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Niklas Lindroos  
The digital transformation of a ski resort: a  
case study

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Supervisor: Professor Dr. Martti Mäntylä

Author: Niklas Lindroos	
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Thesis advisors: Professor Dr. Martti Mäntylä	
<p>Digital technology and new ways of benefitting from information have the potential to radically alter business models and change interaction between a company and its customers. Some leading ski resorts are becoming aware of the potential of customer data and the benefits of having a digital service offering. Weisse Arena Gruppe (WAG) is the company behind the LAAX ski resort in Switzerland. WAG formed an internal digitalisation team to professionalise data handling, increase their understanding of the digital realm and build future digital capabilities.</p> <p>This thesis gives reasons for why a company running a ski resort decided to assemble an internal team to build digital services, an area out of their core expertise, instead of relying on external contractors. The factors that were instrumental for the digitalisation team's results are defined. For this purpose, key persons behind the digitalisation initiative were interviewed.</p> <p>Several factors were fundamental for the success of the digitalisation initiative. The digital services team worked in short development cycles, enabling quick creation of minimum viable products resulting in short feedback loops. The team had the appropriate freedom to form suitable processes and work methods, and support from the CEO throughout the process. Certain web- and mobile development technologies were essential for building impactful services with limited resources in a short time.</p>	
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<p>Digital teknologi och nya sätt att utnyttja information kan potentiellt förändra företagsmodeller och företags växelverkan med kunder på ett fundamentalt plan. Några ledande skidorter börjar förstå möjligheterna som kunddata möjliggör och fördelarna av att ha ett digitalt tjänsteerbjudande. Weisse Arena Gruppe (WAG) är företaget bakom skidorten LAAX i östra Schweiz. WAG grundade ett internt digitaliseringsteam för att professionellt kunna hantera data, skapa digital kompetens och bygga en grund för framtida digitala möjligheter.</p> <p>Detta diplomarbete förklarar varför ett företag som driver en skidort och tillhörande tjänster, bestämde sig för att skapa ett internt team för att utveckla digitala tjänster, ett område utanför företagets kärnkompetens, i stället för att anlita utomstående entreprenörer. De viktigaste faktorerna för resultaten av digitaliseringsteamets arbete definieras. För detta har nyckelpersonerna bakom digitaliseringsinitiativet intervjuats.</p> <p>Flera faktorer var grundläggande för framgången av initiativet. Digitaliseringsteamet använde sig av korta utvecklingsperioder, vilket möjliggjorde utveckling av tjänster och insamling av respons så snabbt som möjligt. Teamet hade nödvändig frihet att skapa egna processer och arbetsmetoder, och verkställande direktörens stöd genom hela processen. Vissa teknologier för utveckling av mobilapplikationer var väsentliga för att bygga betydande tjänster med begränsade resurser inom en kort tid.</p>	
Nyckelord: digitaliseringsstrategi, digital omvandling, skidort	Publiceringsspråk: engelska

# Abbreviations, initialisms and acronyms

AI	Artificial Intelligence
API	Application Programming Interface
AWS	Amazon Web Services
BSON	Binary JavaScript Object Notation
CDN	Content Delivery Network
CMS	Content Management System
CPU	Central Processing Unit
DBMS	Database Management System
GPS	Global Positioning System
HTTP	Hypertext Transfer Protocol
ICT	Information and Communication Technology
JSON	JavaScript Object Notation
KPI	Key Performance Indicator
LAN	Local Area Network
MVP	Minimum Viable Product
OS	Operating System
QR Code	Quick Response Code
RAM	Random Access Memory
REST	Representational State Transfer
RFID	Radio Frequency Identification
SQL	Structured Query Language
URI	Uniform Resource Identifier
WAG	Weisse Arena Gruppe AG
WLAN	Wireless Local Area Network

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# 1 Introduction

Digital technology caters for changes in how companies function and interact with customers. Digitalisation and digital transformation enable not only more efficient use of resources but revised or completely new business models. Digital technology is not merely an add-on to existing processes or services, many services are digital by default. Although digital technology can offer new revenue potential, seeking new levels of competitive advantage means risk taking is becoming a new cultural norm (Kane *et al.*, 2015).

Digitalisation can alter existing business models or create new business models altogether. Failure to embrace new digital technology and the solutions provided by that technology can lead to a competitor or new market disruptor overtaking business. This is the reality in an increasing number of business sectors in the information age.

Digitisation changes the way customers interact with a company's service offering as well as how they research and compare products and services. Being digital is about creating growth at the present and being competitive in the future.

## 1.1 Background and intent

This thesis presents a case study of the digitalisation story of Weisse Arena Gruppe AG (WAG), a Swiss integrated service company operating the LAAX ski resort and auxiliary services. This case study inspects the digitalisation process in LAAX from the middle of 2015 to late 2017.

Weisse Arena Gruppe formed an independent digital services team working in the premises of WAG and reporting directly to the CEO. What causes a company to take the financial risk of employing a group of people to work on projects that lie outside the company's core competencies? This thesis attempts to answer why a company in the leisure and tourism sectors decided to develop digital services in-house and how well these efforts have succeeded. This is achieved by laying out the process and presenting the services produced thus far. The key reasons for the results of the team are distinguished.

This is a case study describing how and why a new digital services team was created within an organisation without much prior digital know-how. Rather than the digital advancements of the company Weisse Arena Gruppe, the important aspect in this case

study is the digital maturity of the customer journey and the comprehensive customer experience in LAAX.

The term “customer journey” refers to the entirety of interactions a customer has with a company (Norton and Pine, 2013). The customer journey can be designed to align with a defined strategy. A focus on improving the customer journey requires understanding the reasons for a customer’s preferences and transforming the end-to-end experience as opposed to merely improving individual interactions. Companies typically excel at certain interactions, but neglect the comprehensive customer experience (Rawson, Duncan and Jones, 2013). The customer journey in a ski resort reaches beyond the mere stay at the resort, and includes for example research and comparisons done prior to the selection of resort and all points of contact after the customer leaves the resort, up until the next stay.

Generalising results from a case study is always prone to errors. One case cannot serve as a comprehensive guide to all related cases. That is not to say that universally working methods or tools cannot be learned from success stories. Many of the success factors of the digitalisation process in LAAX apply to other ski resorts. Even companies in other industries not primarily invested in information technology are wise to study a successful case and gather insights. The insights provided by this case study can be especially useful to other ski resorts, since digital technology utilisation and the digital service offering is still in its infancy in the ski industry.

## 1.2 Methodology

The materials acting as basis for this thesis are interviews conducted with key persons behind the initialisation and realisation of the digitalisation process, as well as experience gathered by the author working one year in the digitalisation team of WAG. These materials are analysed in the context of theoretical frameworks gathered from various sources.

Four interviews with three people were separately conducted to gather results for this thesis. The interviews were done using Skype and by mobile phone.

A comparison of the state of digitalisation in Swiss and Austrian ski resorts was done by a Swiss consultancy, Atos Consulting. An interview about that topic was held with the Solution Area Lead for Customer Experience & Digital Marketing at Atos Consulting. The other interviews were held with the former Director of Digital Services at Weisse Arena Gruppe, now CEO of Inside Labs, the company spun off from the digital services team, and the CEO and Chairman of the Board of Weisse Arena Gruppe.

### 1.3 Structure

Chapter 2 introduces Weisse Arena Gruppe and the market circumstances WAG operates in. Digitalisation in companies along with digital strategy is explained. Suitable circumstances for a strategic digital transformation are laid out. Chapter 2 includes a status check of digitalisation within the ski resorts industry and presents business requirements and circumstances which promote success in digitalisation efforts.

Chapter 3 explains the progress of Weisse Arena Gruppe's digitalisation efforts thus far and presents the decisions made along with the steps taken. Chapter 3 thus is a case history of this digitalisation project. The rationale for a decision to diversify the value offering for customers through digital services is laid out. The most notable software services developed are also introduced in chapter 3 along with a presentation of what the future might hold, as seen by the key persons involved in the digitalisation process of LAAX.

Key factors affecting the outcome of the digitalisation project are evaluated in chapter 4. A necessary but not sufficient requirement for success in new – especially digital – service creation is a results-orientated organisation not too bound by artificial hierarchical constructs or heavy bureaucracy. How the digital services team acted in circumstances enabling rapid product development is answered in chapter 4.

The results of this case study and conclusions are gathered in chapter 5.



## 2 Digitalisation

### 2.1 Digitisation, digitalisation and digital transformation

A comparison and differentiation between digitisation, digitalisation and digital transformation is relevant at this point. The terminology around making digital changes in business circumstances is not scientifically standardised, is context-dependent and is used differently by various parties. Using precise terminology is essential for successfully communicating strategic decisions related to digitalisation and their implications. It is equally important that business leaders have an undivided understanding in order to form successful digital strategies and understand what those mean for their business.

Digitisation is the narrowest of the three terms, usually meaning conversion of processes and material from analogue to digital. More generally, Parviainen et al. (2017) define digitalisation as the conversion of analogue data into a digital format. In the simplest case, this does not alter processes or ways of working.

Digitalisation and digital transformation are often used interchangeably. Stolterman and Fors (2004) describe digital transformation as the changes in digital technology that affects all aspects of human life. In a business environment, digitalisation can also mean “the ability to turn existing products or services into digital variants, and thus offer advantages over tangible products” (Gassmann, Frankenberger and Csik, 2013). Digitalisation goes beyond the scope of digitisation as digitisation is used as a means to achieve digitalisation (Henriette, Feki and Boughzala, 2015). Henriette et al. describe digitalisation as extending beyond mere technological changes and innovations, to affect every aspect of an organisation. These aspects include operational processes, business models, user experience, and naturally, digital capabilities.

Digital transformation means the changes in processes, roles, work methods and business offering caused by the adoption of digital technology in an organisation or an organisation’s operation environment (Parviainen *et al.*, 2017). Parviainen et al. further clarify this concept and distinguish four separate levels affected by digital transformation: process-, organisation-, business domain- and society level, explained in Table 1.

Digital transformation and digitalisation are interchangeably used in this thesis to mean not solely technological changes but also changes in business models and in customer interaction. The primary focus is on the process-, organisation- and business domain level.

*Table 1: The different levels that a digital transformation affects (Parviainen et al., 2017).*

<b>Process level</b>	The adoption of digital tools for reducing and replacing manual steps.
<b>Organisation level</b>	The offering of existing services in new ways and new services while discarding obsolete practices.
<b>Business domain level</b>	Changes in roles and value chains in ecosystems.
<b>Society level</b>	Changes of societal structures, such as types of work available.

The world is increasingly experienced through digital technology. Technologies and products are often individually designed but act as parts of larger systems that evolve as their constituent technologies evolve. What people experience is not solely the constituent devices or technologies, but the result of their interworking. In this sense, the resulting services' underlying structures are getting increasingly complicated. Interconnection and communication between various devices and technologies is increasing. (Stolterman and Fors, 2004)

Henriette et al. (2015) identify three impacts of digitalisation and digital capabilities in their literature review of digital transformation research. These are: extending the market, focusing on customer value propositions and reshaping existing business models due to market imperatives. These three areas of interest can be considered as partially overlapping. The significant factor is customer experience and customer interaction. Customers expect fluency in interactions, tools that work across devices and independent of time and place, and customised or individualised services.

Two different impacts on operational processes are pointed out by Henriette et al. (2015). First, digitisation of a process means using digital technology to handle a previously analogue chain of events. This usually results in easy gains in form of time- and resource savings by automation of process steps. Second, new technologies alter existing processes or even render processes obsolete by changing the underlying business models. As an example, predictive analysis of customer preferences or consumption trends offer new marketing avenues, and thus changes the marketing processes (Berman, 2012). In addition to the aforementioned effects, digital technology offers tools for completely new business opportunities. These require new and innovative processes.

## 2.2 Digital strategy

The pace of progress in information technology has since the advent of technology progressed at a double exponential pace (Kurzweil, 2012), which is to say that not only is the rate of advancement exponential, but the rate of exponential growth has itself grown exponentially. This phenomenon is known as Kurzweil's Law of Accelerating Returns (Kurzweil, 2001). Although not a natural law, there is no imminent reason to believe that Kurzweil's Law of Accelerating Returns will not be continually relevant and accurate in the years to come. For example Moore's Law (Moore, 1965) stating roughly that the number of transistors fitted on an integrated circuit will double every 18-24 months, will come to an end as the physical boundaries for transistor size are reached (Chien and Karamcheti, 2013; Theis and Wong, 2017). This will not mean that the evolution of electronics, and thereby technology, will end, but a new paradigm, such as 3D transistors, will be required for continuous growth.

The exponential development of information technology means that technology quickly gets outdated. This situation requires agility and plasticity of businesses. As the digital landscape changes rapidly, a first mover advantage might be less important than before, as competitors have opportunities to catch up and adopt new trends quickly. Similarly, individual technologies do not provide a long-lasting competitive advantage, since competitors can simply copy working solutions. To differentiate, companies need to create a service offering that can add real value for the customer and offer unique experiences. From another perspective, not having the capability to make quick changes is certainly a liability and might lead to a company being outcompeted. Companies might even face an existential danger by making the wrong strategic decisions or merely moving too slowly in the right direction (Catlin, Scanlan and Willmott, 2015).

MIT Sloan Management Review and Deloitte conducted a study and research project (2015) of digital business by surveying more than 4800 business executives, managers and analysts from around the world. The study places companies on a digital maturity scale. A more mature organisation is one, where digital technology has changed processes, talent engagement and business models. 15 per cent of respondents from organisations at the early stages of digital maturity state that their organisations have a coherent and clear digital strategy, while the same applies to over 80 per cent of digitally maturing organisations. The digitally most mature organisations concentrate on how digitalisation transforms the business, while less mature organisations tend to focus on individual technologies. Needless to say, a strategic approach will win a too narrow focus every time.

In addition to having a digital strategy, digitally maturing companies also excel at communicating this strategy within the organisation. Early-stage companies tend to focus on a single technology instead of forming a strategy around how new

technologies can assist in improving the company's value offering. (Kane *et al.*, 2015) A single technology cannot provide competitive advantage on its own, if not proprietary (Carr, 2003). Technology will ultimately become universally available, and thus provide no inherent advantage. Competitors will find ways to copy working solutions. A focus on a single technology is also in that sense a lost cause.

In the early-stage companies that have a digital strategy, the strategy tends to have an operational focus, such as improving efficiency and customer experience. For 90 per cent of digitally maturing companies, business transformation is at the core of the digital strategy. 90 per cent of maturing companies' digital strategies also focus on improving decisions and innovation, compared to 60 per cent for early-stage companies. (Kane *et al.*, 2015)

Digitally maturing companies are more prone to take risk than less mature companies (Kane *et al.*, 2015). As development progresses faster, the capability and willingness to take risks becomes increasingly important. This requires a change in attitudes, not just of managers, but also of other employees. "Embracing failure" or "celebrating failure" have become overused buzzwords, but they do contain some truth. As risk-taking increases, the amount of failures follow suit. Since increased risk-taking seems to be the future inevitable development, an organisation culture where failure is not a catastrophe is of vital importance. Passivity is not rewarded, and inevitably leads to stagnation and business overtaken by competitors.

Successful digital transformation requires being open to even radical changes in business and acquiring an understanding of where the new sources of value lie (Dörner and Edelman, 2015). Depending on business area and company, tapping into these new value sources might mean expanding or modifying existing sectors or creating completely new value offerings in unfamiliar areas.

When developing a digital strategy, one approach is to reverse the process, that is start by defining a future vision and backtrack the necessary actions to achieve that goal. By starting from a future vision instead of analysing current capabilities and planning the next steps, companies can form strategies that utilise currently not existing technologies when they become available. (Kane *et al.*, 2015)

Because of the fast pace of progress in the information age, the ability to move into new business areas, abandon non-working solutions and reacting quickly to changes in market circumstances are increasingly important factors. Failure to do so can be critical if competitors get a head start. Customer expectations are high, with requirements for near instant access to services around-the-clock, intuitive interfaces and global access (Markovitch and Willmott, 2014).

Being competitive in the digital age often means not only digitising papers and processes, but an overhaul of the entire business model and operating model. New roles may be introduced and the required skill sets of employees change. The organisation structure might require modifications to cater for centralised customer data availability and management, and processes need to be rethought.

New processes and operating models are not solely a necessary evil, they also bring large benefits to a company and its customers. Digitisation and automation can lead to substantial time- and cost saving. In addition to allowing for orders of magnitude faster service request fulfilment, a better quality of service can be achieved. Companies with successful digitalisation efforts often challenge every aspect of a process against changed circumstances. Examples of this are companies creating customer self-service tools rather than tools for employees do digitise customer complaints. Another benefit is increased efficacy of customer data collection. Accurate and timely customer data not only help to identify and correct problems, but can play a vital role in steering strategic decision making. (Markovitch and Willmott, 2014)

An understanding of trends in customer behaviour within and outside a company's business is vital for all business decisions. The same principle applies to strategic digital transformation decisions. The fast pace of progress differentiates digital strategy decisions from other strategic decision. Timeliness is vital and making correct strategic decisions often requires a proactive way of thinking. This is the point where data comes in. Customer behaviour or –preference data is a prerequisite for making relevant decisions.

Catlin, Scanlan and Willmott (2015) present three fundamental questions companies should answer to shape their digital strategies. First, where are the most likely opportunities and threats in terms of digital change? Second, what is the likely scale and pace of change of these digital disruptions? Third, what does this mean for the company, i.e. how can threats be evaded and opportunities be grasped proactively rather than reactively?

To assist business leaders in understanding what types of changes are needed, a concrete distinction of different digital decision types can be helpful. Dörner and Edelman (2015) distinguish three categories of digitalisation in a company:

- value creation at new frontiers,
- value creation in core businesses and
- digital capabilities.

Value creation at new frontiers refers to identifying future business opportunities created by digital technology that previously existed in a different form or did not exist at all. Understanding customer preferences and how they evolve is an important factor.

Value creation in core businesses is about creating and maintaining customer loyalty. As providing relevant services at the right time is key, successful value creation often requires proactive decision making. Many businesses rely on customer analytics and data to guide decision making. This data can be real-time and even predictive. In order to succeed in utilising these data, particular digital- and other capabilities need to exist. Merely gathering data does not automatically lead to valuable insights. Know-how is needed to determine relevant metrics, decide how these are best measured, and how data is interpreted.

When a company starts collecting metrics, they tend to transform measurements into targets. If the metrics for example is the number of customer complaints or the number of bugs in software, those numbers are perceived to be too high and a target is set for lowering them. Goodhart's law (Chrystal and Mizen, 2003) states that when a measure becomes a target, it also becomes a bad measure. Economic and social measures tend to misbehave when turned into targets of policy, because of changes in behaviour. Troy Magennis (2017) presents a different alternative. In his opinion, the units of measurement or actual numbers are not the crucial thing. What instead should be monitored, is the trend of the metric and how it responds to decisions made or changes in the process. Magennis even goes as far as recommending removing units from the x-axis, and just focusing on the rate and direction of change. In case a number must be used, Magennis recommends using a percentage change to the previous period.

When using data as a basis for decision making and making it freely available within the organisation, decisions are based on shared expectations, instead of hear-say or individual beliefs and preconceptions. Data also restricts emotional decision making. (Magennis, 2017)

Philipp Stauffer (2017) divides a company's maturity in using data to guide operations into three stages: descriptive, predictive and prescriptive. These are the stages a company progresses along as it improves analytical efforts. Reaching even the first of these stages requires a fairly advanced understanding of data utilisation. Descriptive uses of data refers to applying data aggregation and data mining to describe what has happened in the past. Predictive users of data apply statistical models and do forecasting based on the data. For prescriptive uses of data, optimisation and simulation algorithms are applied to guide decision making in the correct direction and give suggestions for optimisation efforts. In an advanced form, prescriptive data usage can guide decision-making or execute decisions in real time.

### 2.3 Management of digital transformation

Digitalisation is a potentially disruptive phenomenon. Incumbent firms are generally poised to invest in improvements of existing services with a clear target audience, that is sustaining investments, rather than concern themselves with disruptive threats in possibly separate resource networks. One of the strategies employed by incumbent companies that remained competitive throughout a market disruption according to Christensen et al. (2016), was forming a separate unit or spin-off start-up. This unit's purpose is to develop, form and ultimately commercialise the new innovation. This new unit should not be restricted by existing customer demands or burdened by typical corporate success measurements. The unit can in such a situation relatively freely pursue opportunities in a new value network. Successes of structurally distinct units in tackling challenges caused by discontinuous change have been reported (Gilbert, 2005, 2006).

Other tactics used by incumbents to successfully navigate through disruptive market changes have also been reported. Companies may choose to partner up with entrants or licence start-ups' technology (Marx, Gans and Hsu, 2014). Companies may also extend own capabilities through acquisitions (Sandström, Magnusson and Jörnmark, 2009).

Digitalisation projects do not succeed solely due to new technology, but rather due to a thought-out business strategy and organisational culture assisted by technology. The importance of new technology lies not in its inherent value. Instead, technology is a means to an end as technologies offer possibilities to create better value offerings for customers. For technology to reach its potential, organisations must be ready to change processes and mind-sets, and build cultures that foster change (Kane *et al.*, 2015).

The architecture of an organisation needs to cater for quick changes and fast deliveries of new value offerings. Creating such an organisation begins with fostering the right mind-sets. Iterative principles, self-organising teams, flat hierarchies and spreading out decision making closer to the employees that are involved in customer interaction are all useful tools for creating a reactive organisation with the capability to change quickly. The introduction of these new phenomena requires fundamentally different mind-sets compared to what is expected in traditional business organisations.

Division of responsibility and giving decision making rights to individuals arguably requires more from employees from an individual's standpoint than traditional hierarchical chains-of-command with predetermined roles. Agility also requires a fostering of attitudes towards better change tolerance. Staying relevant in the digital age increasingly means even radical redirections of focus of business activities. Not only does this mean an acceptance or embrace of change, but it also stresses the

importance of flexibility of an individual's skill set and the ability to acquire knowledge and adopt new skills.

Some organisations have formed cross-functional teams with members from different departments to figure out solutions for different digitalisation challenges, such as improving the customer journey. Cross-functionality is thought to bring knowledge from each relevant business unit. A diverse team composition can have challenges delivering results. The success of a cross-functional team widely depends on the individuals and the leadership. Often teams bring in the customer or end user in the design process. It is essential that the team has the mandate to make relevant changes and challenge existing processes (Markovitch and Willmott, 2014).

New ideas oftentimes arise through collaborative efforts of people with different backgrounds rather than through sudden strikes of brilliance. In companies more advanced in the digitalisation space, 80 per cent say their company supports collaborative work better than their competitors. The corresponding share in digitally less advanced companies is 34 per cent. The same type of relation is true what comes to promoting cross-functional teams; 44 per cent of digitally maturing companies use cross-functional teams to implement digital initiatives, while the same occurs in 16 per cent of early-stage companies. Early-stage and developing companies are more siloed. (Kane *et al.*, 2015)

Cross-functional idea creation and collaboration fosters innovative cultures. Digital capabilities can also extend outside the company. As for any domain, co-operation and collaboration partnerships that extend necessary capabilities are also important for digital creativity.

Organisations do typically not have prior digitalisation capability within the organisation. New employees with the right skills within for example user interface design or programming need to be employed. People with digitalisation experience and know-how are challenging to find. Employees across all age groups want to work for companies focused on digital progress (Kane *et al.*, 2015). In-house capability for a digitalisation process is vital for a continuous digitalisation effort of strategic importance. Given that organisations often do not have prior digitalisation capability or experience, it is challenging to pinpoint the exact knowledge and skills that are required. Co-operation with outside agencies and consultancies can be a viable option. As with all outsourcing efforts, especially those of strategic importance, it is important to have a sufficient, comprehensive understanding of the problem area internally. The lack of know-how and understanding on the buyer's side is a guarantee for failure.

Consider a scenario where an organisation is undergoing digital transformation. Due to the potentially radical changes to existing processes and work methods caused by digitalisation, it might be easier to create a new team that uses the solutions created by



the digitalisation team. This team can function in parallel with the team using the traditional process. Employees from the legacy unit can later be transferred to this new team. This might be an easier change to drive through than getting all employees to embrace new working methods right away. (Markovitch and Willmott, 2014)

This kind of transition is a viable operating model for most digitalisation changes. Combining this transition with proof-of-concept development can deliver results quickly. Developing proof-of-concepts and testing these in actual business circumstances is a cost-efficient and quick way to gain experience on what works and what doesn't when something completely new is introduced. Prototyping can also be achieved with a fairly low amount of tied resources.

Minimum viable products (MVP) are an effective way to reduce risk. MVPs are products or services developed to a point where a set of requirements are met. This set of requirements is theoretically the smallest set of requirements for a product or service to be "accepted", or released to a user group. Even if practical implementations vary, the idea of MVPs remains the same. MVPs allow companies to gather customer feedback at an early stage with minimal investments.

Sara Öhrvall (2017) mentions in an interview how companies, especially in manufacturing, are organised for operational efficiency. Many large companies are fine-tuned for reducing waste and increasing efficiency. The problem is, that an efficiency-optimised organisation does not foster a culture of innovation or disruptive thinking. Companies organised in such a manner are generally not able to change quickly. As previously established, the ability to change quickly in a market that varies greatly in an increasingly short time can be essential for survival. To prepare for market disruptions, companies should instead of maximising efficiency, plan how to create an organisation that is built for change, where change is the norm.

Öhrvall recommends that companies should keep technology at the core of the company. New technology should not be developed in isolation in a separated department because that will not change the prevailing situation. Öhrvall recommends starting with small initiatives. Once viable services are found, they need to be scaled quickly. A certain amount of boldness and braveness is needed to invest sufficiently in something that the company believes in. A concrete method for increasing change embracement is to include project managers for new technology projects in the top management team.

Viewing innovation and change as incremental might mean marginalisation in the coming years. As stated by the author and journalist Phil Simon: "the costs of inaction always exceed costs of inaction" (as cited in Kane *et al.*, 2015).

## 3 Digitalisation and Weisse Arena Gruppe

### 3.1 A description of Weisse Arena Gruppe

Weisse Arena Gruppe is a Swiss company operating in the sectors of tourism and leisure in the canton of Graubünden in east Switzerland. Weisse Arena Gruppe offers both summer and winter activities in the Flims Laax Falera destination with around 900 000 annual first entries. WAG includes a cable car and lift company, a ski- and snowboarding school, hotels and gastronomy businesses and a sport equipment rental and sale business. During winter seasons, WAG employs over 1000 persons, some 220 of which work year-round. The turnover of the summer activities is approximately 10 per cent of the annual turnover. Weisse Arena Gruppe has an annual turnover just shy of 90 million Swiss francs (Weisse Arena Gruppe, 2016, 2017).

The winter activities around the Alpine ski centre go under the LAAX brand, while the Flims brand incorporates all summer activities. Under the LAAX and Flims brands, several other brands provide gastronomy, sports and entertainment services. There is a clear rationale behind the separate summer and winter brands, as summer and winter visitors have an overlap of only 3 per cent. (Mountain Vision AG, 2017a) Another study says that the overlap is 8 per cent, and it might be as high as 25 per cent (Paasila, 2017a). Weisse Arena Gruppe is responsible for marketing of the Flims Laax Falera destination.

The LAAX ski centre is one of the largest in Switzerland, with 224km of slopes and 4 snow parks. The whole ski centre stretches through the neighbouring villages Flims, Laax and Falera. LAAX is known for its excellent freestyle skiing and snowboarding facilities. Plenty of resources are invested into shaping the snow parks, and the destination features the largest half-pipe in the world.

The main summer activities are downhill- and cross-country biking, hiking, camps and bathing. Weisse Arena Gruppe controls three lakes in the region, which are popular attractions in summer time. These outdoor activities are offered along with gastronomy and accommodation services. WAG operates a year-round freestyle hall, where snowboarding-, skiing- and skateboarding tricks can be perfected.

Environmental issues are important for the company. Energy consumption is fully covered by energy produced from renewable energy sources. The ski resort utilises both hydroelectric energy and solar energy. Weisse Arena also runs the Greenstyle Foundation in co-operation with other local businesses and dedicated people in the

region. The Greenstyle Foundation is a non-profit organisation dedicated to protecting the environment. (Mountain Vision AG, 2017b)

LAAX visitors can be categorised in three equal-sized customer groups: day visitors, apartment owners and guests renting an apartment or staying in a hotel room. The average age of customers, at around 45, is lower than in many other Swiss ski resorts. LAAX is especially attracting to young visitors and snowboarders due to the excellent snow parks and the freestyle indoor hall, but skiers and snowboarders of all skill levels can find opportunities and challenges on the several hundred kilometres of slopes.

### 3.1.1 Brief history

The cable car company Bergbahnen Crap Sogn Gion was founded in the village Laax by Walter Gurtner in 1962. The first cable car lift from Laax to the Crap Sogn Gion ('Crap' meaning rock or stone in Romansch) peak finished in 1968 and was the fastest of its kind in the world. In the neighbouring village, AG Sesselbahn Flims, the Flims Chairlift company, was founded in 1945. Winter visitor amounts surpassed summer visitors in Flims in 1951 for the first time. (Weisse Arena Gruppe, 2012)

Reto Gurtner overtook the Bergbahnen Crap Sogn Gion cable car company in 1983 from his father, Walter Gurtner. The Laax resort welcomed snowboarders, which were not welcome or even forbidden in many other resorts in the mid 1980s. The mountain summer tourism was encouraged by installing works of art on the mountain in 1991. The first internet café was opened in 1995, ahead of for example London's first internet café. The first web page of any Alpine ski resort was opened in the same year. A new cable car lift from the Flims base station was introduced in 1997-1998. (Weisse Arena Gruppe, 2012)

The Crap Sogn Gion cable cars were merged with the Flims cable cars in 1996 to form Weisse Arena Gruppe. Flims and Laax being neighbouring villages, this allowed for a larger, unified ski centre area. A million visitors in a single season was first achieved in the season of 2002-2003. In the first ten years, Weisse Arena Gruppe had become an integrated service provider in the tourism sector by offering transportation services, training and schooling, rental and sales of sport utilities, and accommodation- as well as gastronomic services. (Weisse Arena Gruppe, 2012)

The destination originally evolved from summer tourism around Lake Cauma in Flims. In 1997 the tourist offices of Laax, Flims and Falera were amalgamated, thus laying the foundation for formation of the Flims Laax Falera destination (Mountain Vision AG, 2017c).

### 3.1.2 Company structure

Weisse Arena Gruppe is divided into 5 subsidiary companies. Weisse Arena Bergbahnen AG handles maintenance and running of the ski lifts and preparation of the slopes. Along with maintenance of the whole infrastructure, Weisse Arena Bergbahnen also manages lift ticket sales and the rescue service. Weisse Arena Gastro AG runs 5 hotels and 22 restaurants or cafés on the mountain and in the valley and is the largest subsidiary by employee amount. Weisse Arena Leisure AG is responsible for the equipment rental shops and stores. Mountain Adventures AG manages the ski- and snowboarding schools, Europe's first indoor freestyle hall, Freestyle Academy, and organises events in the resort. Administration along with sales, accounting and the human resources department are concentrated to Mountain Vision AG.

In addition to the aforementioned companies, Weisse Arena Gruppe is a majority shareholder in Baugesellschaft Rocksresort (Construction Company Rocksresort). This company was founded for the construction of rocksresort, a Design Hotels member including several buildings with 121 apartments for rent or purchase in Laax. Design Hotels is a company with headquarters in Berlin, representing 270 independently owned hotels in 50 countries.

Weisse Arena Gruppe is part owner of Flims Laax Falera Management AG together with the three communities Laax, Flims and Falera, a local retail association and a local hotels association. Flims Laax Falera Management exerts strategic leadership and manages communication to promote tourism in the Flims Laax Falera destination (Handelsregisteramt des Kantons Graubünden, 2017). Marketing of the destination is in effect handled by Mountain Vision AG on behalf of Flims Laax Falera Management. Weisse Arena is also part owner of Inside Labs AG, a start-up spun off from the digital services department of Mountain Vision AG in December 2016.

Weisse Arena Gruppe is in a unique position, since it can offer guests a comprehensive service offering by controlling different kinds of resources. Different actors typically operate restaurants, hotels and the infrastructure in a ski resort. WAG has the opportunity, because of the many functions of the company, to create a unified customer experience unlike those offered by many other ski resorts.

## 3.2 The state of digitalisation in ski resorts

The annual amount of skiing days in the Swiss Alps is expected to decrease in the future, as seasonal snow water equivalents are estimated to decrease by up to 28 per cent by 2050, which shortens snow seasons by two to four weeks. The reduction in snow cover and shortening of the winter season is expected to increase in the second

half of the century. (Bavay, Grünewald and Lehning, 2013). Snow coverage changes are expected to equal an elevation change of 800 meters by the end of the century due to climate change.

This situation will force ski resorts to invent new ways to remain profitable by implementing cost cuts and expanding their value offerings. Many ski resorts in Switzerland, France, Italy and Austria operate in similar geographical circumstances. Swiss tourism is in an unfortunate situation compared to these other countries' tourism, since the Swiss franc has strengthened with respect to the euro by approximately 30 per cent during the last ten years, from the levels before the 2007-2008 global financial crisis, see Figure 1 (European Central Bank, 2017). This has led to an increased relative price level in Switzerland compared to neighbouring countries.



Figure 1: The euro to Swiss franc exchange rate 2006-2017 (European Central Bank, 2017).

Digitalisation in the ski industry has in the previous decades typically meant transformation of lift tickets and keys to digital versions that utilise radio frequency identification (RFID). Some leading ski resorts have expanded their digital service offering beyond a mere web site and are utilising data to steer operations.

Customer data is incredibly valuable. Increased and timely usage of data allows companies to better service their customers and provide relevant services based on the customer segment or even the individual's preferences. This builds on marketing practices employed before digitalisation efforts. Digitalisation and digital technology can provide real-time, detailed data, possibly presented in an actionable format. Knowledgeable utilisation of customer data can create a positive loop, where data allows the company to serve the customer better, and thereby gain access to increased data accrual.

According to Weisse Arena Gruppe's CEO Reto Gurtner (2017), companies in the tourism industry have not thus far, and are not at the moment collecting data at a sufficient level. The value of data and the disruption potential of digital technology is generally not understood. Tourism, and the ski industry, is not immune to digital disruption. Airbnb, Uber, and other such companies have shown the market disruption potential of new business models enabled by digital technology. These companies have figured out a way to offer a better value proposition than what was previously available. Instead of fighting these companies, a more beneficial strategy is to join their value network and adapt to the changing market circumstances. Gurtner believes that the current situation with small, isolated companies cannot continue forever without changing. Disruptive market powers could affect winter tourism.

According to Gurtner, no ski resort gathers enough data to have a comprehensive image of their customers. Not enough is known about the customers' needs and emotional ties or preferences. The lack of insight is an impediment for making better value propositions. With more relevant data, an improved service offering can be created and an improved competitive advantage can be gained. Storing data is relatively inexpensive. The challenge lies in determining the correct methods of collecting data and especially in interpreting collected data and understanding where its potency for the company's business is. All collected data is useless unless it can be analysed, combined and understood to ultimately guide and aid decision making.

Atos Consulting, a Swiss consulting firm, conducted a comparison of the digital service offerings in 12 Swiss and 2 Austrian ski resorts with more than 150km of slopes. The comparison was made at the end of 2016. (Atos Consulting, 2016)

Atos Consulting's study found that although many ski resorts to various degrees have realised that digital technology has a role to play in their business, the implementations and applications still leave more to desire. The variance between ski resorts is large. Several resorts have developed mobile applications to expand their value offering or to offer multi-channel services. The functionality of these mobile apps was in general found to be lacking, and not meeting customer requirements or satisfying real needs.

Mobile versions of web sites do not exist or do not utilise the capabilities of mobile devices. Most web sites were found to have potential for improvement. The way information is presented and grouped was by all test persons found to be a point of weakness. Relevant information was found through trial and error. The comparison found, that the most common neglected aspect was the use of imprecise or confusing terminology.

In several resorts, the organisation structure of the companies running the ski resorts is visible all the way to the customer point of contact. This leads to situations where a

customer might have to gather information about ticket prices on one site and lift open hours on another. This was found to be the case for ski resorts which are mergers of smaller resorts. This is self-evidently not optimal. A company's service offering should not be restricted by the underlying organisational structure, or this restricting effect should at least be minimised. Services should be designed to cater for customer needs rather than the company's restrictions.

Atos Consulting's study ranked Zermatt as first in terms of digital transformation. The study especially commended Zermatt's mobile application, Skiguide Zermatt. Zermatt was found to have the most coherent experience across different digital channels. LAAX placed fifth in the comparison. According to Damian Amherd (2017), Solution Area Lead for Customer Experience & Digital Marketing at Atos Consulting, the digital service offering has changed a lot since the comparison was done in the end of 2016.

The results of the Atos Consulting study would have most likely been different if the study was done half a year later according to Damian Amherd (2017). The study did not include the INSIDE LAAX ecosystem, which is the core of Inside Labs' creations. Would the study have been done half a year later, LAAX would have been among the top contenders for first place. The main factor why LAAX is in the forefront of digital at the moment according to Amherd, is the focus on customer journey or customer experience instead of individual technologies or services.

### 3.3 Digital services in Weisse Arena Gruppe

From the founding of the Weisse Arena Gruppe subsidiary Mountain Vision AG in the mid 90s, WAG has lead a digitalisation agenda. The company installed fibre optics on the mountain before any operator or external actor was willing to do that and engaged in other similar projects ahead of many others. Later on, information and communication technology (ICT) became a commodity, like electricity. All ICT services were outsourced for over five years to an external, Swiss company. (Gurtner, 2017) The same setting continues for some functions; basic IT services are handled by an external service provider.

A digital services team was in 2015 assembled within Weisse Arena Gruppe to build better capabilities to use data and improve the customer experience using digital tools. The team's leader came from the marketing department in WAG while the other three initial members were recruited from outside the company. A software architect with technical competency was hired. The group quickly realised, that in order to have an impact, further resources were needed (Paasila, 2017b). Two software developers without previous connection to the company were hired. Due to the difficulty of finding

technically competent people in Switzerland, and due to the high quality of education and proficiency within computer science in Finland, two Finnish software developers were employed.

The department of digital services was in December 2016 spun off into a new company named Inside Labs AG. See chapter 4.1 for the rationale behind the new company. Inside Labs is a continuation of the work the digital services team was doing, and is still backed by Weisse Arena Gruppe. The team's size has since the start of Inside Labs grown by several members, now incorporating further expertise in data analytics, marketing and customer service.

Inside Labs is not responsible for all digital service development for Weisse Arena Gruppe. The main customer-facing websites for Flims and LAAX as well as some other websites are developed in co-operation with outside agencies. The traditional IT services, including e-mail maintenance, network and computer hardware maintenance are purchased from an external IT service provider.

Weisse Arena collects data of for example gate entries, parking space vacancy, on-mountain customer amounts, daily revenue, and web sales. These data are presented in near real-time dashboards that are available for various parts of the organisation. One application for real-time customer data is automation. Simple automation routines for marketing campaigns can be built e.g. using geo-fencing enabled by mobile phone usage. Geo-fencing means creating a virtual boundary around a specific geographical area determined by global positioning system (GPS) data. Using geo-fencing or some similar technology, offers can be targeted at customers in a specific part of the resort or within a specified proximity to the resort, or any other arbitrary geographical selection. Such offers can be manually triggered as campaigns or automated according to set rules, which trigger sending of offers to the customer when pre-determined conditions are met.

Accurate and timely user data can be used to assist many activities outside marketing and sales in a ski resort. Modern slope grooming machines collect and utilise data such as snow depth and grooming statistics. Data can be used to understand and control the visitors' movement on the mountain and direct resources where they are needed. LAAX visitors can use the INSIDE LAAX mobile application to call for help and automatically send their location in case of an emergency.

The digital service offering of Inside Labs is targeted at all customers capable of operating a smartphone. Some subset of the offering is targeting certain segments. The restaurant table reservation functionality of INSIDE LAAX might target the slightly older apartment owner with high disposable income. Another example is a special park ride ticket targeting freestyle riders.



Digital maturity in the case of LAAX is not so much about the digital advancements of the company Weisse Arena Gruppe as it is about the digital maturity of the customer journey within the resort. The know-how built by the digital services team and by Inside Labs is usable by WAG. WAG as a company has not advanced tremendously in terms of digitalisation due to the work of the digital services team. What has been built is know-how and an understanding of things digital, which is concentrated to Inside Labs. The general sentiment according to the CEO of Inside Labs is that LAAX and WAG are quite far in terms of a digital service offering compared to other ski resorts. There are one or two other companies in Europe engaged in similar efforts. (Paasila, 2017a)

## 4 Process

### 4.1 Reasoning behind the new initiative

The CEO of Weisse Arena Gruppe (Gurtner, 2017) asserts, that if a company wants to provide a higher quality customer experience, reduce hassle and streamline the offered experience, everything that can be digitalised should be digitalised. Everything that can be turned into something conveying data and everything measurable should be digitalised. If this is done, information is available just-in-time and it is possible to act based on as timely and accurate information as possible. With more information, a company can build a better relationship with the customer by offering services more fitting the customer's needs, and which the customer is willing to pay more for than for a generic service. If a customer trusts a brand, she is willing to pay more.

All ICT services in Weisse Arena Gruppe were outsourced to an IT company until 2015. Unhappiness with the prevailing situation began to emerge in the years prior to 2015. The culture in the IT company was corporate, meaning a tight hierarchy and chain-of-command was present. Making changes was a pain, incorporated companies do not typically act rapidly. The opposite approach was needed, an approach focusing on increased agility and the ability to react and change direction quickly.

In the prevailing situation with an external company developing services for WAG, the focus lay on the wrong aspects. There was not a sufficient focus on the end-user or a culture of customer-centricity. Instead, the intermediate actor, Weisse Arena Gruppe, was in the role of the customer of the developed services. This led to design and optimisation of services based on wrong premises and priorities. There was also the problem of focusing on improving efficiency instead of changing the underlying system. Improvements in efficiency do not lead to exponential growth. Weisse Arena Gruppe's CEO believes that it is a fundamental mistake to try to adapt digital methods of working and digital services to existing structures, instead of adapting structures to the requirements that the digital age makes possible (Gurtner, 2017).

A realisation occurred in 2015, that the systems, ways of thinking and approaching challenges were not up-to-date anymore. It was understood, that competitive advantage was to be lost if current trends in the environment, such as the growing importance and ubiquity of smart phones, were not considered. The customer journey was not designed in an optimal way. An understanding arose, that the customer journey can be modelled, anticipated and influenced.

This opened the discussion for what investments needed to be made in order to become state-of-the-art in the digital realm. The decision was made, that a digital services team was to be formed, with the purpose to professionalise the approach to digitalisation and innovation.

A setting where all requirements are defined in the top-level management team is not ideal for innovation. Traditional chains-of-command can act as growth impediments or speed bumps slowing down innovative initiatives. To gain total independence from the existing hierarchical and structural impediments in the organisation, as well as freedom of thought, were important reasons for the founding of Inside Labs. (Gurtner, 2017)

According to Martin Hug, acting chairman of the industry organisation Graubünden Bergbahnen (Graubünden cable car companies) and part of the management team of WAG, the current amount of ski resorts in the Canton, where LAAX also resides, is too large (Hassler, 2017). Digital offerings are an additional channel through which differentiation can be achieved and competitive advantage gained. In a tight market situation, being able to offer unique experiences by utilising digital technologies might be a differentiating factor.

The financial result of Weisse Arena Gruppe for the fiscal year 2015-2016 was the poorest in history. A large reason was the heavy precipitation in June and the late arrival of colds and snow in the winter. These circumstances reduced visitor amounts both during the summer and during the winter. Ski resorts are heavily dependent on the weather, and poor weather seriously diminishes visitor amounts. The digital services team in LAAX was assembled at the beginning of this financially poor winter. Employee contracts were initially signed for six months, to end in April 2016. Despite the financially challenging year, discontinuation of the digital services team was not on the table. Contracts were renewed for another half a year. The work of the digital services team was not directly dependent on the incoming cash flow, and the financially poor year did not affect the strategy for the digital services team.

Poor winters affect all ski resorts and the whole tourism industry. The digital services team's mission was not directly influenced by those circumstances. A ski resort cannot differentiate simply by high-speed lifts with heated seats or similar small improvements. These kinds of improvements provide no long-lasting value, because every other actor can copy them. Changes might be necessary in order to have a certain standard of quality, but they do not provide a unique added value. People are not moved to the mountain just because of that. Differentiation is achieved by combining different value propositions. Creating a positive environment and engaging customers is really done by people and the community around the service. (Gurtner, 2017)

The underlying assumption behind the formation of the new team was to build capabilities for getting more data and utilising that data. One planned application for increased data was to target property owners in the area and transform the service offering to make them more viable customers. These new initiatives had the backing of the CEO, with him building support for the innovative work in the management board. The support of such a strategically central person and influencer was a vital factor for the continuation of the new initiatives.

The study conducted by MIT Sloan Management Review and Deloitte finds that digitally maturing organisations are twice as likely to be led by a single visionary or group than less mature organisations (2015). Often effective management means leading by example. The same study finds that confidence in the leaders' skills to lead digital transformations and confidence in leaders having a sufficient understanding what comes to digitalisation, is 75 per cent and 90 per cent respectively. In early-stage companies, only 15 per cent and 27 per cent think that. It is certainly the case that digitalisation efforts within the LAAX resort have a strong support from the CEO (Paasila, 2017a).

One of the main initialising forces behind the digitalisation efforts within Weisse Arena Gruppe stem from the company's CEO and chairman of the board of directors. WAG and LAAX have always been on the forefront of digitalisation, having the first web page of any Alpine ski resort and having for example installed wireless access in a large part of the ski resort. The current progress is an attempt to professionalise and speed up the digitalisation efforts. The CEO is the strategic visionary for LAAX. (Paasila, 2017b)

Any company needs to have a solid understanding of the market circumstances and how these change with time. The investments into the digitalisation initiative have mostly produced the right kind of results, but have required larger investments than those initially planned. For WAG, a tourism provider with around 80 million Swiss francs of yearly revenue, new kinds of investments are necessary. To remain competitive, the customer journey and experience needs to be designed at least equally well as competitors do. (Paasila, 2017b)

## 4.2 Steps thus far

The future digital strategy for Weisse Arena Gruppe was being discussed in the management board and between the CEO and the Head of Web Management and E-commerce in the marketing department from February until June 2015. In June, the Head of Web Management and E-commerce was appointed Director of Digital Services.

The new department physically moved to a new office, as to signify the paradigm shift in thinking and the new focus area.

Simultaneously, discussions were held with various agencies and potential partners about what kind of solutions were on offer. After discussing with potential partners about big data solutions, new websites and e-commerce suites, it became clear that none of these solutions came even close to covering the main use case of for example the hotels, the lift company or the rental company. The services on offer were also targeting Weisse Arena Gruppe as a company, instead of attempting to increase value to WAG's customers or empowering the customers. The notion of customer-centricity was missing; companies considered the situation as them being the service provider and WAG being the customer. (Paasila, 2017b)

As solutions on the market didn't meet the requirements WAG had, it became obvious that these solutions needed to be built in-house in order to have any kind of competitive advantage. Alternatively, the know-how to create the required capabilities by combining existing pieces of software needed to be assembled. In August 2015, the decision was made to form an in-house technical team to create value by utilising data or big data. A technical lead was hired as second member of this team, in addition to the Director of Digital Services. Two developers were also hired in order to have the capability to make a bigger impact.

At the time the digital services team was formed, WAG had already built a mobile application with an external partner. This customer-facing application was released for the winter season 2015-2016. The digital services team's first priorities were to build back-end systems for the mobile application, as well as extending its functionality. The team built functionality that allowed customers to order and pay for food with their mobile phones, a service hardly seen in a ski resort before. The anticipation was that this mobile application would provide valuable data, with e.g. Airbnb and Booking.com as role models. These companies have built mobile applications and digital services with a wide reach. The gathered data would then be combined to better utilise existing systems and offer an improved customer service. Everything did not go according to plan; the reliance on the external partner was too heavy.

The external partner was not able to keep up with the same pace of development as the internal technical team, and did not have the necessary resources. The partner was also not physically close to the end users, and therefore did not experience customer frustrations and pain points. The external partner was functioning according to a traditional set-up with a project manager leading the work, and software developers not seeing the real impact of their work. The digital services team worked according to a different ideology, striving for increased value through visions and daily customer contact. There was also a language barrier between the external Swiss partner and the members of the digital services team, who used English for communication.

A careful consideration of the current situation was made because of the unsatisfactory co-operation with the external partner. Weisse Arena Gruppe was not adding the maximum amount of value with the existing set-up in terms of digital services. This realisation brought another one; the internal innovation unit should control the full technology stack and the services end-to-end, rather than just being responsible for a part of the technology. This way the value delivered could be maximised. The necessary know-how or capabilities to acquire such know-how already existed in the digital services team.

At the same time as the situation was evaluated, the goals and intended results of the digital services team were also re-iterated. The customers of LAAX are on average around 45 years old, a lower average than in many other resorts. Most customers can thus be assumed to be well-versed smart phone users. The clientele of LAAX is roughly divided into three equal-sized groups: apartment owners, day guests and guests who rent an apartment or a hotel room. These groups could be better served by providing them with relevant information on their mobile phone on-site. For these reasons, a decision was made to create a new mobile application, named INSIDE LAAX. This wasn't a decision taken lightly; creating a new mobile application meant sacrificing the investments into the previous one created in co-operation with the external partner. (Paasila, 2017b)

Development of the customer-facing mobile application was started in spring 2016 and released in time for the summer season. Simultaneously work started on an internal application, WAG Inside, meant for employees. WAG Inside was launched in August 2016, following a few months of development by one team member.

To be able to offer end-to-end experiences for customers, the team needed capabilities beyond software development. In the first half of 2016, a search for other types of resources was initiated. Certain gaps that needed to be filled were identified. To learn from how people used services and distributing them to a broader audience, a non-technical marketing employee started in August 2016. A data analyst also joined the team at the end of the year.

As the team was growing, it became clear that the tied-up resources might be too large for a ski resort, having software developers combined with marketing-focused and data analytics personnel. It might also be hard for a ski resort to remain an attractive employer, the competition for talent being fierce. Plans about commercialising some of the developed services had been brewing all along. The solutions developed could with some customisations serve other ski resorts or other types of actors. There were some other technical challenges related to work permits at the same time. All of these factors led to the foundation of Inside Labs in December 2016, the successor of the

digital services team. Inside Labs started without a clear strategy, but with the prospect of commercialisation and the independence to do so.

At the point of the new company being formed, the Inside Labs team was also marketing the INSIDE LAAX application with physical material costs, including billboards and branding of gondolas, reaching over 100 000 Swiss francs. The marketing department within Weisse Arena Gruppe used seasonal planning. The budget and personnel of the marketing department was also cut during the same time period. For these reasons, the pace and capabilities of the marketing department of Weisse Arena Gruppe were not sufficient for the requirements of Inside Labs. The Inside Labs team's marketing efforts of the INSIDE LAAX app were successful. INSIDE LAAX generated 2.8 million francs of revenue and attracted 65 000 users during the first winter season of 2015-2016.

The initial release of INSIDE LAAX was in the summer of 2016. The revenue coming through the application in the summer was not large. The real test started in the winter season, when a winter version of INSIDE LAAX was released. This turned out to be an impactful service, overtaking several million, or 3-4 % of the revenue of the entire company. Lift tickets and parking tickets were sold through the application while some old websites were shut down. Switching a part of sales to a new platform was a large operational risk, but the trial was successful.

#### 4.3 Digital strategy within Weisse Arena Gruppe

As is a widely recognised fact in strategic management, the choice and design of organisational structure is a major contributing factor to strategic success (Flagesta and Hope, 2001). LAAX is in a unique position compared to many other ski resorts in Switzerland, as many hotels and restaurants in the resort are owned by the same company, Weisse Arena Gruppe. This makes it possible to offer a seamless customer experience throughout the customer's stay. In most other resorts, these types of services are operated by separate companies. (Amherd, 2017)

Such an integrated resort governance model is in a better position than traditional community-based models (Clydesdale, 2007). The comparatively large amount of available resources allow for large-scale marketing efforts and investments into infrastructure that increase the general attractiveness of the resort (Müller, 2014). Other overheads involved in decision making can also be avoided in an integrated model, since negotiations about financial obligations between different parties are not to the same degree necessary. With fewer parties involved in an investment, less time needs to be devoted to the share of investment of each party. In a study by Victoria

Müller (2014, p. 121) stakeholders in the Flims Laax Falera destination identified drawn-out decision making as one major impediment to quick responses to market changes. This further strengthens the case for a single-source service provider within a destination. (Müller, 2014)

There are many ski resorts and destinations in Switzerland that are not large enough to have resources to develop their own digital services, let alone have the necessary know-how. This fact provides a sound opportunity for larger resorts with sufficient resources to develop digital services in-house to conceptualise and package developed services that could be used also in other resorts. The digital service offering in LAAX is advanced compared to most competitors (Amherd, 2017; Gurtner, 2017; Paasila, 2017a). Weisse Arena Gruppe therefore holds an attractive market position, having the necessary resources and demonstrably well-functioning practical applications.

When trying to sell services or products, an instrumental factor is that the practical applicability of these services has been demonstrated. For commercialisation purposes, the created services' general applicability for other ski resorts still needs to be demonstrated and relevant stakeholders convinced. LAAX holds excellent settings for creating digital services with internal services having a potential user base of over a thousand employees in winter time and a customer-base with close to a million first entries annually.

WAG's CEO Reto Gurtner (2017) believes that to really understand the needs and desires of a customer, more data than a company can extract on its own is needed. Other sources need to be used as well. Through channels such as social media, the lifestyle and preferences of a customer can be more closely mapped and understood. Customers are in the ski resort for a relatively short time, which means there is but a brief moment to impress the customer and create memorable experiences. Offering convenient services, such as handy parking or easier ski rental is not enough on its own. Instead, the company should, with a deep understanding of the customer, offer a community the customer can feel she belongs in. With enough knowledge about the customer, it is possible to create new, improved value propositions. The viability of assumptions made based on these data can then be tested through MVPs. By deploying MVPs, customer feedback can be gathered and experience can be gained of how these MVPs are received.

Storing data is relatively inexpensive. Data has through some channels been gathered before the digital services team was formed. What the new digitalisation initiative within LAAX tries to do, is to combine data from different siloes to form a clearer picture of everything related to the customer. The goal is to figure out which combination of data gives you new perspectives and information to create new value propositions for the customers. One of the most important channels through which this data can be gathered, is the mobile phone. The mobile phone virtually always follows



the customer and is the most straightforward channel through which location or activity data can be gathered. The INSIDE LAAX application is a channel through which the customer can be engaged and data can be gathered.

Without precise data, resources cannot be delegated to where they are truly needed. Effort, time and money will be wasted on unhelpful activities, because the focus is not clear without a comprehensive picture of the client. If you know that a ski resort guest only has done skiing his whole life, there is no sense in trying to convert her or offering her all the snowboard-related services. These services are available for that customer, but are not actively promoted. These are reasons for why direct communication between customers and the company is important. Direct communication is mutually beneficial by offering a clearer picture of the customer to the company and increasing trust between the parties. Increased communication can be achieved by letting the customer rate different aspects of the service or offering a feedback platform. Rating and other similar functionality is too expensive to carry out without digital tools. (Gurtner, 2017)

Why should the customer then agree to share his personal data, from his mobile phone or from elsewhere? The relationship can be formed into a beneficial cycle. The company having a clearer picture of the customer, created through collection of information, means that a better value proposition with services tailored to the customer's needs or more suited to the individual can be offered. A better value proposition creates ties between the customer and the company and increases trust in that relationship. Increased trust in a brand or company means that the customer is willing to spend more time and money with the company's services and consequently share more data.

In order to really benefit from data, a critical mass of data is needed. The beginning can therefore be difficult. With a solid foundation, the beneficial spiral is set in motion, where increased data allows the service provider to create more fitting or more desirable services, which make the customer more engaged and allow for increased – or more precise – data collection. Creating and shaping services in LAAX is an ongoing process. Just like when building a hotel, the hotel cannot be left in the same fashion for the coming 20 years. Whatever competitive advantage you had in the beginning will be copied by competitors, and other innovations will arise. The same is true in the ski industry. You cannot afford to simply stay where you currently are without the ability and willingness to change.

The goal is not simply to make the customer happy, but rather to create more value for the customer. Making the customer happy is easy to do in the short term, to the detriment of the company, by for example selling tickets for a fraction of the normal price. Going back to the normal price is afterwards difficult. Instead, a value proposition needs to be created, wherein the customer can learn something. When

comparing universities, it is not the cheapest university that gains most recognition and fame, but the one that offers the most value, or the best education. The same scenario applies to ski resorts. If an application or service does not have a clear value offering, there is no reason for the customer to download an application or use a company's services. A focus on creating value propositions for customers through new services will ultimately lead to increased revenues for the company. A value proposition could mean that the customer can be included in a like-minded community not found elsewhere. Feeling a belongingness or community spirit increases the chances that the customer will return. Innovation in LAAX in a general sense therefore refers to how more value is created for the customer by offering unique experiences. These unique experiences make the customer willing to return. (Gurtner, 2017)

Instead of solely relying on strategic business plans, different approaches should be validated by creating MVPs and testing these with customers. This is the approach that should be employed to software development and every new service development effort according to the CEO of Weisse Arena Gruppe (Gurtner, 2017). Reaching sufficient agility to do this is only possible with a new team that likes to work together and is not bound by traditional chains-of-command or hierarchies. A team with freedom of thinking and a freedom of spirit that can create what they need to without unnecessary external impediments. A shared vision is however required.

#### 4.4 Developed services

The digital services team's – and later Inside Labs' – work has not been done according to a clear-cut master plan. Instead the premise has been to act in an agile manner, being able to test ideas quickly in a tangible way and being able to steer into a new direction when required. Certain strategic elements – such as improving the customer experience in a comprehensive way or build capabilities and know-how for utilising customer data – were present since the beginning. These have been refined and translated into concrete actions along the process.

According to Inside Labs' CEO Kristian Paasila (2017a), the results of the team have been successful. The capabilities and understanding of what kind of digital technologies a ski resort should have, have been successfully built. A foundation for further work and future benefits during the next few years has been laid. The investments made have been higher than what was originally expected. These investments need to continue during the next few years.

Not all ventures have been fundamentally successful. In the spirit of agile, quick-and-dirty testing of concepts through prototype building, some services developed did not

experience lift-off and were not taken into use. Some mistakes were made, which the team could promptly correct for. For users who logged in to the customer-facing mobile application using a certain method, a required e-mail address was not stored due to technical reasons. This meant that for tickets sold through the application, no confirmation e-mails containing the actual tickets could be sent, and customers didn't receive their paid-for tickets. This issue was quickly noticed and corrected for, and did not have a large financial impact.

In the first part of the team's existence, resources were dedicated to building tools around wireless detection, tracking locations on the mountain and similar efforts. The integration with the hardware was ultimately too unreliable to be feasible for any production-grade services. These trials were not completely unbeneficial however, valuable learnings were gathered along the way.

In addition to the generic goals being reached, there have been several successful individual projects. Below is a listing of the most important projects undertaken and the most extensive services developed. Besides the services listed below, a number of prototypes were developed which did not end up being used as of yet. These included automatically created heat maps of visitor movements during the day in the resort and its vicinity, as well as some tools for tracking customer behaviour using the location data provided by the customer-facing application developed in co-operation with an external agency.

#### 4.4.1 Mobile ordering

LAAX visitors were offered a consumer mobile application developed in co-operation with an external actor in the winter season 2015-2016. The digital services team created a web application for ordering and paying for food and drinks in selected restaurants in the resort, which was integrated into the mobile application. The application was among the very first created by the digital services team, built from scratch in a few weeks' time. The functionality was quite innovative and most likely unique to the LAAX ski resort.

Using the mobile ordering application, customers could assemble products into a virtual shopping cart and pay with the press of a button, automatically debiting a previously registered credit card. The online ordering functionality consisted of two separate applications communicating through the back-end. In addition to the client-facing application, the restaurants controlled an administrative interface. Tablet computers were set up in restaurants. When a customer placed an order with their mobile phone, the interface in the restaurant would automatically update to display that incoming order. The restaurant could then choose to accept the order and give an

estimated time for completion, upon which the payment was automatically handled, or reject the order, notifying the customer of the reason for the rejection.

The administrative interface included functionality beyond handling the incoming orders. The restaurant personnel could view dynamically created reports of sales during a date period of their choice. The availability of items could be managed by simply toggling a switch on or off. These choices were immediately reflected in the client application. Messages about for example order processing were relayed from client to client via the back-end using the WebSocket (Fette and Melnikov, 2011) standard. Mobile ordering is now integrated into the INSIDE LAAX mobile application.

#### 4.4.2 INSIDE LAAX

Weisse Arena Gruppe had together with an external actor developed a mobile application for its customers for the winter season 2015-2016. Unhappiness with the co-operation and functionality of the application, as well as strategic decisions to move end-to-end maintenance of software inside the company, led to the decision to internally create a new mobile application to replace the one in use. The first version of the new application, called INSIDE LAAX, was released for the summer season 2016. The architecture of the mobile application was redesigned, which meant that the code needed to be rewritten from scratch. React Native was chosen as the main technology (see Chapter 5.3.3). The focus of the application, along with its design and functionality, was completely rebuilt based on the learnings gathered so far and the current understanding of the requirements. An external contractor was used for creating designs, working in co-operation with the developers. The same designer produced designs for the WAG Inside mobile application as well as concept designs for Inside Labs.

The same application is used for both winter and summer content. The contents are periodically changed to reflect the different seasonal offerings. According to Kristian Paasila (2017a), this the most rational approach compared to having separate applications for summer and winter. For psychological and behavioural reasons, there is no sense in changing the name of an application for the same destination in different seasons and going back-and-forth. The entity owning the LAAX brand is also the entity which has financed development of the application. It is therefore natural that INSIDE LAAX was never meant to specifically promote the Flims summer brand. Strategically, this relates to the effort of transforming LAAX into a year-round brand representing urban Alpine lifestyle. This way the potential clientele is increased, and customers can be attracted to become year-round guests.

The functionality of the first summer version of INSIDE LAAX was focused around providing relevant information about opening times, restaurant locations etcetera, as well as providing the possibility to cut queues by purchasing entry tickets through the application. The mobile tickets could be machine-read at gates. Quick Response (QR) codes (International Organization for Standardization, 2015) were generated, which could be scanned at the gates to gain entry. The revenue flowing through the application during the summer season was not large. The real test for the potential of INSIDE LAAX came in the winter of 2016-2017.

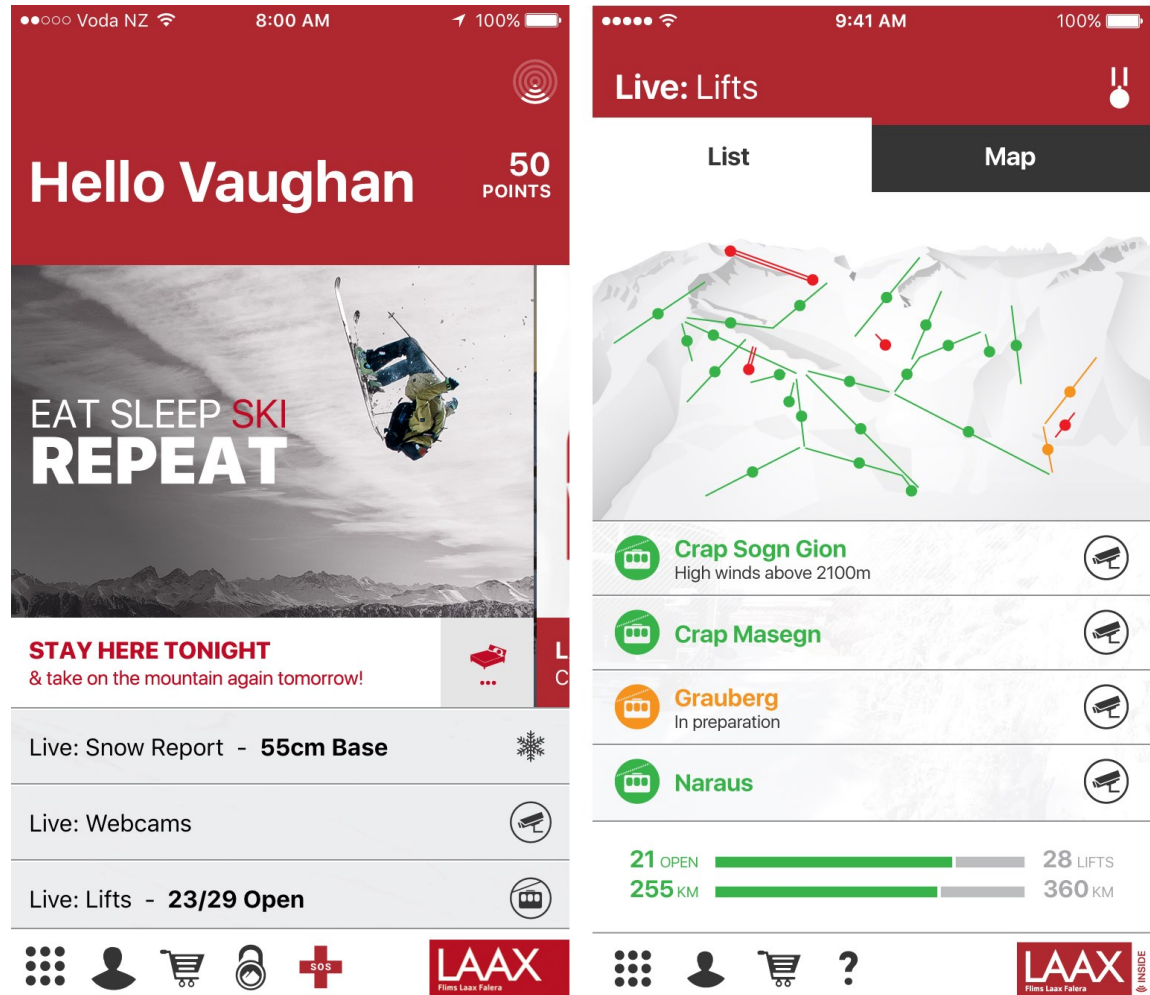


Figure 2: Screen captures from the winter version of INSIDE LAAX in 2016.

The winter version of INSIDE LAAX (see Figure 2) introduced several new features. Users were able to collect virtual badges and points by performing different activities on the mountain. Gamification is a feature that has engaged customers and received wide attention (Gurtner, 2017). Gamification includes the enticing social and competitive aspect of comparing one's results to others' results. Both the winter version and the summer version of the application have gamification features. Points

are also collectable outside the resort. Points can be gathered by checking in on the INSIDE LAAX application at different geographical locations. Check-ins based on GPS are available in different parts of Switzerland as well as in a few other European countries. The check-in furthest from Laax can be found at the London Heathrow airport. Points are redeemable for products or discounts in the resort.

INSIDE LAAX is arguably the most impactful service developed by the digital services team and Inside Labs thus far, both from the customer- and business viewpoint. The application overtook 2.8 million francs, or 3-4 %, of annual revenue from other sales channels of revenue during the first active winter season (Paasila, 2017b). It gathered over 65 000 users, of which 30 000 were active monthly.

#### 4.4.3 WAG Inside

In addition to the INSIDE LAAX consumer application being built in the spring of 2016, the digital services team set out to work on an employee mobile application, named WAG Inside (see Figure 3). The internal application's goal was to empower employees by offering them up-to-date information and new channels for communication. The original idea was to create a tool for better utilisation of the available work force. Weisse Arena Gruppe employs many seasonal workers who have a part-time contract during the winter season, such as snowboarding and skiing teachers. The team wanted to build a service to utilise available resources better by connecting persons offering project-work within WAG with those part-time employees who were available and interested in taking a short-time job. A sort of internal job market in miniature form.

In the implementation of this tool, inspiration was gathered from a social media dating application, where people can show interest in one another by a swiping gesture. The internal application was available to every employee. Certain employees were given permission to post jobs visible to everyone else. People could show interest towards a job by swiping that job card to the right. Upon this, the employee and the job poster were connected, and could use the built-in real-time chat functionality to continue interacting.

Several other features were later added to the application. As a complement to – and later improved replacement for – the weekly newsletter sent by e-mail to every employee, the WAG Inside application contains a news functionality, which is updated immediately when a news item is posted. Instead of being aggregated to a weekly digest, news can be sent out immediately to spread information faster. The most important news can be sent as a push notification, visible in the notification area of the mobile phone.

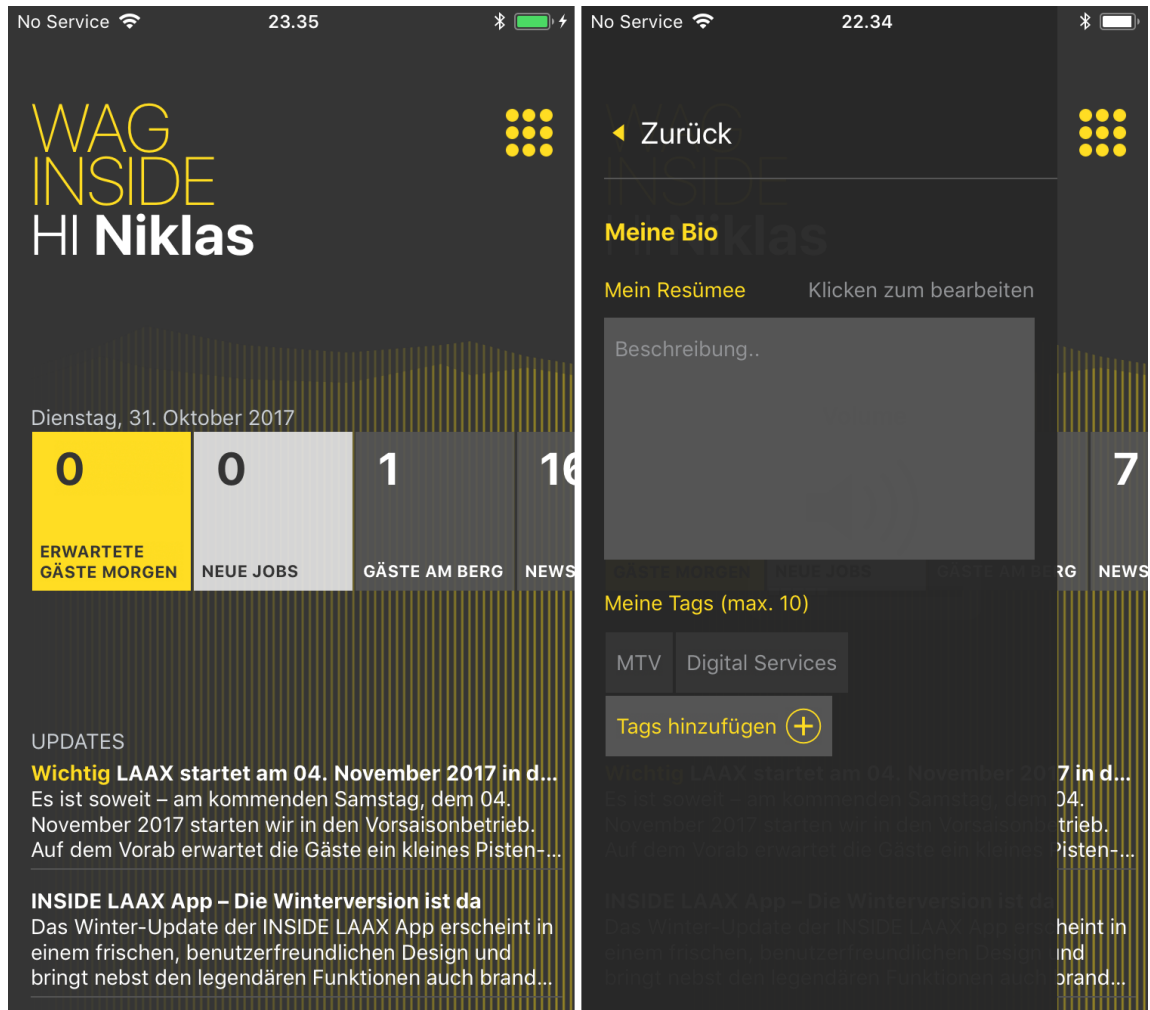


Figure 3: Screen captures from WAG Inside: dashboard and biography menu.

WAG Inside contains a contact directory for employees, with the ability to directly call or e-mail contacts from within the app. INSIDE LAAX and WAG Inside both contain a tool for estimating the visitor amount in the coming days. The estimation tools are built to benefit from gamification principles. The closest guess each day receives a cash price. Offering prices for accurate guesses increases the participation rate. Responses are aggregated and the average estimate for each day is visible in the app to all employees. The visitor amount is a particularly suitable KPI for crowdsourcing, since people with vast experience, such as on-mountain employees, can provide their educated guesses. Crowdsourcing means dividing work between participants to achieve a cumulative result. By time, as estimates and realised visitor amount data is collected, it is possible to learn how those two metrics correlate, that is when guesses tend to line up with actual visitor amounts, and calculate even more precise estimates. The benefits accrue with time as the organisation can be taught to direct efforts where they are truly needed, thus also freeing up resources in other areas.

The visitor amount is one of the most important key performance indicators (KPIs) in the ski business. Having even a crude estimation of what the number is going to be in the coming days is important for many operations. Resources can be directed to where they are needed and unnecessary spending avoided.

#### 4.4.4 Administrative interface

A web application was built as a platform for testing different tools. It was initially used as a purely internal test platform, but was gradually expanded with tools being used by people outside the digital services team, and eventually even tools for users outside of Weisse Arena Gruppe. The site was modularly built, with the possibility of granting access to only selected modules for one person. Modules could be easily activated or deactivated for a specific user or user group.

Some modules have users outside of WAG. An information editing tool was built for the over 100 restaurants in the region. Restaurant managers can access and edit open hours, status and contact information of – as well as add photos for – their restaurant. This data is stored in a content management system (CMS) and distributed to client applications, such as INSIDE LAAX, where the data is displayed. This allows the restaurants to always have up-to-date information for their customers, and use an interface through which that information could be updated directly, without the need for intermediators.

The tools used by WAG employees include an employee data handling tool. The tool acts as a management interface for the central repository of employee data stored in the database. A web application was built for registering to and paying for events in the resort, with an accompanying management interface for handling registrations. The administrative interface also contained several other smaller tools for company-internal usage.

#### 4.5 Future steps

Inside Labs is currently making efforts of commercialising some of the developed services. Other ski resorts are the natural target audience, but other types or organisations are also potential customers. Inside Labs is also helping its backer, Weisse Arena Gruppe, on several different fronts. The INSIDE LAAX ecosystem touches Weisse Arena operation on two different fronts. First, the internal mobile application WAG Inside is used for connecting and empowering employees. Second, Inside Labs assists



WAG on two new business areas of interest: gaming and new uses of infrastructure. (Paasila, 2017a)

While development continues, purposes and potentialities for commercialisation are continuously sought for these technologies. The business model has shifted away from being a software company towards being a prototyping lab. This means that the focus is not merely on digital services, but also in other kinds of ventures for generating new revenue. Established services are defined by considering whether the removal of a service has a significant, measurable, negative impact. If it does, then that is considered an established product. The next step for an established product or service is figuring out whether it can benefit other clients with similar needs or attributes. If the same established service –test applies to that multi-client service, it is considered a platform. (Paasila, 2017a)

The goal for Inside Labs is to create services that offer value to at least 80 per cent of potential users. The assumption when creating new services is that they will not please everyone. Up to 20 per cent of potential users might not value the created services. A classic service provider might operate on the assumption to please almost everyone. For digital services, the edge cases are too numerous to all be taken into consideration. An example of this is the INSIDE LAAX mobile application, where the choice was made to not offer support for Windows Phone, even though that might derive value for a small minority of the clientele.

The MVPs and products produced by Inside Labs need to cover basic costs. As a small company, Inside Labs does not have resources to simultaneously deliver many MVPs or multi-client services. Ambitions are set on finding a suitable partner for co-operation. The partner could be another resort, an established technology company or an international event organisation. To be able to create multi-client solutions, Inside Labs is actively looking for potential partners.

Gaming is one area where Inside Labs is assisting WAG. A mobile phone game, to be released in the winter season 2017-2018, is under development with an external partner. Through gaming, the LAAX brand could be leveraged in a digital world to create revenue. This would mean creating revenue without bringing customers to the resort, which is the opposite to the approach of any traditional tourism destination. The goal is also to spread awareness of the LAAX brand, create a connection to people and get new people to discover and ultimately visit the resort. Combining digital and analogue products is one of the directions of future business for LAAX (Gurtner, 2017). Digital services, such as augmented reality or virtual reality applications, allow for service combinations not previously achievable.

Another ongoing venture is finding new purposes for existing infrastructure. There is a lot of infrastructure in a ski resort, and part of it is vacant during at least some part of

the year. An old mountain station is being turned into a co-working space. The idea is to attract a new, year-round customer segment for combining work with leisure activities. There are tens of thousands of square meters around the resort that could be used for different things. The reutilisation of infrastructure is therefore a concept that can be expanded, if successful. Attracting more visitors and customers to the region delivers positive network effects to all regional actors.

According to Kristian Paasila (2017a), the assumption within LAAX is that ski resorts will undergo a similar process to what airlines have undergone in previous years. Self-service will increase; there aren't necessarily physical ticket offices in 5 years anymore. Instead tickets are purchased using mobile phones or through self-service terminals. This is analogous to how ticket purchases are handled in train stations throughout Europe.

Inside Labs is really an enabler for interconnecting experiences and people, promoting communication and simplifying operations, making the mountain experience as convenient and accessible as possible. This is done by reducing or removing queuing and hassle around waiting. Inside Labs attempts the challenging feat of tying customers emotionally to the product or service offering.

Although not yet a reality, Inside Labs works from the assumption of being independent from its financial backers. The focus is on providing an optimal customer experience in the region, instead of solely profiting and supporting LAAX or Weisse Arena Gruppe. A concrete example of this approach is the loyalty program. A customer can check in at for example a restaurant using GPS positioning using the INSIDE LAAX mobile application, and thereby earn points that are redeemable for benefits or discounts within the resort. The restaurants where check-ins can be done are not exclusively operated by WAG. Instead, a curated selection of restaurants in the region is used, chosen by locals or people with deep knowledge of the destination. These are restaurants that are considered worth a visit during a stay in the destination.

For continuously producing outstanding results, it is important to be able to proceed without constantly having to worry about financing operations and continued work. As for all starting companies, sufficient cash flow is hard to achieve in the beginning before the product has achieved success. Inside Labs is not a viable business on its own yet and still needs Weisse Arena Gruppe as a backer to be able to test proof-of-concepts. The relationship is mutually beneficial because Inside Labs with the backing of WAG can improve circumstances within Weisse Arena Gruppe. Viability of the concepts Inside Labs are building need to be demonstrated. Other actors need to be convinced that created solutions can work in other resorts as well. So far, the general feeling is that the created innovations are impressive, but other resorts are not convinced that they can bring value and increase revenues. Convincing other actors of the viability of developed services is the next big challenge. (Gurtner, 2017)

## 5 Key factors determining the result

This chapter lays out the central factors for the successes and setbacks of the digital services team. Most factors are generally applicable to other scenarios, and organisations other than ski resorts. The majority of the elements considered were crucial for the digitalisation initiative's success, but some possibilities for improvement are also pinpointed.

### 5.1 Size and independence

An important factor for how well the digital services team performed was the appropriate operational setting and suitable circumstances. The team reported directly to the management board and the CEO. This situation provided an unusually large degree of independence to act based on current best knowledge and experience gathered from continuous customer contact. The team could focus on what was deemed important at each point, instead of being slowed down by requirements from the outside causing unnecessary overhead. Micro-management was absent. The management hierarchy in Swiss companies is typically rigid. While effective in certain circumstances, such a management system is not optimal for quick and dirty MVP creation or proof-of-concept development. The digital services team was in a more suitable situation for new service creation, having the freedom to create customised, more suitable processes.

Equally important to having a certain degree of independence, was the support of the CEO. The backing of the whole initiative and idea creation in collaboration with the CEO was of vital importance. The CEO not only supported the digital services team's work, but was an important instigator and idea source for the whole digitalisation initiative.

Fast decision making is important in innovative ventures. Not having to go through the traditional work organisation and hierarchy in Weisse Arena Gruppe was instrumental for the success of Inside Labs (Gurtner, 2017). Integrating a new team with a corporation is very tough and ultimately increases the risk of failure, because a lot of different opinions must be considered, even if the person expressing her opinions is not invested in, or has a deep understanding of the issue at hand. Many employees in leading positions have differing opinions or thoughts about how things should proceed. This hinders the formation of a clear strategy and slows down decision making. The founding of Inside Labs was therefore a necessity to reach an independence from the traditional decision processes of WAG.

Hierarchical structures also negatively impact creativity. Creativity in new service creation means testing out the validity of different assumptions. There needs to be a culture where people are willing to take risks. People are typically risk-averse in an established corporation. New service creation requires an entrepreneurial spirit, even when a risk of failure is present. This is the opposite to the prevalent approach in traditional organisations.

An easily overlooked factor is that of physical placement. It might be necessary to separate innovation to a new office, as a concrete measure to signify the difference in approaching challenges by the new team. For the digital services team, a placement close to the end users and customers was important. This enabled the team to experience challenges customers faced in a more direct manner and with a shorter feedback loop. This also included experiencing how guests interact with the resort and how employees use developed services.

## 5.2 Agility

Software development has traditionally been done according to the so-called waterfall model. This approach uses a step-by-step, sequential model familiar from many other industries. A project goes through the steps of requirements engineering, design and implementation, release and maintenance, with each sequential step idle until the previous has been finished and accepted (Royce, 1987). Many problems have been ascribed to this approach, but it is continually in use throughout the industry, and might be the best choice for the development of for example large-scale security-critical systems.

To combat long delivery times, delays, cost overruns and unsatisfying results, the software development industry has introduced so-called agile methodologies, the most notable of which are Kanban and Scrum (Schwaber and Beedle, 2001). These are frameworks containing tools and recommendations for increased software development project efficacy. Agile practices emphasise an iterative, cyclical approach rather than a linear start-to-finish approach. Adopting agile practices ideally produces a result that more closely matches the end users' needs with less effort than using traditional practices.

Development of services in the digital services team was done with a test-and-learn attitude, using iterative development cycles. Scrum principles were employed in the team from the beginning. The importance of using short development cycles to test the viability of small services, as opposed to creating a full-fledged, finalised product, was understood. Using short development cycles was certainly one of the success factors

due to the possibility to gain feedback quickly and direct resources accordingly. Releasing small features is often a balancing act, since companies don't want to lose or divert customers by constantly changing interfaces or releasing faulty software. A certain quality of code needs to be ensured, while not slowing down releases until everything is guaranteed to be perfect. Quick feedback cycles are essential for testing the viability of new features or reject unwanted features without unnecessarily over-committing resources.

The restraints for moving quickly often come from business requirements rather than direct technical IT challenges (Markovitch and Willmott, 2014). For this reason, new services creation needs a mandate to make changes to existing processes. The company's managers or the company board need to have accepted this mandate and need to give the team a certain amount of freedom to go their own way and make their own solutions.

The fundamental assumption in traditional software development is that a system can be fully specified in advance (Dybå and Dingsøyr, 2008). It turns out that besides laying out the general purpose, customers often do not have a sufficiently comprehensive understanding of what they want. Ideas are based on current systems and their limitations instead of an understanding of what is currently possible. Requirements specification requires a wide knowledge of business circumstances as well as of technical aspects. Even if the customer has a clear idea of what she wants and the necessary know-how, there will be some information loss due to miscommunication and not being able to express one's ideas precisely. Companies offering professional software development services should try to bridge this gap in understanding and knowledge, presenting aspects on the right abstraction level.

Software is inherently complex, meaning no one person can have a comprehensive understanding of the entire system, and this means that predictions of time spent or bugs found often are imprecise. Due to complexity, the initial designs are hardly ever accurate on a detailed level. Predicting the required effort or time spent for the development of a fixed set of requirements often have a large margin of error. According to Boehm et al. (1995) initial estimates vary significantly and are often widely inaccurate. Given the estimated effort of  $x$  months for set systems, the actual effort turned out to be  $0.25x$  to  $4x$  on system delivery. The difficulty of prediction is a major contributing factor to software project failures. In fact, according to Reel (1999), 46 per cent of software projects experience cost and schedule overruns or significantly reduced functionality.

Agile principles concede the notion of pre-determinable exact requirements. Instead the focus is on using the current best knowledge to set the course for development efforts in iterative development cycles. Short development- and release cycles lead to a short feedback loop. With a visible, tangible product in hand, users can specify their

intentions more clearly. Course-correction is simpler and cheaper the earlier in the development process it is done. A result more closely resembling the customer's wishes is optimally reached in a shorter time when agile principles are employed in software engineering.

Scrum emphasises the time-dependency rather than the requirements-dependency of software development. Software is developed in increments during a fixed-length time period called a sprint (Schwaber and Beedle, 2001). A sprint is typically 2-4 weeks long. At the end of this period, results are presented to end users and responses gathered. The development efforts are modified accordingly to the next sprint. Using such an approach can in certain situations lead to orders-of-magnitude shorter feedback times compared to the waterfall approach, where end user feedback can be gathered only after the release phase. Because of code interdependence and system complexity, the cost of making changes rises significantly the later in the development process changes are made. This means that implementing changes to the original design is significantly cheaper when agile principles are used.

Market disruptions enabled by digital technology are happening across industries. To prepare for disruptive powers, companies have opted for organisation-wide restructuring (Bloomberg, 2017). This means bringing agile principles and self-organisation principles to the whole organisation, not just the software development team. Self-organisation and agility do not typically mix well with traditional hierarchical management structures, one or the other of these contradictory paradigms tend to take over. Total freedom and letting go of all processes only leads to chaos. The right balance must be struck between management structures and agile principles, and the transition must be well organised and properly lead. The fundamental change is from a hierarchy-driven organisation to an organisation driven by core values that all employees are aware of and where the responsibility to lead is given to each employee. Such a transition is naturally extremely demanding to implement and is not possible without a change of mind-set, which often means restructuring efforts or laying off old and hiring new employees.

A holistic agile transformation requires a new kind of approach to risk taking. The assumption is, that strategic risks of not being sufficiently able to adapt, trump the risks inherent in an agile transformation. A transition to an agile organisation is a strategic decision like any other, with fundamental, cross-functional implications. Measuring success in an agile organisation necessitates new key performance indicators (KPIs). Change in employee happiness and customer delight can be measured instead of transactions per hour. (Bloomberg, 2017) Agility in LAAX was mostly concentrated to the digital services team. The management structure of Weisse Arena Gruppe is hierarchical and in that sense the chain-of-command more traditional.

Successful adoption of agile principles requires the support of the whole organisation. Failures tend to occur when parts of the organisation are not committed to the necessary fundamental paradigm shift in thinking and acting demanded by agile principles. Lighter versions, or partial adoptions, of agile principles are possible and might produce positive results depending on the circumstances. A partial adoption of agile principles can lead to misuse of practices, however. Stand-ups are as an integral part of Scrum, designed to emphasise three things: what was done yesterday, what's going to happen today and any obstacles moving forward. Stand-ups thus highlight problems and help work move forward. Daily stand-ups may be abused as check-ups to assert control, which violates the original purpose of stand-ups. Issues like these mean that a soft transition to this new way of thinking and acting might prove tricky to implement.

By being small and independent, the digital services team had the possibility to create the work methods that fit their needs, instead of being obliged to enact traditional processes present in large organisations. Scrum was a helpful tool for bringing structure into experimental work not bound or restricted by traditional processes.

Catlin, Scanlan and Wilcott (2015) present a model of two layers of IT capability used in leading companies. The more traditional layer is concerned with data integrity and stability of services, while the customer-facing layer focuses on agility, providing timely and relevant, even personalised, services. The customer-facing department's focus is thereby on being able to move quickly in order to provide relevant services at the right time and attend to evolving customer expectations.

The same kind of division of responsibility is partly active within WAG. Email services and server maintenance among other IT tasks are outsourced to an external company. The purpose of the digital services team and later Inside Labs is to concentrate on new ways to utilise software to provide value for customers.

### 5.3 Technology choices

Working in an agile way using short iteration cycles requires technologies that minimise the necessary overhead and ideally automate tedious manual work. At least a few major technology choices that have supported quick service creation can be distinguished. The technology choices in the digital services team were primarily made by the Software Architect with input taken from the other developers. In smaller projects, some new software libraries and technologies were tested, and freedom of choice was given to the software developers as to which particular technology to use that would best fit the requirements of that particular project. The choice of suitable

technologies is arguably crucial to the success of a project, although several reasonable alternatives usually exist.

The general theme of the technologies used by the digital services team is modernity, easy extendibility and openness, that is the ability of avoiding vendor lock-in.

### 5.3.1 Representational State Transfer Application Programming Interface

Representational State Transfer (REST), also called RESTful web services, allow requesting systems to access and manipulate resources on a server. REST is not a standard in itself but relies on a number of official standards, such as Hypertext Transfer Protocol (HTTP). REST is a design system for a web service based on pre-defined rules and resources rather than based on actions, as other web service architectures. Client applications use Application Programming Interfaces (APIs) to communicate with web services. The API is the interface listening and responding to client requests. A web service API conforming to the REST architecture is called a REST API. (Masse, 2011)

A RESTful service allows clients to query or manipulate resources by HTTP requests. Resources are identified by Uniform Resource Identifiers (URIs). Resources can be represented in different formats. Client applications typically authorise themselves by some method, and are thus allowed to perform operations on the database through HTTP requests. Some routes or resource representations are implemented without the authorisation requirement, with the idea that any application can query non-sensitive data.

REST APIs have the drawback of allowing multiple competing implementations. The development team must therefore enforce agreed-upon principles and require the team members to adhere to these rules. Certain industry best practices for how to design and build RESTful APIs exist, which can serve as guidelines to avoid common pitfalls and mistakes. Some practices for REST API design are also implicit in the HTTP standard. Many public REST APIs implementations are not as scalable, extensible, and interoperable as promised due to not adhering to best practices (Li and Chou, 2011).

The REST API built by the digital services team represented resources in JavaScript Object Notation (JSON). The REST API design was particularly suitable for the use cases of the digital services team. By using a RESTful design, several client applications can be connected to the same back-end, sharing business logic and underlying databases. Client applications can utilise common resources regardless of if they are web applications or mobile applications. Relying on a REST API gives flexibility in terms of how the client applications are designed. The back-end can remain the same even if the



front-end, that is client application, would change. On the other hand, the back-end functionality for a REST interface is easily expandable. New functionality can be built upon the existing base. Easy and quick expandability is naturally a helpful factor for testing and building new services, without the need to build a rigorous infrastructure for every application.

### 5.3.2 MongoDB

MongoDB is a NoSQL- (not only Structured Query Language), non-relational document-orientated database implementation. In traditional relational databases, data is structured in tables. Each record or row in a data table represents the actual data. Tables might have some relationship to each other. MongoDB takes a different approach. In MongoDB, data is stored in collections of documents in JSON format without a particular schema. Behind the scenes, JSON documents are represented as Binary JSON (BSON). BSON is an extension of JSON, providing additional data types and ordered, unique fields (MongoDB, 2017). BSON makes encoding and decoding more efficient within different languages.

The digital services team was in the fortunate situation of often having the possibility to implement the software architecture of choice without the need to conform to restrictions posed by antiquated software. In these projects, and as the general database solution, MongoDB was used. Several projects related to integration with existing data streams or databases were however also undertaken.

The capability to have dynamic schemas in MongoDB offers great flexibility for storing data of different formats, adapting to requirements. Especially the quick set-up of new data types enabled by MongoDB was of great importance in the projects done by the digital services team. If data has a lot relations or is normalised, relational database structures are typically to be preferred. Document stores, such as MongoDB, are suitable when the domain model can be split up across documents. (Nayak, Poriya and Poojary, 2013)

NoSQL databases are easily scaled and distributed. The usage load on web and mobile applications varies greatly with time. Easy scalability and adaptability of hardware is therefore necessary. NoSQL systems can support a large number of read/write operations per second by distributing both data and workloads across servers. This is called horizontal scaling, as opposed to vertical scaling, meaning utilisation of cores or central processing units (CPUs) that share random access memory (RAM) and disk space. (Cattell, 2010)

The relatively easy set-up, instantiation and extendibility of MongoDB comes at a cost. Consistency of data is not enforced by the database management system (DBMS), and there is not a rigid schema familiar from relational databases. Instead MongoDB has a dynamically typed schema, where structuring and maintaining an agreed upon structure is the responsibility of the applications and ultimately the individual developers. The lack of schemas can lead to more error-prone code, code duplication and easily deeply nested structures. Increased flexibility is coupled to increased risks due to the schemaless structure. (Huotari, 2017)

There have not been many problems related to data consistency within WAG. The small amount of overhead in creating new data types makes extending the database quick. Less strict and more forgiving systems particularly suit small projects with few developers and maintainers. In small teams, maintaining coherent development principles and agreed-upon rules is easier than in larger teams. The nature of the applications produced by the digital services team favours solutions enabling quick development rather than solutions promoting rigorous consistency and security measures.

In addition to MongoDB, Redis was used as a cache memory. Redis is an in-memory data structure store with outstanding performance for simple operations. Redis stores data in volatile RAM, but can be backed up to non-volatile memory. Redis was used to store the results of frequent queries or anything that need not be necessarily permanently stored.

### 5.3.3 React Native

React Native is an open source mobile application development framework, in 2017 still in a pre-major version release state. React Native allows development of native Android, iOS and Windows Phone applications using mostly or exclusively the asynchronous programming language JavaScript. React Native compiles JavaScript to native code on each platform and makes calls to native APIs for the respective Operating System (OS). This enables native application development without performance downsides associated with some other JavaScript mobile development frameworks, which execute the application in a web view.

There are a few notable alternatives to React Native that work according to the same principle of converting JavaScript to native code, for example NativeScript and Appcelerator. React Native was chosen mainly due to its recent rise in popularity and the wide open-source component library. Utilisation of open source components allows for expanding the functionality of the core functionality React Native provides

without the need to write everything on your own, a significant factor for increased productivity widely used in web development.

The main aspect of why React Native was an important technology choice is the productivity boost it provided, or rather the lack of productivity slowdown. Starting development with React Native is fairly easy for web developers and developers with previous JavaScript experience, and it does not include a steep learning curve. With existing JavaScript experience, visible results can be achieved quickly. Using a framework that enables development for several OSs by writing code in only one language, means that a large portion of code can be shared between platforms. In the case of React Native, between Android and iOS. A smaller code base reduces time committed to development, bugs and maintenance costs.

The development team members had minor previous experience of mobile application development. Not committing to learning native application development for iOS with Objective C or Swift, and Android with Java, was a natural decision. React Native was chosen as the core technology for both the INSIDE LAAX and the WAG Inside mobile applications. Since JavaScript code is automatically translated to native code on each platform, there is no noticeable performance downside to using React Native compared to direct native technologies. React Native is undergoing rapid development in 2017 with a new version released approximately twice a month. Development is lead by Facebook with contributions accepted from the open-source community. React Native is widely stable, although some noticeable issues can be attributed to its under-development state. One example of this was rendering images in lists of rows, where images would not always load properly upon scrolling.

#### 5.3.4 Amazon Web Services

Amazon has long had a service offering beyond selling books online. One major business area is Amazon Web Services (AWS), providing on-demand cloud computing services of various kinds for individuals and companies. The net sales for the AWS business in 2016 was \$12 billion, constituting almost three quarters of the company's operating income (Amazon, 2017).

Amazon Web Services were used for several different tasks by the digital services team and by Inside Labs. Virtual server instances as well as load-balancing services were set up and run in AWS. Data storage-, monitoring- and logging services were also used. The global content delivery network (CDN) of AWS allows for short query response times regardless of geographical location.

Other viable cloud service providers exist. What makes AWS a tempting choice is the broad range of services available and the established infrastructure. Expanding into new areas and developing new functionality is easily attainable. The most important aspect of using AWS from the digital services team's perspective was the usage of cloud technologies, as opposed to running own hardware. Cloud services provide many benefits over running physical hardware yourself.

Running your own physical hardware is always compromise. If having no downtime of service is a priority, hardware needs to be scaled to be able to handle peak loads. This means that hardware that remains idle or unused for most of the time must be operated. If instead the strategy is to support normal usage loads, the hardware will not be able to handle maximum usage peaks and certain users will experience drop-outs or service outages. With cloud services, that compromise does not need to be made. Cloud services can utilise economies of scale to efficiently cater for performance requirements.

Running your own hardware requires specific expertise of for example information security. Time needs to be committed for maintenance, which is a major cost. Cloud services promise solutions to all of these issues by only charging for capacity used. Major vendors have an up-to-date, distributed hardware infrastructure. They also have the capabilities to handle security threats of various kinds. Resource availability through CDNs is superior. Using cloud services, server instances can be set up in minutes. Purchasing computing power instead of running own hardware freed up resources and allowed the digital services team to focus on its actual purpose, developing outstanding applications. Purchasing hardware might require high capital expenditure and involves bigger risks than purchasing computational resources. Using cloud services, there is no need to pay for unused capacity.

## 5.4 People and culture

According to Kristian Paasila (2017a), a factor for success in the digital services team was the people. In ventures including a small amount of people doing intellectually challenging creative work, the importance of individuals is naturally large. Even more important than individual efficacy is the ability to function as a contributing member of a team.

“People” sounds like a vague factor and an unnecessarily broad categorisation. How can success factors related to personalities and character be distinguished and lessons learned? A couple of personality traits stand out. To be successful in an agile, fast-moving landscape, people need to be willing and able to change their area of focus.

This is fundamentally different to the typical approach in most industries, where highly specialised skills are valued and employees can concentrate on a few narrow tasks. This crosses another important aspect, specificity. Succeeding in a small group working on unfamiliar technology or solutions requires that each member take larger responsibility for the result than in an organisation with highly detailed roles and strict hierarchies. A certain willingness to work outside one's comfort zone is certainly beneficial. A broad skill-set is preferred over highly specialised but narrow knowledge for creative work. Changing procedures and established approaches in an organisation is challenging. Working on such change requires a mentality able to face potential opposition.

The entire work of the digital services team and Inside Labs is founded on a start-up mentality, where development speed and a results-driven approach is key. In a culture emphasising speed, all projects will not succeed perfectly, and some will not succeed at all. Mistakes will be made. Creating a culture where failures are tolerated and turned into learnings is necessary to achieve success. That does naturally not imply that failures should be sought, merely that small failures are not catastrophes. The company culture should be able to withstand pressure from the outside and opposition from within the organisation (Paasila, 2017a).

The culture of Inside Labs emphasises approaching questions with an open mind. Instead of focusing on too narrow aspects, individual technologies or particular issues, the focus should be on how the customer journey can be improved. In the case of the LAAX customer, the focus lies on how the time between her leaving her home and entering the resort until the customer arrives at home again can be improved, and how pain points can be alleviated.

## 5.5 Communication within the organisation

A factor that to some extent was neglected in the work of the digital services team, was communication with the rest of the company, according to Weisse Arena Gruppe's CEO Reto Gurtner (2017). Communication was not prioritised enough. Transparency and communication with the rest of the organisation makes employees feel included and part of the new service creation. This in turn leads to increased willingness to participate and work for a common cause. People are invested in improving services instead of fighting against a perceived disruptive force from the outside of the own team if they feel included.

Although physically in the vicinity of the rest of the organisation, the digital services team was partly working in isolation from the rest of the organisation. This might have, to a certain extent, been an instrumental factor for achieving results fast. It however

made the rest of the organisation somewhat hostile towards the team's achievements. The important thing is striking a balance between sticking to one's own ways of working without worrying extensively about outside opinions or outside pressure, and including other parts of the organisation in the process. Employees can feel included by simply having results shared with them or developed services showcased to them.

Communication must be done in a way that the rest of the organisation can relate to. The Inside Labs team naturally has a deeper understanding of their focus area than the rest of the organisation. Results need to therefore be communicated on the correct abstraction level, in an understandable way. Results can for example be demonstrated based on what their customer impact is or their impact on the other organisational functions' work.

If employees outside the team feel that they are not included in the work being done, they will treat the team as outsiders. What needs to happen is a change of mind-sets of people in the company. Employees in Weisse Arena Gruppe are not used to quick, disruptive changes. They are not used to be allowed to make mistakes and take risks. (Gurtner, 2017) An organisation totally averse to taking risks kills innovation, when instead innovation should be encouraged. A culture change needs to happen, where liberation to make mistakes and take risks is encouraged.

## 6 Conclusions and results

Companies having a digital service offering is becoming the norm, regardless of industry. The disruptive potential of new technology and data is increasingly understood. Ski resorts are no outliers. Digitalisation in ski resorts is to a large extent still in its infancy. One of the front-runners in ski resorts digitalisation is Weisse Arena Gruppe (WAG), the company running the Swiss Alpine ski resort LAAX. This thesis presents a case study of digital transformation in LAAX, driven by the digital services team of Weisse Arena Gruppe. The digital services team has since been spun off into a start-up, Inside Labs.

There was a realisation within Weisse Arena Gruppe in 2015, that the current technical systems and the ways of approaching digitalisation challenges were not sufficiently advanced to allow the company to remain competitive. Certain digital trends in the operational environment were distinguished. Efforts were made to distinguish what kinds of actions should be made to stay competitive. A study of the available digital services on the market was conducted, the results of which showed that the required services did not exist. No actor offered what was sought after. Co-operation with external agencies to produce digital services had been unsatisfactory. These issues aggregated led to the decision to form an internal digital services team to tackle digital challenges in a professional manner.

The highest management of the company understood the importance of data and analytics and the disruption potential of digital technology. No ski resort to date collects enough data to have a clear picture of their customers' preferences. The focus of the digital services team lay on the customer experience and on creating new and superior value offerings to be more competitive. The goal was to use digital technology to build capabilities for the present moment and pave the way for future development.

There were several crucial factors for the success and continued operation of the digital services team and Inside Labs. One major factor was the CEO's understanding of the importance and power of data. The CEO played a major role in the initiation and instigation of the digitalisation initiative, and in supporting the team's work, as well as forming a vision for the team. The digital services team worked in short development- and release cycles, adopting principles from agile methodologies. Using short feedback loops meant that the viability of different approaches could be quickly tested. Minimum viable products (MVPs) were created to gather experiences and customer feedback.

The digital service team had the appropriate freedom to define own processes and work methods. Since the team reported directly to the CEO, it was not unnecessarily

restricted by the traditional hierarchical structures present in the rest of the organisation.

The digital services team sometimes worked too much in isolation from the rest of the organisation. Internal communication was an overlooked issue. Results should have been shared with and demonstrated to other employees. Including employees from outside the core team decreases hostility towards services with the ability to potentially even radically alter existing processes and ways of working in the rest of the organisation.

Some core technologies enabling rapid, modern service development, and thereby the success of the digital team, can be distinguished. React Native was used to build mobile applications for different platforms. Using React native, the digital services team was able to utilise existing web development proficiency in mobile development. Using cloud services instead of operating own hardware was a strategic move, and certainly the correct choice for the team. The utilisation of cloud services permitted the team to focus on the essential goals. While other technology choices might have been viable as well, the choice of wrong technologies is a guarantee for failure.

Digital transformation can be started on a small scale with a single team or department. That team's goal is to affect processes and customer interaction however, inevitably also touching areas of focus of the rest of the organisation. The team should have a clear strategy and a perspicuous vision. Their work should be restricted as little as possible by hierarchical constructs, micro-management or direct business requirements. The team needs a mandate to change processes and ways of working according to their needs. This is the recipe for achieving goals in digitalisation ventures.

The digitalisation initiative was ultimately a success. The magnitude of what was achieved in a relatively short time was impressive. The knowledge available now and accessibility to that knowledge is on a whole other level than it was before the digitalisation venture (Gurtner, 2017). The applications built by WAG and Inside Labs are actually just enablers for creating value. The applications built enable increasing direct customer contact, gathering data and thereby making improved value offerings and offer unique experiences. Organisations in industries undergoing digital transformation should not focus extensively on individual technologies or applications. The focus should instead be on creating the right kind of circumstances for digitalisation to occur. This means customer-centricity, the ability to react quickly to changes, and fostering the correct mind-sets to embrace new challenges instead of shying away from risk.



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