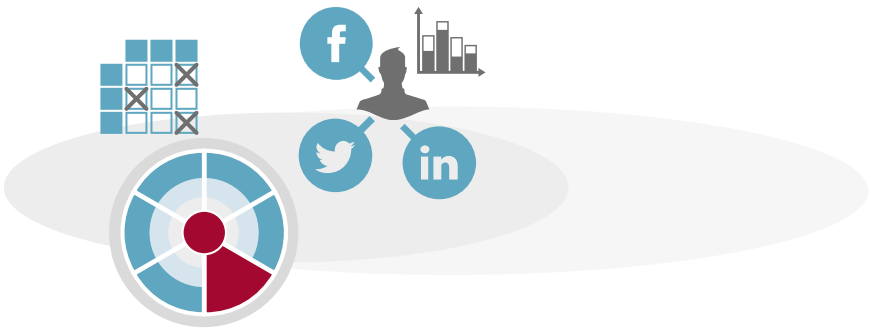


Figure 6: Usability and UX as a Subset of the CX



Discipline of DIGITAL EXPERIENCE

Elevator Pitch

Creating a customer experience requires the use of new and customer-oriented technologies. The discipline of digital experience describes the concept for using those technologies to create the customer experience and is a particularly important feedback loop for the user experience discipline. Ideas for the current business context are developed and configured based on the digital expert's technological know-how.

Focus

The digital experience focuses on the technical realization of the touchpoints from the customer experience and the use case scenarios and points of interaction from the user experience. They enable an implementation into the business, application and enterprise architecture.

Method

The purpose of the digital experience discipline is to provide expertise on trends and technologies during every step of the transformation cycle. The digital expert uses their experience in using such digital technologies to provide support for the technical realization.

Classification with the Digital Innovation Model
The digital innovation model, which is part of the digital transformation cycle, is a system that defines the digital domain, IT mega trends, use case scenario, technologies, goals and objects and then puts them all into context.

The focus is placed on a specific field, which varies depending on the discipline in question. This ensures communication is suitable to the roles of the digital transformation cycle.

Focus of the Digital Innovation Model
The digital expert places the digital innovation model in the current business content and works to identify the relevant mega trends, digital domains and technologies - beginning with the industry in general and then narrowing things down to a specific use case scenario or product.

The feasibility of the use case scenarios is then examined based on the identified technologies. Solution scenarios are developed, discussed and potential concepts and designs recorded. The digital experience also searches for further use case scenarios, produced when the existing technology stack is combined with other IT mega trends and business drivers.

> **Any sufficiently advanced technology is indistinguishable from magic.**
>
> Arthur C. Clarke

Results

The result of the digital experience is: a description of the technologies for decision makers that is based on the "business meets technology" method, solution proposals for the actual realization based on the digital innovation model, as well as suggestions for expanding the use case scenarios.

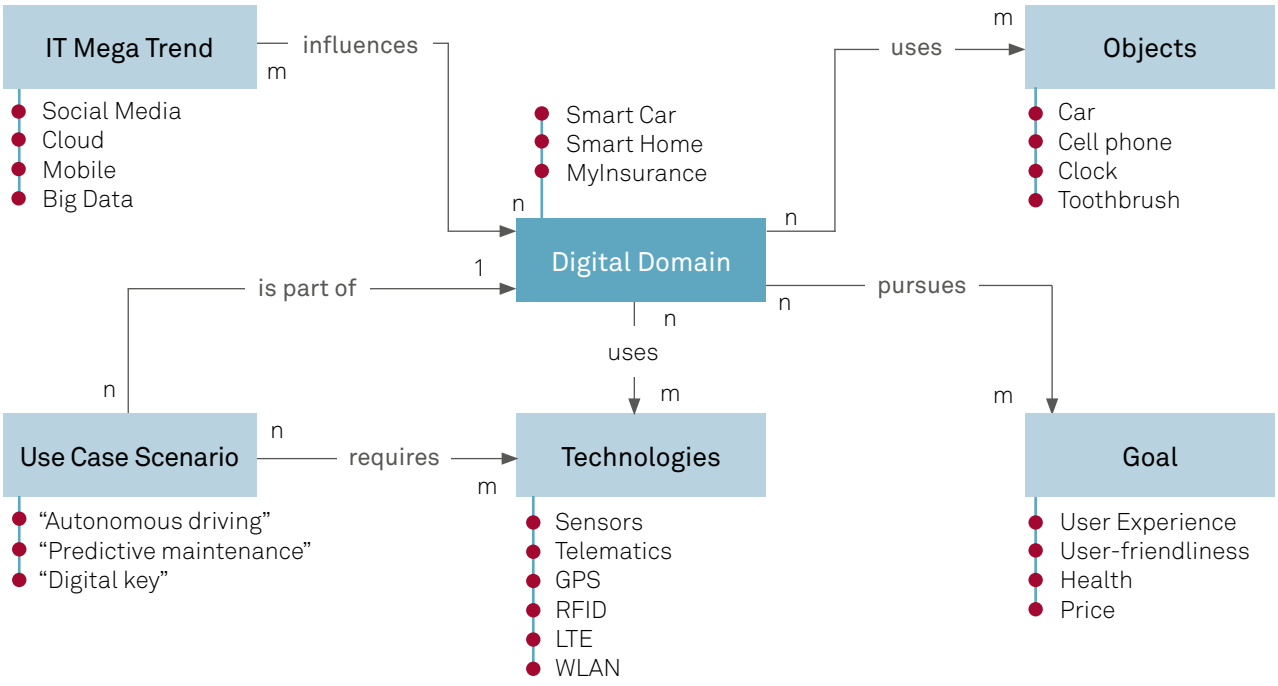


Abbildung 7: Anwendungsbeispiel für das Digital Innovation Model

Digital Innovation Model Element	Roles of the DTC Influenced by It	Description	Example
Digital Domain	Business Manager	A summary of the technologies, use case scenarios, goals, objects and IT mega trends of a digital domain that has already been defined and established.	Smart car, smart home, intelligent enterprise, smart cities, smartphones, big data, clouds
IT Mega Trend	Business Manager	An emerging trend. A trend involves technologies and allows use case scenarios to be realized. A trend is not bound to a specific technology. For example the trend toward "connected everything" can be realized using LTE for Smartphones, while a combination of NFC and LTE can be used for smart cars.	Connected everything, big data, cell phones, personalized products and services, Car2Car communication
Use Case Scenario	Business Manager, UX Expert, Business Architect, Application Architect, Enterprise Architect	A concrete use case scenario that should be implemented to achieve a goal using technology.	Autonomous driving, predictive maintenance, traffic optimization during peak hours, real-time supply
Technology	UX Expert, Business Architect, Application Architect, Enterprise Architect	One or more technologies used by a use case scenario.	Sensors, Hadoop, clouds, OAuth, RFID, NFC, social media/profiles, augmented reality, artificial intelligence, real-time big data processing
Goal	All roles	A goal that an organization pursues. It can be a customer benefit or a manufacturer objective. Even goals that benefit the public are plausible, such as rendering collected data anonymous and making it available to the public at no charge.	Developing new products, enhancing user-friendliness, offering additional mediums/additional channels, reducing costs
Object (Can Include User or Product)	All roles	An object, product or person affected by the use case scenario.	Vehicle, insurance, wearable, smartphone, user

Table 1: Terms Used in the Digital Innovation Model and their Meaning

Discipline of BUSINESS ARCHITECTURE

Elevator Pitch

The business architecture documents the functional implementation of the digital business model on which the subsequent technical implementation is based. In the business architecture, the digital business model is broken down in the functional components of stakeholders, business objects, business processes and services, which are then assigned to the applications.

Focus

The business architecture as a whole defines the layout of a company's business model on different abstraction levels: from the strategic alignment to the operational implementation. On the operational level, the IT architecture is responsible for the implementation of the business model that was defined on the strategic level. The business architecture discipline is part of the IT architecture and focuses on the operational implementation of exactly one application and its components.

Method

Assigning Responsibilities

The goal of the business architecture is to model the stakeholders, business objects, business processes and services. In other words, the key business objects. The objects are determined based on the analysis of the digital business model and the use case scenarios derived from it. They must be assigned to the different applications in the systems of record and the systems of engagement in order to enable a clear definition of responsibilities.

The business object assignment follows a sample catalog developed for precisely that purpose. It contains criteria that can be evaluated to establish a clear assignment, although different criteria are defined for the business objects, business processes and services. For example, criteria such as volume, velocity and variety[5] play a decisive role in the assignment of the business objects.

In addition to specific criteria, there are also more general criteria, such as autonomy or security, which apply for all business objects and influence the assignment thereof.

> **Content is king, but distribution is queen and she wears the pants.**
>
> Jonathan Perelman

New Modeling Techniques

Due to the diametrical properties of the systems of record and systems of engagement, the business objects are modeled in different manners. The traditional modeling techniques of service oriented architecture (SOA), business process modeling (BPM) and relational modeling are used for the systems of record. While for the systems of engagement, mainly newer modeling techniques are used, such as domain-driven design[6], microservice orchestration[7] and techniques for non-relational data. The different modeling techniques must be taken into consideration when designing the business architecture.

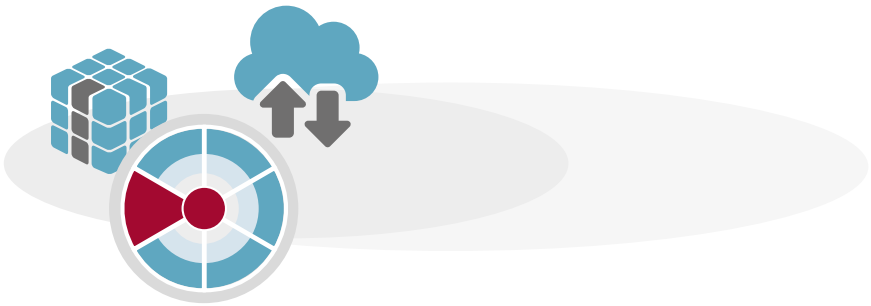
Business Technology

Technologies have a major influence on the design of the business architecture and the use of new technological trends enhances that influence considerably. The technological connection of the business models, especially with customers, but also with new partners and companies, creates another major influence on the business architecture. For example, when a partner offers existing services on the Internet and those services must be considered when designing the own business processes and services.

Results

The result of the business architecture is a business blueprint describing the functional requirements for the application, with the distribution of the business objects to the different applications and the use of external services forming key components of the blueprint.

> Architecture is an expression of values.
>
> Norman Foster



Discipline of APPLICATION ARCHITECTURE

Elevator Pitch

The discipline of application architecture describes a high-capacity architecture for implementing the business architecture on the application level. It specifically includes the cloud, with its three orthogonal dimensions: Services can be developed and provided in the cloud; even services from third-party providers can be integrated on the cloud.

Focus

On the operational level, the discipline of application architecture is responsible for the architecture of a concrete application. In this context, the strategic alignment of the IT architecture influences the architecture of an application, an influence that is taken into consideration by this discipline.

Method

Application Architecture in the Cloud

The purpose of the application architecture discipline is to develop an architecture for applications used in the cloud. The cloud poses a new context for architectures, a context referred to as a cloud-native architecture[8]. It uses new maxims, principles and patterns; all of which must be reflected in the architecture in the form of new organizational, non-functional and technological requirements. Architectures in the cloud differ significantly from the architectures of traditional enterprise applications. Agile approaches should be used to develop architectures for the cloud, in order to satisfy the requirements for a native cloud architecture.

The New Architectural Modules

A central task of the application architecture is to map the business objects, business processes and services from the business architecture to the component model of the cloud.

The component model of the cloud consists of apps and services, with apps being the tool used to make the application available to the customer on any end device. The services, in turn, are used by the apps and provide technical and business functions. Within this context, services can be offered or provided on an Internet market place for a fee, can be used locally in the cloud to structure or modularize the application or can be used in the Internet to integrate existing services, such as Amazon, PayPal or enterprise services.

New Architectures for Technological Trends

The use of technological trends and the integration thereof have resulted in the need for new architectural approaches in the cloud. A prime example is the field of social media, where a large number of APIs exist that are offered by a wide range of providers, from Amazon to PayPal to Twitter. Integrating these APIs requires the use of a resource-oriented architecture (ROA), as well as

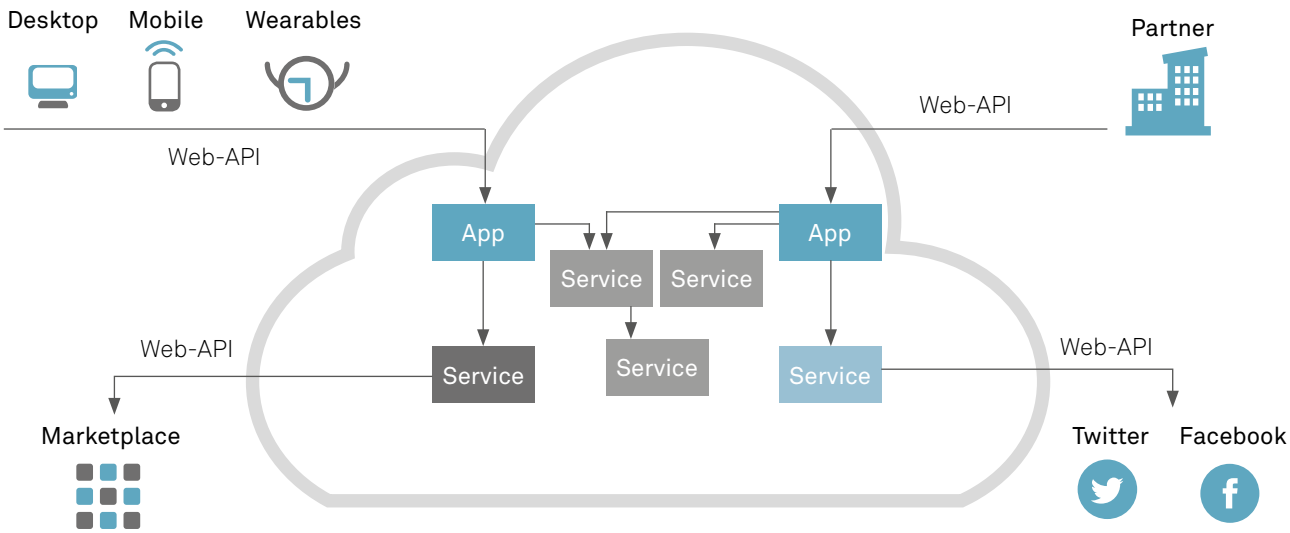


Figure 8: The Component Model of the Cloud

the corresponding skills and experience with handling Web APIs.

The Internet of Things - that already has 700 billion nodes that deliver vast quantities of data in a matter of seconds - requires an architecture that is perfectly aligned with the ROA in order to reduce bandwidths and network complexity, while making data processing effective and efficient. Some of these aspects have already been realized by innovative forms of communication such as MQTT or WebSockets.

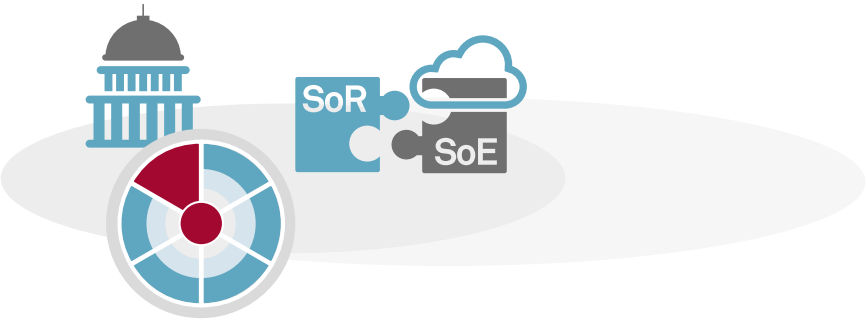
Terabytes of data, real-time inquiries and the requirement that data be stored unstructured all mean that big data architectures must be used and those structures are realized using platforms like Hadoop[9]. Data analysis, business intelligence and the latest trends in the business intelligence environment, such as real-time analytics, for example, all need suitable architectures, like the Lambda architecture[10].

Engagement - The Challenge

Business models must be adapted to ensure an excellent customer experience and, in doing so, the points of engagement must be connected - meaning mobile, apps, point of sale or even partners. When connected via APIs they form the system of engagement. This requires professional API management. The API management is responsible for the design, as well as the publishing and monitoring of APIs. The cloud integrates API management tools, such as the WS02 API Manager[11] or the Apigee API Exchange[12], which allows it to offer professional API management services.

Results

The result of the application architecture is the IT concept, consisting of the following profiles: context, functional, information, concurrency, developer, deployment and operational.



Discipline of ENTERPRISE ARCHITECTURE

Elevator Pitch

The discipline of enterprise architecture is responsible for integrating the cloud into a company's existing IT landscape, making it a new IT resource for the corporate IT. In addition, the applications and services must be structured and managed in the cloud. To do so, data not used in traditional enterprise architecture management (EAM) is required.

Focus

Four areas of the enterprise architecture are relevant for digital transformation:

1. Development and management of the overall architecture in the cloud
2. Integration architecture between the cloud and the Internet
3. Integration architecture between the cloud and enterprise
4. Communication and coordination between the departments as part of the central IT governance.

Method

Certain data or priorities influence the EAM during the digital transformation and cause it to differ from traditional EAM, for example, in the tasks it involves.

EAM Data in the Cloud

In contrast to traditional EAM, the customer experience is given top priority instead of internal IT support. The architectural spectrum incorporates the customer infrastructure, with their devices and specific process context.

Agility is more important than long-term operability in this case. The annual cycles established by TOGAF and the target architecture designed for the long-term do not work for the cloud. New systems are created quicker and do not last as long. This leads to agile enterprise architecture management that must meet these challenges.

For EAM it is more important to be integrated than to satisfy requirements right away or to create long-term visions. The enterprise architecture is included in active deliberations and decisions about the application architecture and decisions are made quickly.

Effective diversification is a more decisive factor than consolidation. The enterprise architecture management is confronted with many new technological opportunities and with constantly changing framework conditions from external services and service providers. Niche solutions are once again given greater attention, instead of merely availing themselves of those at the top of the Gartner Magic Quadrant[13]. This results in unavoidable functional and technical redundancies. Downstream consolidation reduces redundancies and diversifications for established solutions that strive for longer-term operation.

> It takes both sides to build a bridge.
>
> Fredrik Nael

Developing an Overall Architecture for the Cloud
The enterprise architecture management is responsible for the overall architecture in the cloud and makes sure the actual architecture is adequately transparent. The right cloud model must be selected for each digitally transformed solution. The decision between public, private or hybrid cloud[14] is enabled by a decision matrix developed specifically for that purpose. The structuring and optimization of the actual architecture is promoted by agile enterprise architecture management that takes the aforementioned data into consideration. A vision for the mid-term, the target architecture, serves as a helpful tool during this process.

Developing Integration Architectures
The enterprise architecture management develops three integration architectures: The first integration architecture between the cloud and the company ensures the bilateral exchange of data and activities between the worlds. The second integration architecture between the cloud and the Internet is essential for the usability and availability of services and applications.

The third integration architecture involves the company's provision of services and applications. It satisfies a variety of requirements, such as security, locatability, documentation, version management and if necessary, billing for the provided services and applications.

Consolidating the Entire Enterprise Architecture Management in the IT Governance
Cloud IT owners and enterprise IT owners must work together when it comes to IT governance. An IT governance board or architecture board is in place and information on the architectural planning is exchanged no later than once it reaches the board. After all, the success and operability of the corporate structure produced by the digital transformation can only be achieved through successful cooperation between enterprise IT and cloud IT.

Results

The result of the enterprise architecture is the provision of an enterprise architecture for the new system landscape, consisting of systems of record and systems of engagement.

> The power of the ideal is in the practical.
>
> Swami Vivekananda

Use Case Examples - The Digital Transformation Cycle in Use

Examples from three different industries will demonstrate the approach and the results of the digital transformation cycle. To that end, the analysis phase of the digital transformation cycle was put to the test during workshops - using an iteration of use case scenarios from three different industries. Please note, that these are merely examples and do not claim to be complete or to be a comprehensive and detailed presentation; rather, they simply illustrate how the digital transformation cycle is used and the possible results it may produce. In contrast to the other two examples, the example involving the insurance industry is based on a concrete project that was started before the digital transformation cycle was developed.

Automotive

Starting Situation

Digital transformation will have a lasting impact on the automotive industry. Vehicles as such could become less important as an actual product. New players with more capital, such as Google or Apple, that have their roots in the digital world are forcing their way into the market. Their prime interest is less related to the vehicle or mobility and more to do with the data and information they can gather or distribute through it. This generates a series of questions that demand an answer: Who does the data belong to? Who has the direct customer interface? How safe is an autonomous vehicle? Will these types of digital developments make a whole new type of traffic laws necessary?

Use Case Scenario

Different members of a family share a vehicle. In the past, vehicles were usually sold with two sets of keys. How can technical developments be used to provide each member of the family with their own key, without having to physically exchange keys each time?

The key is an important touchpoint of the user experience and represents a point of interaction between the customer and the vehicle as a product. The goal of this use case scenario is to develop an easy method for controlled access to vehicle use.

Method

Digital Vision

Three business ideas were identified that were inspired by technological possibilities and the customer experience that is expected in the automotive sector:

- Mobile Key: Automatic exchange of car keys via mobile devices such as a smartphone, wearables, etc.
- Smart city navigation, e.g. navigation to a parking lot
- Car2Car communication

An evaluation of the business ideas by the business manager led to the selection of a “mobile key” with the aforementioned use case scenario, since this business idea could, on the one hand, produce a considerable improvement of the customer experience compared to a conventional key, while on the other, the infrastructure required to introduce such a mobile key was already available or could be easily configured.

User Experience

First, the applicable user groups were identified and the key tasks determined. These were then used to create two use case scenarios: "managing keys" and "exchanging keys".

Also important were the questions as to a secure and practical channel for key exchanges - such as NFC, Bluetooth or even e-mail, whether or not a separate application would be necessary for managing the keys and what sort of information would need to be displayed on which end devices.

Digital Experience

Once the use case scenarios had been defined, the digital innovation model was used to identify the relevant technologies:

- RFID and NFC for unlocking the vehicle
- OAuth for identifying the user of the key
- Private Key Infrastructure for managing the digital keys
- Trusted service manager platform[16] for secure distribution of the key
- Secure element in SIM cards for the secure storage of the digital key

Business Architecture

The following services were identified when modeling the mobile key business process:

Service	Input	Output	Description	System
List of potential recipients	Customers	Recipient list	Creating a list of all potential recipients affiliated with a customer based on their social networks	SoE Native App
Token distribution	Customer Recipient	Yes/No	Create token and distribute to recipient. The token represents a valid car key.	SoE
Identify customer master data	Customer	Master data	Provision of the customer master data.	SoR

Table 2: Services Required for the Mobile Key Use Case Scenario

> **The first step is to establish that something is possible; then probability will occur.**
>
> Elon Musk, Co-founder Tesla Motors

The business objects shown in Table 2 were derived based on the modeling of the services and were then assigned to the systems of engagement and the systems of record.

Business Objects	Description	System
Customer	Customer data	SoR
Recipient	Recipient data	SoE
Master data	Customer master data	SoR

Table 3: Business Objects Required for the Mobile Key Use Case Scenario

The "list of potential recipients" service (see first line in Table 2 found on Page 38) only exists in the mobile native app and uses the contacts saved on the smartphone to identify potential recipients of the token. The "distribute token" service only exists in the systems of engagement, meaning in a partner system that specializes in the secure creation and distribution of keys. The service that uses master data to determine the customer data is located in the systems of record. Business object "recipient", on the other hand, only exists in the systems of engagement, since it is only used for communication between systems of engagement. The other types of information are simply the usual master data.

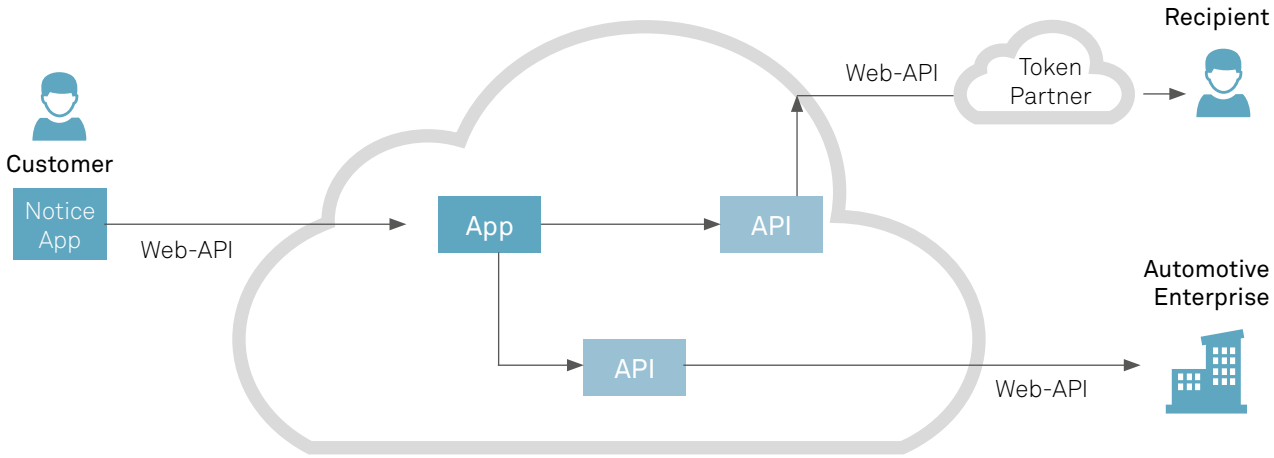


Figure 9: Overview of the Architecture for the Mobile Key Application

Application Architecture

The Bluemix cloud by IBM was selected for the realization of the application architecture. The mobile key application was provided as a native app for iOS, Android and Windows cell phones. The services in the cloud were implemented into Node.js using Java Script. The enterprise systems were connected via REST API and SSL to enable the provision of the customer data.

The business objects defined in the business architecture had to be mapped to the component model used by the cloud. Table 4 shows how the services are divided.

Service	Component Model	System
List of potential recipients	API management service	SoE Native App
Token distribution	Custom service API management service	SoE Token partner
Identify customer master data	API management service	SoR Enterprise

Table 4: Mapping Services to the Cloud Component Model for Mobile Key

> **One of the huge benefits of a connected car is not only the immediate information available to the customer but also building a detailed understanding of how people use their cars.**
>
> Ian Digman, Nissan

Enterprise Architecture

For the token generation and distribution, an external service provided by an Internet-based partner platform is used when designing the enterprise architecture. To that end, the enterprise architecture strives to provide a platform-based solution that can be used by all cellular service providers or similar services. The trusted service manager could be used during this process. How the platform and the standards affiliated with it develop and how any such developments need to be reflected in the target architecture are all examined.

Summary

Digitalization holds a wide range of new business ideas and opportunities for the automotive industry. Companies can produce tailored products in response to customer-specific requests or can develop entirely new use case scenarios like a digital, freely transmittable and configurable car key for a unique customer experience.

There were many examples from the field of connected car alone that were found as part of this use case scenario. Using the digital innovation model allowed a variety of new ideas to be developed based on the existing use case scenario, including a central key that can even be used for one's own home.

Finance

Starting Situation

The modern customer communicates with their bank using many different channels. Time and location play a lesser role. Are financial institutes ready for this?

Even with banks being exposed to growing cost pressures? The founding of numerous FinTechs has introduced a new type of competitor to the market. As a result, traditional banks are being forced to modify both their organization and technology. To survive over the long term, companies will have to establish themselves as a digital presence in the market.

Use Case Scenario

While at an electronics store, a customer noticed a smart TV that they immediately wanted to buy, but would need to finance. However, they wanted to use their own bank instead of the electronic store's finance department to do so.

Thus, they proceeded to scan the bar code on the television and sent it to their own bank along with a request for financing and the product information. The bank then offered them one or more financing alternatives. It also informed the customer what their credit limit was, which abruptly caused the customer to select the larger and more expensive model. The bank placed the funds in the customer's account as soon as the purchase was verified at the checkout.

Method

Digital Vision
Three business ideas were identified that were inspired by technological possibilities and the customer experience that is expected in the financial services sector:

- Mobile payment - cashless payment
- Mobile financing - fast, online credit limit inquiries
- Mobile smart credit – mobile and immediate credit for smaller amounts

An evaluation of the business ideas by the business manager led to the selection of "mobile smart credit", since this concept would offer a considerable improvement of the customer experience: On the one hand, products could be purchased immediately, while on the other, eliminating the need for financial discussions with store staff, which can lead to uncomfortable situations when customers have poor credit ratings.

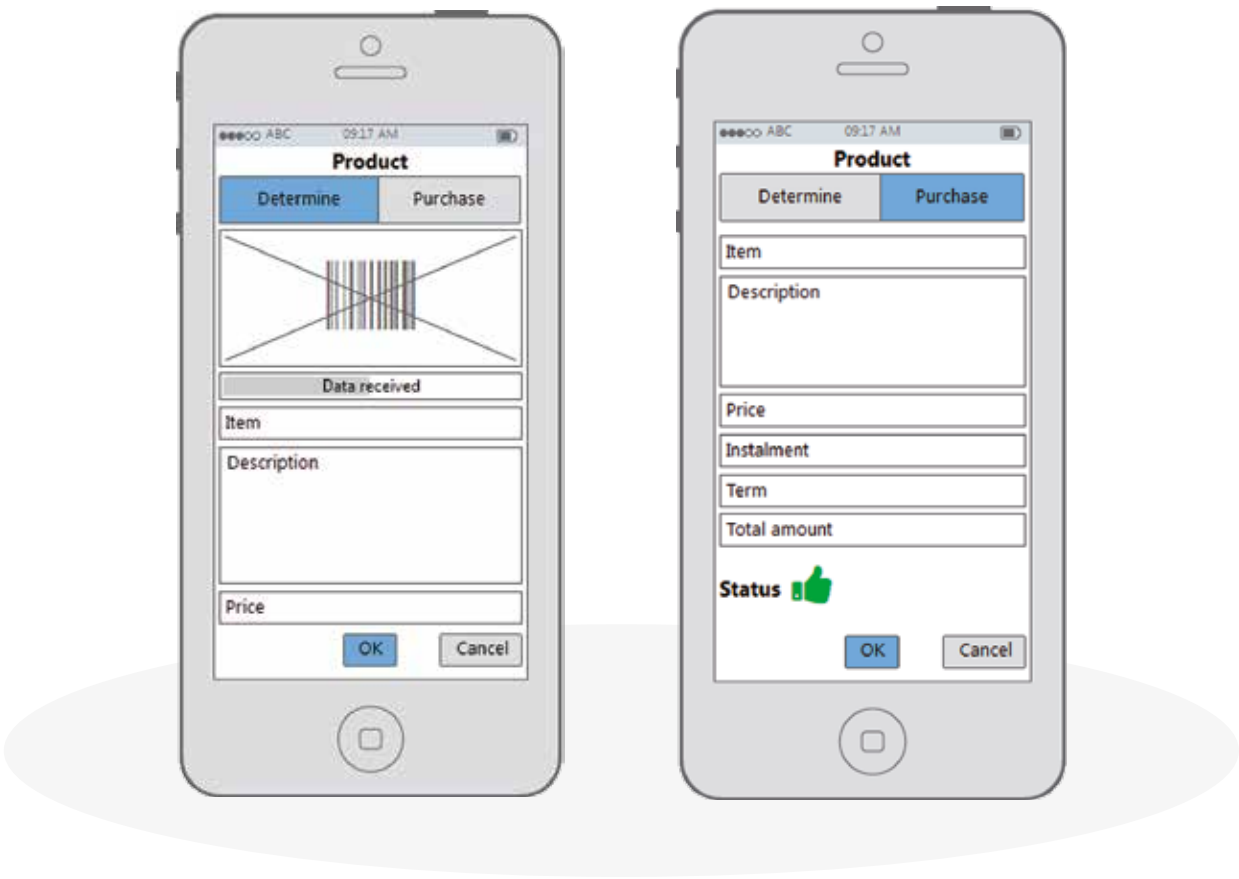


Figure 10: Mock-Up of Mobile Smart Credit

User Experience

The touchpoints identified based on the digital vision assume a purely digital process controlled by the interested party. The identified user groups are thus very diverse, but all have the same objective: to use a smartphone to quickly and easily apply for financing with one's personal bank. This can be done using an app provided by the bank.

The customer scans the bar code or QR code of the product, thereby accessing the product information. They then submit a credit request to their personal bank at the touch of a button. Scenarios for both a positive and a negative response to the credit request were developed, as well as scenarios for integrating social media and product ratings.

A rather simple user interface presented itself when creating the app mock-ups (see Figure 10).

Digital Experience

With the digital innovation model, mobile end devices and bar codes or RFID could be used to identify the relevant technologies via NFC interfaces.

Further ideas and use case scenarios based on the existing technology stacks could include a recommendation function, an anonymized forwarding of the proposed loan to a credit broker to determine whether a more affordable offer might be available or a legally binding signature of a loan agreement using a new personal ID.

Business Architecture

The following services were identified when modeling the mobile smart credit business process:

Service	Input	Output	Description	System
Find product	Bar code	Product	The scanned code that only exists in the electronics store. Used to provide information on and identify the product for which financing is being requested.	SoE
Check financing	Product, customer	Yes/No	Examines whether the product can be financed for a customer.	SoE
Identify customer master data	Customer	Small loan	The small credit limit is determined for a customer.	SoR
Conduct transaction	Customer, conditions	Yes/No	Conducts an actual transaction for a customer based on the conditions.	SoR
Create conditions	Customer	Conditions	The conditions at which a customer would receive the loan are determined.	SoR

Table 5: Services Required for the Mobile Smart Credit Use Case Scenario

> **Banking is necessary, banks are not.**
>
> Bill Gates

The business objects were derived based on the modeling of the services and were then assigned to the systems of engagement or the systems of record.

Business Objects	Description	System
Customer	Customer data	SoR
Product	Product the customer wishes to purchase	SoE
Conditions	Conditions at which they would receive the loan	SoR
Small loan	The small credit limit available to the customer	SoR

Table 6: Business Objects Required for the Mobile Smart Credit Use Case Scenario

Once all of the business objects had been identified, they were then assigned to the systems of record and the systems of engagement. The assignment is shown in the "Systems" column. The "Find product" and "Check financing" services are services that are only required to realize the new digital business model. The model is an uncomplicated credit limit check for small loans. The business objects are only found in the systems of record. The objects themselves are merely master data, but must be maintained in the systems of record even if the "small loan" business object is only required for the new digital business model.

> **Social tools are not just about giving people a voice, but giving them a way to collaborate, contribute and connect.**
>
> John Stepper, Deutsche Bank

Application Architecture

For the application architecture, the electronics store provides the partner system required to realize the business process. The product data is provided via a Web API in the form of a bar code.

The application is designed as a single page app, runs on a mobile end device from any manufacturer and can be accessed on the cloud, as can all of the services needed to realize the business process. The services that already exist at the company are integrated using the Web API and the cloud itself is an Azure cloud by Microsoft.

The business objects defined in the business architecture were mapped to the component model used by the cloud.

Service	Description	System
Find product	API management service	SoE
Check financing	Custom service	SoE
Customer master data	API management service	SoR
Conduct transaction	API management service	SoR
Create conditions	API management service	SoR

Table 7: Mapping Services to the Cloud Component Model for Mobile Smart Credit

The “Description” column shows the service type used in the cloud, while the “System” column shows the location of the actual implementation.

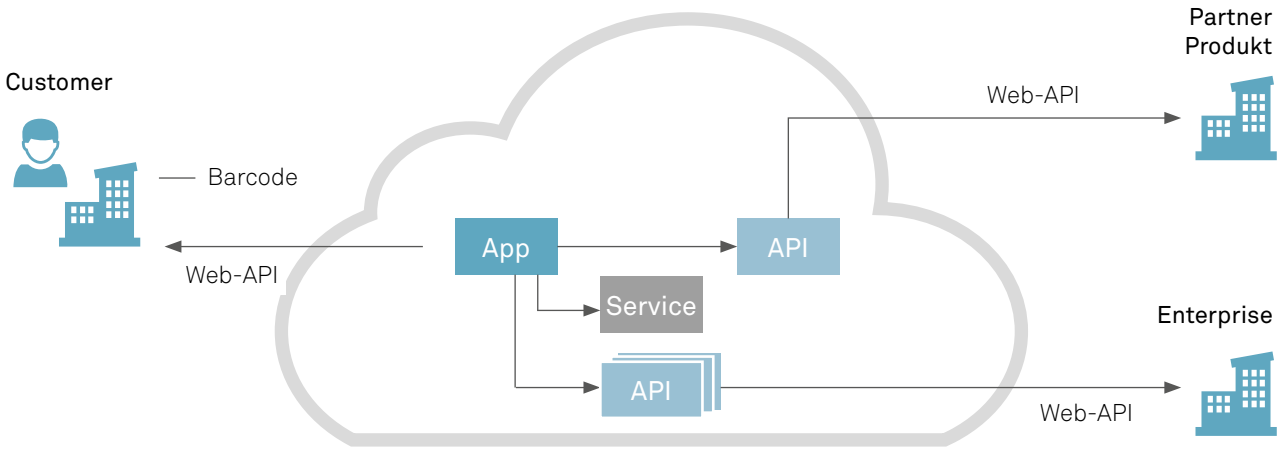


Figure 11: Overview of the Architecture for the Mobile Smart Credit Application

Enterprise Architecture

The enterprise architecture determines which systems of record need to be connected based on the target function of "Check credit limit" and defines which information flows are required to those systems. Information on the credit limit must be protected in the cloud using suitable security measures. A public cloud can be used assuming that a decision in favor of or against a loan can be made based purely on information found in the systems of engagement. However, if the exact credit limit from the systems of record is also required in the cloud, a hybrid cloud should be used where the information can be kept "on premises".

When connecting systems of record, the integration architecture between the cloud and the company should ensure that no long-running credit approval processes occur that might reduce the performance of the cloud. Furthermore, queues should be used to protect the systems of record against excessive requests. Connecting the external service provider can prove to be a challenge, as this is done using different interfaces. Thus, a platform that has the corresponding standards or quasi-standards is recommended.

Summary

A large number of digital business models exist in the financial services industry. One major advantage of the use case scenario presented here is the preservation of the customer's anonymity, which is a decisive factor in the customer experience. Full digitalization would be achieved once the customer completed the payment at the checkout using digital funds, with those funds then being transferred to the customer as soon as they signed the loan agreement using their smartphone.

Insurance

Starting Situation

The digitalization of the value chain has also reached the German insurance industry. The number of start-ups is growing and they frequently assume a position that places them between the customer and the insurance company, thereby cutting insurance companies off from direct communication with the customer.

In addition, this change in customer behavior has also increased the pressure to deliver greater innovation: customers are relying less and less on established long-term relationships built on trust and are willing to change insurers if the right offer comes along.

Thus, besides all their efforts to generate new business, it is also essential for companies to maintain existing customer relationships by ensuring critical business processes are optimally designed - especially at key touchpoints. They must be present in all relevant channels with a service portfolio that is tailored to the customer and that is seamlessly integrated into the digital environment the customer is accustomed to. Beyond merely assigning an internal company department to the task, it can also be helpful to involve highly-specialized service providers so that the company's own internal processes can be optimized.

Use Case Scenario

The reporting of a loss for the first time ("first notice of loss") represents a critical point of contact between the insurance company and their customer. Trust can either be established or irreversibly lost. The modern customer expects to be able to report losses easily and at any time and using their preferred channel. However, it is also important for the process to be quick and transparent.

Method

Digital Vision

A workshop was held in which trainees and students were interviewed as the "customers of tomorrow" to determine which criteria would achieve a high level of customer satisfaction when interacting with insurance companies. This revealed that above all mobile availability, processing status transparency and live support played the key roles.

Based on these findings, loss notification was selected as a critical touchpoint in the customer journey. The goal was to map that touchpoint using a mobile-enabled and device-independent Web appli-

> **It is not just about automating existing processes, but recreating them.**
>
> Oliver Bäte, CEO of Allianz

cation. This customer process is suitable for satisfying the identified criteria using a digital transformation process.

User Experience

For the "loss notification" touchpoint multiple critical points of interaction were identified that are important to a policyholder during the loss notification process: Logon, loss notification, processing, customization, support and feedback.

These form important fixed points when designing an ideal user experience and the following use case scenario provides a good description of them: A policyholder's television has been damaged by a power surge. She would like to quickly report the damage online from her tablet and hopes the process will not be complicated. To avoid a lengthy registration process, she should be able to use an existing social media account. She should also be able to identify the defective device using a bar code instead of having to enter the extensive product number. Furthermore, at the end of the process, she should be able to go directly from reporting the damage to ordering a replacement and arranging an installation date.

First, a rough draft of the user interfaces for different target devices is created. The next step is to create the visual design, meaning the detailed construction of the user interface including layout, colors, typography, graphics and images.

Digital Experience

The digital experience enriches the identified critical points of interaction with concrete technologies and services.

Point of Interaction	Technology
Registration	Use existing social media accounts, such as Facebook, Twitter, Google, etc. and avoid registering a new account
Loss notification	Reduced information entry and accelerated process through effective and well-coordinated, modular queries and the use of existing device peripherals including GPS location, cameras, etc.
Handling	Automatic device recognition via camera and bar code scans, replacement ordering through Amazon, as well as arrangement of an installation date - all part of the process
Individual customization	Analytics: Use of social media sources, such as a Facebook profile and analysis by linguistic analytical technologies such as, e.g. IBM Watson "Personality Insights"
Support	Live customer support available on different media, whether chat, audit, etc.
Feedback	Live customer support available on different media, whether chat, audit, etc.

Table 8: Assigning the Used Technologies to the Points of Interaction

Business Architecture

From a functional perspective, the customer journey involving the "first notice of loss" is modeled as a business process using business process management (BPM). The services are then identified based on the modeling. These services are assigned to the systems of record and systems of engagement. The same assignment is done with the data.

The systems of engagement are realized in the Internet as part of a "platform as a service" or PaaS, while the systems of record are realized using the "msg.Insurance Suite" product, which has a claim back office component called "msg.Claims" and uses a private cloud[15].

The user interface (UI) is described using story boards and is based on the customer journey and the digitized touchpoints.

Application Architecture

The implementation of the necessary app and the realization or connection of the services used are also accomplished using a platform as a service (PaaS). For this scenario, the IBM Bluemix cloud was selected as the PaaS. Both existing services from the Bluemix marketplace - such as Geo Location, Watson Personality Insights, Node.js and NoSQL - and external services such as Facebook Single-Sign-on, Facebook Open-Graph, Amazon Product Advertising API, OpenWeather-Map and QuaggaJS are used.

Moreover, the Bluemix integration architecture is used to integrate the systems of record, in this case the msg.Insurance Suite (including the msg.Claims service) which is used to create a claim and is operated on the internal infrastructure.

When it comes to security aspects, the Bluemix security architecture gateway uses a REST interface to ensure the secure integration of the msg.Insurance Suite. In addition, the continuous delivery (CD) and continuous integration (CI) available through Bluemix via Jazz.net also support the development process.

Enterprise Architecture

The enterprise architecture management strategy is defined as follows:

- Selection of a native systems of record/public cloud enterprise integration architecture
- System architecture: External hosting of the systems of engagement public cloud via IBM Softlayer USA. Provision of the systems of record - msg.Insurance Suite via DMZ in the provider's Intranet
- Integration architecture: Unidirectional HTTP-/REST-API calling of the systems of record
- Security architecture: For systems of record
- Identification of the need for protection and the protection factor (realized through SSL/HTTP)

Summary

The result of the digital transformation process described in this business scenario is a publicly available FNOL Web application that is operated in the Bluemix public cloud. It can be accessed from a smartphone, tablet or desktop and, in contrast to similar native apps, it does not require installation, yet it does offer a similar look & feel. A responsive design ensures that the presentation and operation are suitable to the end device in use. To access these functions, the application uses a variety of the "on demand" services of the Bluemix PaaS, as well as external sources available through the Internet and uses REST services to gain "on premises" access to the insurer's back office system landscape.

The Road to Success

Step 5: Performing a Representative Project

Together, we use the digital transformation cycle to conduct an initial, small project to prove the effectiveness of the method.

Step 2: Assessing Digital Maturity

Together, we create transparency, identify the current status and expose the potential digital transformation holds.

Step 1: Thinking Digitally

Together, we can create awareness of the digital transformation and find out more about the digital transformation cycle method of operationalizing digital transformation.

Step 6: Performing a Joint Project

Together, we perform a project using the digital transformation cycle with the goal of digitally transforming a concrete project.

Step 4: Getting to Know the Method

Together, we use the digital transformation cycle to create a concrete scenario for your company, allowing you to familiarize yourself with the method.

Step 3: Installing Customer Experience Management

Together, we introduce customer experience management and identify the current status and the goal of customer experience for your products of the future.

Annex

List of Sources

1 Digital Readiness Index, http://www.neuland.me/digital-readiness-index-executive-summary/ (Dated: 12/17/2015)
2 Kreutzer, Ralf T. & Land, Karl-Heinz, Dematerialization - The Redistribution of the world in Times of Digital Darwinism [original title: Dematerialisierung – Die Neuverteilung der Welt in Zeiten des digitalen Darwinismus], Future Vision Press e. K., 2015
3 Westermann, Georg, Leading Digital – Turning Technology into Business Transformation, Harvard Business Review Press, 2014
4 Board of Innovation, BUSINESS MODEL KIT, http://www.boardofinnovation.com/ (Dated: 12/17/2015)
5 Hellerstein, Joseph/Stonebraker, Michael, Readings in Database Systems, MIT Press, February 2005
6 Evans, Eric, Domain-Driven Design: Tackling Complexity in the Heart of Software, Addison Wesley, August 2003
7 Newman, Sam, Building Microservices, O'REILLY, February 2015
8 Stine, Matt, Migrating to Cloud-Native Application Architectures, O'REILLY, February 2015
9 Hadoop, https://hadoop.apache.org/ (version of: 12/17/2015)
10 Lambda Architecture, http://lambda-architecture.net/ (version of: 12/17/2015)
11 WSO2 API Manager, http://wso2.com/ (version of: 12/17/2015)
12 Apigee API Exchange, http://apigee.com/about/ (version of: 12/17/2015)
13 Gartner Magic Quadrant Methodology, http://www.gartner.com/technology/research/methodologies/research_mq.jsp (version of: 12/17/2015)
14 Hybrid Cloud, http://www.itwissen.info/definition/lexikon/Hybrid-Cloud-hybrid-cloud.html (version of: 12/17/2015)
15 Private Cloud, http://www.itwissen.info/definition/lexikon/Private-Cloud-private-cloud.html (version of: 12/17/2015)
16 Trusted Service Manager, https://en.wikipedia.org/wiki/Trusted_service_manager (version of: 12/17/2015)

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