BSc in Business Administration

with a minor in Computer Science

Icelandair digital development

A focus on digital development to gain or maintain a competitive advantage

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Abstract

Academic research generally supports that digital development offers opportunities to enhance operational efficiency, and gain or maintain competitive advantage for companies. In the case of Icelandair, aviation consultants and internal stakeholders also support these efforts, and are of the common opinion that digital developments are vital to the company's future success.

Icelandair's current digital development efforts are focused on processes which directly relate to the Marketing and Sales division, and its requirements. Our analysis of Icelandair's business and operations supports that digital development efforts and its impact on operational efficiency, is vital for the organisation. It should continue to focus on digital development to enhance the operational efficiency, and gain or maintain competitive advantage.

On the other hand, our analysis suggests that Icelandair's current approach to digital development inhibits the organisation to take full advantage of the presented opportunities. The absence of an implementation plan in relation to pan-organisational requirement analysis, digital strategy, and information flow is inhibiting company and could possibly hinder future efforts.

In this thesis, we present several proposals which we believe that Icelandair needs to undertake to correct the course of its current and future digital development efforts to take full advantage of the opportunities presented by digital development.

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1. Introduction

Over 70 years have passed since international passenger flights began in Iceland. On the 11th of July 1945, a seaplane owned by Flugfélag Íslands transported four passengers from Reykjavik to Scotland in about six hours (Icel, Icel, & Reykjavík, 2015). A lot has changed since 1945 and in 2016 approximately 3.7 million revenue passengers were transported by one of Iceland´s largest carrier, Icelandair (Icelandair Group, 2016). The number of passengers who pass through Keflavik international airport has grown considerably in the years since the financial crash in 2008 and is expected to pass 8.7 million people in the year 2017 (Grétar Már Garðarsson, Project Manager Business & Route Development ISAVIA, personal communication, e-mail, 23rd March 2017), compared to just under 4 million in 2014 (Samgönguráð, 2015).

Tourism in Iceland has had to cope with the rapid growth in passenger numbers and at the same time the country´s infrastructure has been tested to its limits (Samgönguráð, 2015). Icelandair has somewhat benefited and met that growth by expanding its fleet and reinforcing critical departments and processes (Hilmar B. Baldursson, VP Flight Operations and Captain Icelandair, personal communication, interview, 7thApril 2017). A forecast by the operator of airports in Iceland (ISAVIA) expects the number of passengers who pass through Keflavik Airport to exceed 15 million in 2027 and 22 million in 2040 (Grétar Már Garðarsson, Project Manager Business & Route Development ISAVIA, personal communication, e-mail, 23rd March 2017).

Nonetheless, the financial results for 2016 indicate that Icelandair has not been able to react and capitalise fully on the increased number of passengers flying to and through Keflavik airport as net profits are down 20% from the previous year. Increased competition, lowering of average airfares, unstable political landscape and labour strikes have been offered as the main reasons for this decline (Icelandair Group hf., 2017).

There have been several projects undertaken in recent years which have had the aim of coping with the increase in the number of passengers that travel with Icelandair. These projects have mostly been at the departmental level or part of a quarterly or yearly review. The need for long term strategy and new approaches in methodology to capitalise on that growth and to streamline operations is more important than ever as per Icelandair's operations manager (Hilmar B. Baldursson, VP Flight Operations and Captain Icelandair, personal communication, interview, 3rd February 2017).

1.1 Objective

The objective of this thesis is to analyse Icelandair's key divisions, departments, business processes, organisational structure, and resources in relation to digital strategy and operational efficiency. Should Icelandair focus on digital development to gain and/or maintain a competitive advantage?

1.2 Resources and information

Internal information was gathered by conducting in-depth qualitative interviews with management personnel from departments that play a key role in Icelandair's business. The interviews were conducted over a period of 16 weeks from January to April 2017. The interviewees were given notice on the topic and a list of general questions and notes, which then acted as the interview thread. This approach facilitated open-ended interviews which we determined to be an approach which delivered results that would provide us with the greatest amount of information in relation to the subject.

From Icelandair, interviews were conducted with:

- Icelandair Chief Executive Officer (CEO): Birkir Hólm Guðnason
- SVP Marketing and Sales – Marketing and Sales: Helgi Már Björgvinsson
- Director Digital Business Developments – Digital Labs: Guðmundur Guðnason
- VP Flight Operations and Captain - Flight Operations: Hilmar B. Baldursson
- Lead Project Manager - On-board Retail and Services: Ingigerður Erlingsdóttir
- VP Technical Services - Technical Services: Jens Þórðarsson
- SVP Finance and Administration – Finance and Administration: Hlynur Elísson
- Director Business Intelligence – Finance and Administration: Dagur Egonson
- Director Resource Management - Finance and Administration: Ívar S. Kristinsson
- Electronic Flight Bag (EFB) Administrator and Captain - Flight Operations: Grétar Mar Óðinsson
- Manager Fuel Efficiency – Einar Ingvi Andrésson
- Avionics Engineer – Technical Services: Geirfinnur Smári Sigurðsson
- SVP Human Resources and Strategy – HR & Strategy: Svali Björgvinsson

Furthermore, we were granted access to Icelandair's internal documents, reports, presentations, charts and other relevant internal resources. Expertise and an outside-in perspective about digital development and strategy in the general aeronautical industry and Icelandair were gathered through in-depth qualitative interviews with selected industry experts:

Michael A. Bryan, consultant from Closed Loop and John Schramm, Chief Executive Officer (CEO) of iJet Technologies.

Closed Loop is an Australian aerospace consultancy established in 2009. They claim an established portfolio which spans operational programmes such as the Electronic Flight Bag (EFB), eEnablement, support and integration and strategic planning. The agency is headed by Captain and Principal Michael A. Bryan who commands an aviation career of about 40 years and is an established source of industry expertise ('Who We Are', n.d.). Michael A. Bryan has been a regular keynote speaker and host at the Aircraft-Commerce Aircraft eEnablement Connectivity & IFE Conference held annually in London Heathrow, United Kingdom ('Conference Agenda', n.d.). eEnablement is a loosely defined term used in the airline industry to cover digital and hardware development in relation to aircraft operations, information technology and airline business processes (Nichols, 2015).

iJet Technologies specialises in transforming traditional aviation business processes from often rigid, hardware-centric architecture to flexible, software-defined infrastructures to facilitate data and analytic services ('iJet Technologies | Connecting aviation with innovation', n.d.). Their Chief Executive Officer (CEO), John Schramm commands over 25 years of experience in the United States of America (USA) military and commercial flight operations, aerospace product and technology strategy. Prior to joining iJet Technologies, John Schramm was a senior consultant with SeaTec LLC where his focus was on strategic and financial analysis of aerospace technology ('Meet the Team | iJet Technologies', n.d.).

Michael A. Bryan has previously consulted for Icelandair on the current Electronic Flight Bag (EFB) project. John Schramm is currently working with Icelandair on various projects which directly relate to aircraft data and trend analysis. Furthermore, information was gathered through previous literature, academic research, and consultancy reports. To look at the external market and competition of Icelandair, information was gathered through internal and public documents from the operator for all airports in Iceland (ISAVIA), the Icelandic Transport Authority (ICETRA), the centre for official statistics in Iceland (Statistics Iceland) and tourism reports from two Icelandic banks.

The information gathered was used to perform an external and internal analysis of Icelandair, its environment and market. This was achieved by using previously developed models and methods: Porter´s five forces and strengths, weaknesses, opportunities, and threats analysis (SWOT).

These two models were chosen because they were deemed to be good indicators for the internal and external forces that affect Icelandair´s business processes, the relevant departments, and the subject matter of this thesis. The results from the analysis, alongside previous research was then used to make change proposals that could be considered relevant to Icelandair´s support management in either maintaining or advancing a competitive advantage, and enables development within various divisions and departments.

2. Business Review

2.1 Icelandair Group

Icelandair Group is made up of nine subsidiaries: Icelandair, Air Iceland, Icelandair Hotels, Icelandair Cargo, Iceland Travel, Loftleiðir Icelandic, Fjárvakur, Vita, and Icelandair Ground Services (IGS). These subsidiaries are working in industries related to air travel, air cargo and/or tourism, except for Fjárvakur, which handles financial services for the group (‘Companies | Icelandairgroup.is’, n.d.). The group is a large organisation on an Icelandic scale with a total income of 1,285 million USD in 2016. The company’s shares are listed on the NASDAQ QMX Iceland stock exchange, with Icelandic pension funds being the biggest shareholders (Icelandair Group, 2016).

2.1.1 Strategy

Icelandair Group long term strategy is described in the following five key points: Focusing on route networks and tourism services, reducing seasonality in the group´s operations, focusing on organic growth and business developments, achieving greater synergies between group companies and improving efficiency with special emphasis on continuous cost control (‘About | Icelandairgroup.is’, n.d.).

2.1.2 Vision

Icelandair Group Vision is described as follows: To unlock Iceland’s potential as a year-round destination, to strengthen Iceland’s position as a connecting hub and to maintain our focus on flexibility and experience (‘About | Icelandairgroup.is’, n.d.).

2.2 Icelandair ehf

In 1937 Flugfélag Akureyrar was founded in the northern part of Iceland. Three years later the company changed its name to Flugfélag Íslands or Air Iceland and relocated to Reykjavik. In 1944 the airline Loftleiðir was established. A few years later both companies started operating international flights from Iceland, Air Iceland in 1945 and Loftleiðir in 1947. In 1973 both companies were united under one holding company Flugleiðir. Six years later in 1979 the two companies were merged and became Icelandair in international markets but still operated as Flugleiðir in Iceland. The business structure was changed once again in 2003 when Flugleiðir became a holding company with 11 subsidiaries and in 2005 the holding company became Icelandair Group ('Saga Icelandair | Icelandair', n.d.).

In 2016, the Icelandair´s international passenger numbers grew by about 20% to approximately 3.7 million between years. Icelandair has in recent years experienced growth not often seen in the company´s history with the second highest earnings before interests, taxes, depreciation and amortisation (EBITDA) posted since its establishment about 80 years ago (Icelandair Group, 2016). The Group´s Chairman of the Board, Sigurður Helgason is quoted saying.

> We had to cope with a number of challenging factors in our operations: A surge in the value of the Icelandic krona and significant domestic cost increases. Even so, our performance was good, which illustrates the flexibility that is built into the Company's business model. I believe that there are still a number of untapped opportunities to continue our profitable organic growth (Icelandair Group, 2016, p. 10).

Despite the positive reporting the volatility of the market was demonstrated when shares in the Icelandair Group dropped by 24% on February 1st 2017 after the earning predictions were lowered ('A good year behind us – Increased uncertainty in terms of short-term prospects', 2017).

2.2.1 Icelandair Strategy, Mission, Value and Vision

Strategy

Icelandair's business strategy is closely tied in with the geographical position of Iceland, serving the trans-Atlantic markets of Europe and North America. The setup of Icelandair´s main hub in Keflavik facilitates the transportation of passengers to and from Iceland as well as

serving passengers crossing the Atlantic. The Icelandair schedule network services the hub on a 24-hour basis, with aircraft departing to 26 locations in Europe in the mornings and to 18 locations in North America in the afternoons ('About Icelandair - A leading international airline | Icelandair', n.d.). The strategy further focuses on promoting Iceland as an all year round destination and is supported by the mantra "Refreshing Icelandic Travel Experience" (Svali Björgvinsson, SVP Human Resource and Strategy Icelandair, personal communication, interview, 11th April 2017) which defines Icelandair's positioning: The company's emotional modifier, how its service should be delivered, the company's descriptive modifier, nature of the business function, the company's business category and product, and the function of the brand (Helgi Már Björgvinsson, 2014). The strategy is examined overall once every year, with the inclusion of as many departments as possible to see if it needs changing (Svali Björgvinsson, SVP Human Resource and Strategy Icelandair, personal communication, interview, 11th April 2017).

Mission

Icelandair´s mission is: "To operate a first-rate airline, maintaining a reliable quality service, by utilising the experience and knowledge gained in over 70 years of operation. To be the airline of choice for travel to and from Iceland and a unique and exciting alternative across the North Atlantic. To streamline our operations through efficiency and flexibility in order to create value for our customers and other stakeholders" (Icelandair, n.d.-a).

Values

Icelandair´s values are: "We care: For our customers, employees, environment and shareholders. We think clients: Through consistency, reliability, clear product alternatives and friendly service. We drive results: Via teamwork, shared information and values, accountability and profitability" (Icelandair, n.d.-b).

Vision

Icelandair´s vision is: "To be the first choice in Iceland for customers and employees, a cornerstone of the Icelandic travel industry and a major contributor to the Icelandic economy and to society. To be operating an integrated network of scheduled air travel services to and from Iceland and to be a valuable choice cross the Atlantic. To be renowned for the efficiency

and reliability of our operations, quality and flexibility of service. To be one of the ten best-run European airlines with regard to reliability and profitability" (Icelandair, n.d.-c).

2.3 Organisation

Icelandair can be considered a fairly complex organisation in terms of setup, business management, and hierarchy (Etzioni, 1975). As any airline, it operates in an environment which abides by traditional business norms, legal and administrative requirements combined with directives, regulatory and license requirements levied by local and international bodies (Hilmar B. Baldursson, VP Flight Operations and Captain Icelandair, personal communication, interview, 7th April 2017).

As for the company´s inner workings from an outsider's perspective, Icelandair has a reputation for being quite flexible as a business entity, it employs management which is forward thinking enough to tackle new challenges quite efficiently (Michael A. Bryan, Principal Closed Loop Consulting, personal communication, interview, 1st March 2017).

2.3.1 Organisational chart for Icelandair

The organisation´s Board of Directors have the ultimate authority in the company´s matters between shareholder meetings. They are trusted with the task of ensuring that the organisation and its activities are always correct and in order. They are responsible with the overall high-level strategy for the organisation (Icelandair Group, 2016). Daily operations strategies, in cooperation with the Human Resource and Strategy department (HR) and the organisational management, are the responsibility of the Icelandair CEO (Svali Björgvinsson, SVP Human Resource and Strategy, personal communication, interview, 11th April 2017).

Under the Board of Directors, the Chief Executive Officer (CEO) of Icelandair resides over two main divisions, Operations, and Marketing and Sales, and two support divisions, Finance and Administration, and HR and Strategy, which are aligned horizontally on the organisational chart (Icelandair, 2014).

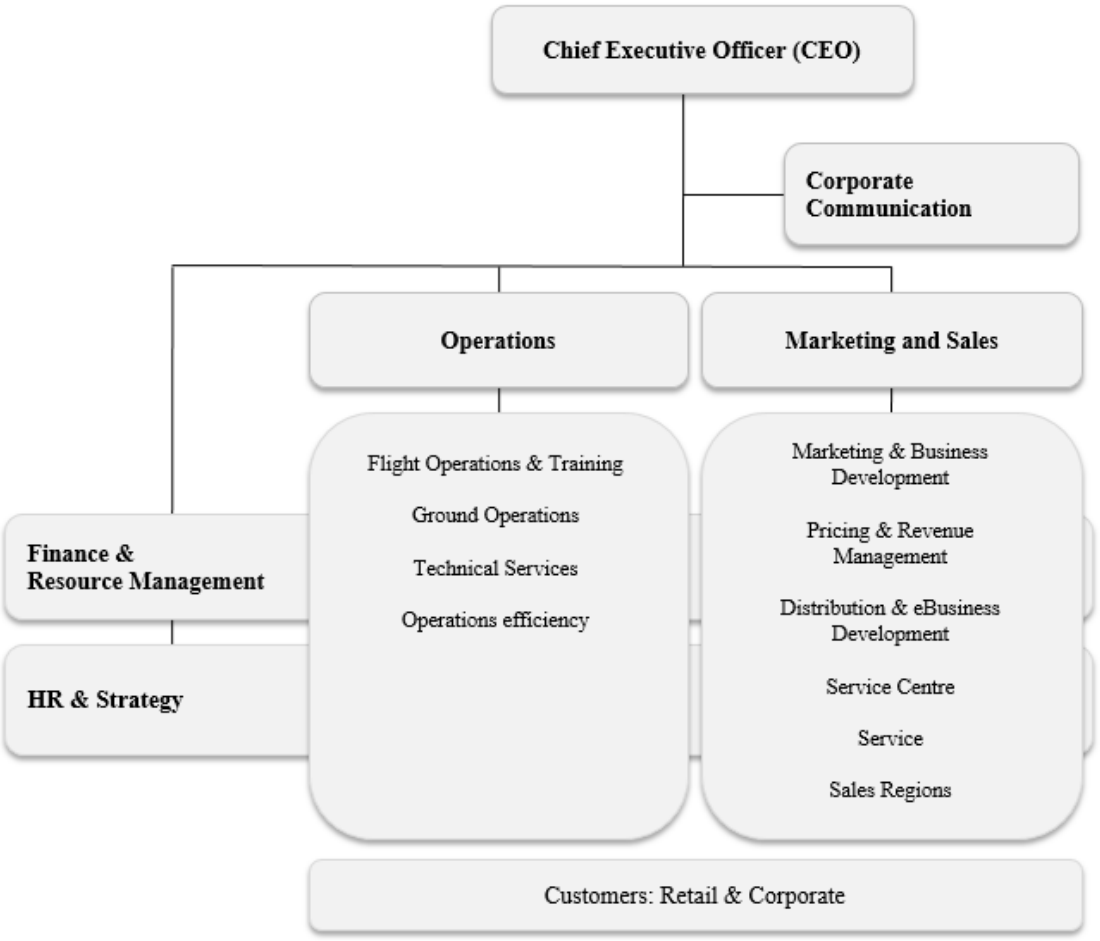

Figure 1. Icelandair Organisational Chart

The CEO of Icelandair, along with the Board of Directors and its President, are responsible for the management of the organisation. The CEO oversees the daily operation of the company which includes observing the policy and instructions, as set by the Board of Directors. Daily operations do not include measures which can be classified as unusual or extraordinary (Icelandair Group, 2016). The CEO oversees Operations, Marketing and Sales, Finance and Administration, and HR and Strategy. Among other tasks, the CEO is generally responsible for.

- Managing the top down strategy and direction.
- Modelling and setting the company's culture, values, and behaviour.
- Building and leading the senior executive team.
- Allocating capital and resources to the company's priorities.

(Birkir Holm Gudnason, Chief Executive Officer, personal communication, e-mail, 03rd April 2017)

2.3.2 Operations Division

The Operations division is divided into four main departments. Flight Operations and Training, Technical Services, Ground Operations, and Operational Efficiency. The division is headed by the SVP of Operations and Accountable Manager, who has the corporate authority to ensure that all operational activities can be financed and carried out in accordance with applicable requirements. The SVP of Operations has the corporate authority for ensuring that all other regulatory requirements related to flight and technical operations imposed on the company by ICETRA, FAA, EASA or other authorities, can be financed and carried out to the required standards (Icelandair Flight Operations, 2017a).

Flight Operations Department

One of the larger departments within the Operations division is the Flight Operations department which is divided into five main entities: Crew Planning, Cabin Operations, Chief Pilot Office, Flight Operations Engineering, and Operations Control (OPSCO). The Icelandair Operations division employs about 84 office personnel and in December 2016 the Chief Pilot Office and Cabin Operations together managed between 900 to 1000 personnel of flight and cabin crew (Kristín Björnsdóttir, Manager HR Head office, personal communication, e-mail, 27th March 2017). For the 2017 summer season the total number of flight and cabin crew is expected to reach around 1500 personnel (Hilmar B. Baldursson, VP Flight Operations and Captain Icelandair, personal communication, e-mail, 21st April 2017). Furthermore, there are an additional five support departments. These are: Project Management Office, Analysis and Development, Information Technology, Human Resource, and Regulation Affairs. These departments are sub-departments from their pan-organisational equivalents (Icelandair, 2016), except for the Project Management Office as Icelandair does not have a Project Management Office at the pan-organisational level (Ívar S. Kristjánsson, Director Resource Management Icelandair, personal communication, interview, 28th February 2017). The overall goal with this setup was to bring specific support services closer to the operations level (Hilmar B. Baldursson, VP Flight Operations and Captain Icelandair, personal communication, interview, 3rd February 2017).

Technical Services

Another large department within the Operations division is the Icelandair Technical Services (ITS). It employs about 350 personnel (Kristín Björnsdóttir, Manager HR Head office, personal communication, e-mail, 27th March 2017). The primary function of ITS, is to carry out maintenance and continuing airworthiness services for Icelandair aircraft. Its core business is to provide Icelandair Group and its subsidiaries with maintenance and technical services. ITS also provides services to aircraft landing in Keflavik, heavy maintenance, and technical services for other operators. The Accountable Manager has the corporate authority for ensuring that all operation and maintenance activities can be financed and carried out to the standards required by ICETRA. ITS used to be a separate subsidiary within Icelandair group but was merged into Icelandair Operations division in 2007 (Icelandair Technical Services, 2017).

Organisation and management

The Icelandair Operations management system is designed to have continuity throughout the organisation to ensure control of operations, management of safety and security. The management system ensures compliance with all operational procedures, which are designed to ensure safe operations and the applicable standards and state regulatory requirements. This management system is described in detail in the Icelandair Operations Manual Chapter M (Icelandair Flight Operations, 2017b).

2.3.3 Marketing and Sales division

The SVP of Marketing and Sales resides over five directors, four general managers and two regional managers, and they all play an integral part in managing and promoting any Icelandair product in Iceland and internationally. The SVP of the division has the corporate authority to ensure that all marketing activities can be financed and carried out in accordance with applicable requirements. Marketing and Sales division has a traditional setup where the focus is mainly on the customer side of the business. Though marketing and sales play different roles, their chief goals are the same: To reach the customer, promote sales, promote Iceland as a destination, and promote the Icelandair brand. The brand is promoted through public relations, traditional advertisements, social media, media campaigns, and collaborative efforts like Inspired by Iceland. This is achieved through short-term and long-term objectives which provide direct support for sales processes. Icelandair's sales processes, which are the primary

source of revenue for the airline, differ in many ways to most other airlines. The focus has been on selling Iceland as a destination, which in previous years has often been a more complex product than flights between well-known destinations (Helgi Már Björgvinsson, SVP Marketing and Sales, personal communication, interview, 24th April 2017).

2.3.4 Finance and Administration

SVP of Finance and Administration resides over five departments which manage various internal business aspects vital to the organisation. These are Resource Management, Network Planning, Information Technology (IT) and Digital Business, and Business Intelligence and Scheduling. The department´s main role is to facilitate efficiency, support the organisation as a whole, and to provide focus to its core business. At the heart of the business model lies the Icelandair route network. Network planning, both short and long term, falls under the responsibilities of the department as well, where the focus is on long term profitable organic growth. Furthermore, its targets are met through provision of its administrative and financial services, including financial planning and budgeting, developing management information systems, and overseeing continuous improvement efforts throughout the company (Ívar S. Kristjánsson, Director Resource Management Icelandair, personal communication, e-mail, 25th April 2017).

2.3.5 Human Resources & Strategy

SVP of Human Resources and Strategy (HR) coordinates human resource functions with different departments within the two organisational divisions. In addition to coordinating efforts between departments, HR and Strategy acts as a liaison with other group subsidiaries. Icelandair HR services provides traditional support to employees for professional and personal development, payroll, recruitment, and training. The strategic element of HR however offers another tactical approach to the organisation which is to facilitate business objectives as managed by the overall strategic plan in place for the company and the group. The strategic approach focuses on objectives that are to be achieved and how resources and positions can be appropriately allocated to maximise those achievements. The aim is to also move towards an organisation which is more data driven, has the ability to make the most of productivity and possesses the ability to measure if and how objectives are being achieved. Traditional human resource management combined with the strategy approach ultimately allows HR

representatives to better coordinate with top, middle, and lower management on how to execute strategy, facilitate, and improve process efficiency, represent employees, and address concerns to senior management. It provides the company with tools which can help manage changes within the organisation and its culture. Further it prioritises initiatives that will advance the organisation's competitive advantage (Svali Björgvinsson, SVP Human Resource and Strategy, personal communication, interview, 11th April 2017).

Strategic initiatives

The airline industry is highly regulated. Therefore, most strategic initiatives, organisational changes, programmes, or projects often need to fall inside that regulation framework. Especially when related to any processes which touch the airline's operations (Hilmar B. Baldursson, VP Flight Operations and Captain Icelandair, personal communication, interview, 7th April 2017). Each individual department needs to strive to accomplish its goals and objectives, but also collaborate and contribute to the overall goals of the airline (Wells, 2007). Icelandair has in the past initiated strategic initiatives to synchronise the organisation for a common goal or objective (Hilmar B. Baldursson, VP Flight Operations and Captain Icelandair, personal communication, interview, 7th April 2017). In 2013, all of Icelandair's main departments got together to strategize how the organisation was going to meet the growth in number of passengers on-board their aircraft to three or four million a year and again in 2015 for the growth to four or five million a year. The objectives were to make the management think about the future ahead and make better defined investments ('Icelandair 4 & 5 - Project', 2015). One of the prerequisites to cope with the growth in a safe and efficient manner was the digitalisation of data and connected aircraft programme where all departments were participating. Another result from those initiatives was the building of Icelandair's training centre in Hafnarfjörður which had the aim of meeting projected shortage in pilots and the demand for new training methods (Hilmar B. Baldursson, VP Flight Operations and Captain Icelandair, personal communication, interview, 7th April 2017), and the building of a new aircraft hangar at Keflavik Airport which is currently underway (Jens Þórðarsson, VP Technical Services Icelandair, personal communication, interview, 23rd February 2017). The organisation has also implemented lean management into its strategy with the goal to improve efficiency ('About | Icelandairgroup.is', n.d.) One of those initiatives was a Lean Cabin project where the objectives were to improve on-board working environment, minimise on-board stock, and maintain current service levels (Hafsteinsdóttir, 2015). Other strategic initiatives

include introducing new markets with development of the route network and strategic partnerships, introducing Iceland as a tourist destination and Icelandair as the first choice, managing unit costs, increase ancillary revenue sales, and increase customer loyalty, satisfaction, and brand awareness (Birkir Hólm Guðnason, 2014). Last year a digital strategic initiative was started with the focus on marketing and sales processes (Icelandair, 2015). That initiative will be discussed further later in this thesis. Most recently a new programme was started called Better Icelandair with the goal of saving cost after last year's drop in profits (Hilmar B. Baldursson, VP Flight Operations and Captain Icelandair, personal communication, interview, 7th April 2017).

2.3.6 Employees

Icelandair accredits their employees and the company's team spirit as the major reasons for the company's success throughout the major growth of previous years ('Employees | Icelandairgroup.is', n.d.). The organisation's human resources strategy aims to attract talented and qualified people and emphasises equality, non-discrimination, diversity, access to further development and education ("Employees | Icelandairgroup.is," n.d.). In 2014 a research into the loyalty of Icelandair's flight crew suggested correlated factors to loyalty as education, age, and working age (Rúnarsson, 2014).

In December of 2016 Icelandair employed about 1718 people full time. This number expands by about 20% during the summer months due to seasonal hiring of flight and cabin crew. From 2015 to 2016 there was an average increase of 16% in the total number of employees. The number of employees between the divisions and departments was reported to be as follows in December 2016.

- Flight Crew: about 351 employees.
- Cabin Crew: about 576 employees.
- Technical Services: about 350 employees.
- Marketing and Sales: about 300 employees.
- Operations and Support: about 100 employees.
- Human Resource and Finance: about 40 employees.

(Kristín Björnsdóttir, Manager HR Head office, personal communication, e-mail, 6th April 2017).

The organisation as a whole regularly scores high in job satisfaction and employee engagement (‘Employees | Icelandairgroup.is’, n.d.). Icelandair generally does not out-source its business processes. The company employs its own flight crew, pilots, mechanics, HR consultants, lawyers, marketing consultants, customer service agents, sales advisors, and other personnel who are essential to Icelandair’s critical business processes. The average period of employment is about 20 years (Kristín Björnsdóttir, Manager HR Head office, personal communication, e-mail, 27th March 2017).

2.3.7 Information flow

The organisation believes that its interests are best served by having employees well informed. Information flow throughout the organisation is facilitated with newsletters, employee meetings and an internal company intranet (“Employees | Icelandairgroup.is,” n.d.). External consultants have described employee competence as being positive and the communication channels inside the organisation, vertically and horizontally to be informal and expedient (Michael A. Bryan, Principal Closed Loop Consulting, personal communication, interview, 1st March 2017), which should allow for knowledge and information to be transferred across boundaries and throughout the organisational hierarchy (Ajmal & Koskinen, 2008). Nonetheless several internal stakeholders have described the flow of information and data between departments being to a point non-existent and that vital departments are often not consistently aware of what the others are doing (Jens Þórðarsson, VP Technical Services Icelandair, personal communication, interview, 23rd February 2017) and even though everybody is striving towards the same goal there is a tendency to fall back into working in silos (Hilmar B. Baldursson, VP Flight Operations and Captain Icelandair, personal communication, interview, 3rd February 2017).

2.3.8 Aircraft fleet

Through the years Icelandair has mostly operated aircraft from Boeing on its international routes. In 2008 the fleet consisted of eleven aircraft, ten Boeing 757-200 and one Boeing 757-300. About ten years later the fleet has grown to twenty-seven Boeing 757-200, one Boeing 757-300 and four Boeing 767-300. The 757-200 has seating for up to 183-186 passengers while the larger 757-300 has seating for 222 passengers and the even larger 767-300 has seating for up to 262 passengers (‘Aircraft fleet Icelandair | Icelandair’, n.d.).

In the beginning of 2013 Icelandair submitted an order for sixteen Boeing 737 MAX aircraft, with an additional eight available on order if Icelandair chooses that option. The first aircraft are to be delivered in early 2018 and the last by 2021. The aircraft will come in two versions: 737 MAX 800 series which has seating for 153 passengers and 737 MAX 900 series which is longer and has seating for 172 passengers ('Boeing 737 MAX | Icelandair', n.d.).

As of March, 15th 2017, Icelandair has 32 operating aircraft. After the delivery of the new Boeing 737 MAX is completed in 2021, that number will be up to about 48 aircraft, not considering the average used aircraft additions of two to three aircraft per year. Including such estimates would bring the fleet to about 60 aircraft by 2022 if the current trends continue.

Aircraft strategy

A review of the next generation of aircraft for Icelandair was undertaken between 2010 and 2012, and an agreement signed with Boeing in 2013 ('Boeing 737 MAX | Icelandair', n.d.). At that time Icelandair aircraft strategy was for 16 Boeing 737 MAX aircraft and about 8 Boeing 757 legacy aircraft (Birkir Hólm Guðnason, Chief Executive Officer Icelandair, personal communication, interview, 23rd March 2017).

Since this initial assessment was made, the aviation landscape has changed considerably and in return the strategy. The Boeing 737 MAX aircraft are now meant to serve the weaker, lower yield and in terms of passenger numbers, European market. The aircraft are however well equipped to cover all-year network destinations or seasonal secondary markets which are not well suited for the Boeing 757 as the seat capacity exceeds demand. The strategy morphed into calls for more Boeing 757 and Boeing 767 aircraft, which is a wide body aircraft, carries higher seat capacity and longer range. The operational and fuel efficiency of the Boeing 757 is relatively unmatched and supplemented by the Boeing 737 MAX aircraft, the combination is a smart strategy. Icelandair, like many other airlines, has been waiting for what is often referred to as the ´middle of the market´ aircraft, which would be a replacement aircraft for the Boeing 757. The plan today is to utilise the Boeing 757 until around the year 2025 but it technically has a lifespan until the year 2030. Boeing has on the drawing board a ´middle of the market´ aircraft with a seat-capacity for about 200-260 passengers where the focus is on range. This aircraft is expected to be unveiled for market review in either 2018 or 2019. By 2020 Icelandair would need to review whether this aircraft would be suited for the next decade's strategy. If this aircraft turns out to be unsuitable for the network beyond 2020-2025, the company will need to review aircraft from competing aircraft manufacturers, such as

Airbus, and potentially switch out the entire fleet. The replacement process for the Boeing 757, or a fadeout to other aircraft, is expected to take about five years. Part of the fleet strategy has been to have aircraft from a single Original Equipment Manufacturer (OEM) (Birkir Hólm Guðnason, Chief Executive Officer Icelandair, personal communication, interview, 23rd March 2017).

2.3.9 Project management

Icelandair does not run a Project Management Office (PMO) at the pan-organisational level (Ívar S. Kristjánsson, Director Resource Management Icelandair, personal communication, interview, 28th February 2017). The setup of a PMO for an organisation of Icelandair´s size could however help improve efficiency and bring specific advantages to the company structure (Hilmarsson, 2011). A project management unit was established specifically for the Flight Operations department after a Closed Loop recommendation (Bryan, 2013) and a 2014 study pointed out the benefits of such a unit (Snorradóttir, 2014). The Director of Resource Management, Ívar Sigurður Kristinsson, has however been spearheading a project management improvement programme within Icelandair. As recent as 2016, an intranet website was established for project managers to manage projects at a very basic level and report the progress to SVP´s and the CEO on selected operations. The usage of the intranet website is optional except for specific projects which are considered to have a significant effect on the company operations and/or finance (Ívar S. Kristjánsson, Director Resource Management Icelandair, personal communication, interview, 28th February 2017).

Within each department there are project managers but they operate independently from each other with no formal ties in place. To this day there has been no grounds to establish such a unit by management and subject matter experts within Icelandair as per Ívar Sigurður Kristinsson. He notes however that such arrangements are always subject to review and there is always room for improvement. His view is that the current arrangement has its benefits as projects between departments are often very different in nature. A centralised project management office would not serve its purpose if decisions were being made centrally on what project to undertake or how they are managed. The emphasis has rather been on having capable and knowledgeable project managers which can link together on projects if necessary (Ívar S. Kristjánsson, Director Resource Management Icelandair, personal communication, interview, 28th February 2017).

2.3.10 Systems and projects

Icelandair has several systems on-board its aircraft and operational projects and/or programmes which are considered vital to both passenger service competitive advantage, digital strategy, and operational efficiency (Hilmar B. Baldursson, VP Flight Operations and Captain Icelandair, personal communication, interview, 3rd February 2017).

Passenger and operations connectivity

Icelandair aircraft are today standardised with a passenger wireless network system (Wi-Fi) from Global Eagle Entertainment Inc (GEE). GEE is a provider of aircraft connectivity systems, operations solutions, and media content to the travel industry. The system is a Ku band based system which provides passengers with internet speed, compatible to 3G ground mobile systems. The GEE on-board aircraft network is split into two domains, one being the passenger Wi-Fi system and the other for operations related traffic. The current Wi-Fi system does not provide any direct profit to Icelandair as the take rate is only around 2-4% for economy passengers and 30% for complimented passengers, the main reason for the low take rate is believed to be the low bandwidth (Ingigerður Erlingsdóttir, Lead Project Manager Icelandair, personal communication, interview, 30th January 2017).

The next generation passenger Wi-Fi system contractor that Icelandair has selected is ViaSat. The ViaSat system is Ka band based system which will provide improved internet speed for passengers as well as a wider capacity pipe for operations data. With this system, ViaSat advertises 12Mbps to each passenger while the older generation systems, such as the GEE system, are capable of roughly 3-5Mbps to the entire aircraft at any given time (Ingigerður Erlingsdóttir, Lead Project Manager Icelandair, personal communication, interview, 30th January 2017). This is beneficial for systems which depend on connecting the aircraft to the traditional company infrastructure and streaming of data on or off the aircraft in near-real time (Grétar Már Óðinsson, EFB Administrator and Captain Icelandair, personal communication, interview, 14th March 2017). The in-flight entertainment system (IFE) will also be connected to the new Wi-Fi system and that connection will make it possible in the future for passengers to order food and beverages through the IFE system (Ingigerður Erlingsdóttir, Lead Project Manager Icelandair, personal communication, interview, 30th January 2017).

The next generation Wi-Fi system will enable Icelandair to quickly change and customise the Wi-Fi login portal (Guðmundur Guðnason, Director Digital Business

Development Icelandair, personal communication, interview, 27th January 2017). In the current Wi-Fi system from GEE, all changes and customisations of the login portal need to be implemented by GEE. The experience with that setup has not been positive, as all development has been slow. For example, it has taken more than a year to activate the passenger payment option for Wi-Fi access with Icelandair's Saga points. Global Eagle only has three developers to service all their client's requests, including larger airlines like Norwegian and South-West, which could explain the slow development time (Ingigerður Erlingsdóttir, Lead Project Manager Icelandair, personal communication, interview, 30th January 2017).

The network systems on-board are key to support the digital development of most processes in-flight. The responsibility and possession of the current and next generation of on-board Wi-Fi systems is with the Marketing and Sales division (Guðmundur Guðnason, Director Digital Business Development Icelandair, personal communication, interview, 27th January 2017). Stakeholders to some of those processes believe that such an important resource, should potentially not be under the control of one department as there might be a conflict of interest (Hilmar B. Baldursson, VP Flight Operations and Captain Icelandair, personal communication, interview, 3rd February 2017). Michael B. Bryant agrees with those worries and says that for one department to control such an important resource is an untenable situation (Michael A. Bryan, Principal Closed Loop Consulting, personal communication, interview, 1st March 2017).

Passenger In-flight Entertainment System (IFE)

Icelandair is in the process of switching to a new In-flight Entertainment System (IFE) on its fleet of passenger aircraft, provided by Zodiac Aerospace (Ingigerður Erlingsdóttir, Lead Project Manager Icelandair, personal communication, interview, 30th January 2017). The system is called RAVE and is advertised as a new generation of high-definition displays which are lighter, consume less power, and are simpler to support and replace for the airlines ('Zodiac Inflight Innovations', n.d.). Along with an improved passenger experience, Icelandair sees opportunities in delivering targeted advertisements to its customers with new integration options that can be built around the IFE system (Birkir Hólm Guðnason, Chief Executive Officer Icelandair, personal communication, interview, 23rd March 2017).

New Icelandair website and Customer Relations Management System (CRM)

The new Icelandair website which is being designed, will introduce a completely new experience for the customer. The site will integrate with a new customer relationship management system and allow Icelandair to have a more personal interaction with the customer, in terms of customer seat options, retail choices or food and beverage orders as an example. The aim is to better understand where the customer is coming from and support him or her in a more personal way. In February 2017 Icelandair signed a contract with Salesforce to implement some of their services into Icelandair business processes. Icelandair will eventually use Salesforce as the single source of information for customer data and to support a more personal interaction with the customer (Guðmundur Guðnason, Director Digital Business Development Icelandair, personal communication, interview, 27th January 2017).

A long side Salesforce and the new website, a new portal for the customer will be introduced that facilitates better self-service options, a key part of that is when a customer logs into the portal, Salesforce will have all the information about him or her and can relate that information to the portal. Salesforce will collect information from other systems like Icelandair's loyalty and booking systems, be available everywhere, and display the overall picture about the customer (Guðmundur Guðnason, Director Digital Business Development Icelandair, personal communication, interview, 27th January 2017).

Quick Access Recorder System (QAR)

In 2015 iJet Technologies was contracted by Icelandair to systematically analyse and process operational and technical information from the Quick Access Recorder (QAR) data file which is derived from Icelandair's Boeing 757-200 and Boeing 767-300 aircraft (Hilmar B. Baldursson, VP Flight Operations and Captain Icelandair, personal communication, interview, 5th April 2017). The QAR is an electronic device that records and stores raw flight data or parameters from an aircraft when the aircraft is powered. The device is an EASA regulatory required device and must be on-board every aircraft. It provides post-flight access to flight data created by the aircraft's components inflight (Bragi Baldursson, Head of Icelandair Design Organisation Approval (DOA), personal communication, e-mail, 4th April 2017). Without any additional hardware and software connected to the QAR, the recorded data is not made available inflight to any of Icelandair's IT systems. The data is first made available after the aircraft has been parked, and then by manual observation and input by the aircraft mechanics. iJet Technologies has designed a platform that can read the raw data from the aircraft, analyse,

and make it available in near real time. iJet Technologies' platform is able to access up to 1500 parameters on a legacy Boeing 757 and 767 aircraft and make select data parameters available to the aircraft's network which could be used for both operational and maintenance processes (iJet Technologies, 2014).

As well as having the traditional QAR system for post-flight data retrieval, the new generation of aircraft, such as the Boeing 737-MAX, will include a different setup which incorporates a Boeing controlled On-board Network System (ONS). The ONS is Boeing's answer to airlines requests of being able to easily access aircraft data during flight or post flight. It combines the functionalities of the QAR, iJet's Technologies platform, and other systems into a single system by making the raw flight data available to the airplane's network, or through the flight deck Ethernet port. In addition, the ONS is meant to integrate functions usually handled by other systems like the EFB and is capable of connecting to a much larger set of data systems and stores hundreds of gigabytes of data ('Boeing', n.d.). Despite the new Boeing 737-MAX being able to access a much larger set of parameters, it is expected that only 65 will be made available to aircraft systems such as the EFB during flight. Rest of the parameters or data will be available post-flight (John Schramm, Chief Executive Officer iJet Technologies, personal communication, interview, 21st February 2017).

Electronic Flight Bag (EFB)

The purpose of the project was to move away from the static non-connected Electronic Flight Bag (EFB) and pilot assigned devices and upgrade the Boeing 757-200/300 and Boeing 767 to a connected aircraft tail-assigned system, making use of modern technology and best IT practices and achieve fuel savings, streamlined operations, labour savings, and process efficiency across the flight operations and other parts organisation (Grétar Már Óðinsson, EFB Administrator and Captain Icelandair, personal communication, interview, 14th March 2017).

Traditionally, an EFB has been a laptop or tablet which the pilots carry on-board the aircraft. Since its introduction in 2004/2005, considerable weight savings have been achieved by moving printed paper onto electronic portable document format (pdf) residing on the pilot EFB´s. Aircraft performance calculations software has also been a driver for the technology but the setup had reached its maximum potential. The original system was flight deck focused and was achieving minimal benefits for the company. Deficiencies included, but were not limited to, non-connectivity on-board the aircraft, hardware could not be used during all phases of flight and non-existent capability for retrieving or delivering data and information to crew

and on/off the aircraft (Grétar Már Óðinsson, EFB Administrator and Captain Icelandair, personal communication, interview, 14th March 2017).

The upgraded EFB approach can connect the aircraft, make devices available for usage during all phases of flight, and have the option to deliver, retrieve, and process data on or off the aircraft at any point in near-real-time. This project is ongoing within the company but achieved a major milestone in the beginning of February 2017 when the Icelandair Transport Authority (ICETRA) issued an approval for the new setup. The EFB now consists of two mounted tablets that remain on-board the aircraft at all times. They are hardware serviced by Icelandair Technical Services (ITS) and managed at the software level by Flight Operations EFB administration. This is somewhat a unique arrangement in terms of flight deck hardware and management but is fully compliant with the applicable regulations. Data connection is achieved in-flight through Global Eagle Entertainment (GEE) Ku band satellite system and 3G/4G connection while on the ground (Grétar Már Óðinsson, EFB Administrator and Captain Icelandair, personal communication, interview, 14th March 2017).

Electronic Technical Log

A Technical Log is a logbook that must be on-board every aircraft. In it, pilots and maintenance crew log the maintenance status of that specific aircraft. This logbook must be maintained at all times while the aircraft is in active operation and airworthy. At Icelandair the logbook is stored in a modified A4 size metal container, among some other forms. Its main purpose is to store the Aircraft Journey and Technical Log (AJTL) triplicate forms and copies. The data manually recorded into this AJTL form has implications well beyond the aircraft as the information is required by several departments, for record keeping and processing. Today this information is manually entered into several databases, often multiple times. Work is however underway to establish an Electronic Technical Logbook (eTechLog) to replace the current system. Plans are for the new system to integrate with other systems, such as the Electronic Flight Bag (EFB), the Aircraft Interface Device (AID), Aircraft Health Monitoring System (AHM), on-board communication systems for streaming of data off the aircraft as well as to ground databases and maintenance systems. The objective is to limit or eliminate the manual entry system and much like the EFB programme, translate the data from the aircraft operations in digital form (Geirfinnur Smári Sigurðsson, Avionics Engineer Technical Services, personal communication, interview, 6th April 2017).

2.3.11 Keflavik Airport

Keflavik Airport is the main international airport in Iceland and is operated by ISAVIA, which is a governmentally owned operator of airports in Iceland (‘Saga og menning - Kefairport.is’, n.d.). In 2016 nearly seven million passengers travelled through Keflavik Airport which is an increase of 40,4% from the year before and an increase of 180% since 2007 (‘Staðreyndir og tölur - Kefairport.is’, n.d.). That number is estimated to grow by 28,3% in 2017, to 8.7 million passengers (ISAVIA, 2016). To be able to service the growing number of passengers travelling through Iceland and multiple airlines now flying to and from Iceland the airport has introduced what is referred to as the masterplan. The masterplan is a development schedule for the airport until the year 2040. At the end of that period the airport is expected to be able to service up to 14 million passengers per year. The masterplan of the airport gives airlines, service companies, neighbouring authorities, and others a general idea of the future development of the airport, which they may use for their own long term strategy (ISAVIA, 2015).

The airport's masterplan does not include a plan on how or if the airport is going to support future digital development by the airlines (ISAVIA, 2015), even though a large number of projects are being undertaken by the airport which directly or indirectly support the digital development of the airlines. For example, the airport is working at setting up a Wi-Fi connection in the ramp area for the airlines and working with international aviation authorities to include payment options with credit cards in a common use platform which would make it easier for airlines to charge added services at the airport's kiosks, check-ins or at boarding gates (Grétar Már Garðarsson, Project Manager Business & Route Development ISAVIA, personal communication, e-mail, 23rd March 2017).

2.3.12 Market challenges

The CEO of Icelandair, Birkir Hólm Guðnason, sees two main challenges that are currently facing Icelandair. One is the strength of the Icelandic krona which is increasing labour cost considerably. The other challenge is that the yields from the ´via KEF´ market has plummeted. ´Via´ being flights between Europe and North America via Keflavik international airport. The low-cost airlines, such as Norwegian Airlines, EasyJet, etc. are increasing their market share by lowering their fares. The surprise factor in this scenario is that the network carriers have been following suit (Birkir Hólm Guðnason, Chief Executive Officer Icelandair, personal communication, interview, 23rd March 2017).

All indications are that a record breaking number of 26 airlines will fly regularly to and from Keflavik Airport in the summer of 2017 (Grétar Már Garðarsson, Project Manager Business & Route Development ISAVIA, personal communication, e-mail, 23rd March 2017). One of Icelandair's largest competitor is another Icelandic airline, WOW air. WOW air is expected to fly up to 3 million passengers to, from or via Iceland in 2017 ('Sagan okkar | WOW air', n.d.), compared to just over 4 million passengers for Icelandair (Icelandair Group, 2016). WOW air was established in November 2011 and today operates 12 Airbus aircraft ('Sagan okkar | WOW air', n.d.) and is expected to grow that number to 17 aircraft by the end of 2017 (ISAVIA, 2016). WOW air's route network is now easily compared to Icelandair's network and includes major cities in Europe and the United States ('Leiðakerfi | WOW air', n.d.). In just a few years WOW air has been able to enter and capture nearly 30% of the market (Íslandsbanki, 2017). Icelandair also faces competition from foreign airlines like Finnair, Wizz Air, Air Berlin, Delta, Norwegian, EasyJet, SAS, and British Airways. Most of these airlines are expected to increase the number of flights to Iceland in 2017 to meet the expected passenger growth (ISAVIA, 2016).

Porter says that superior value to the customer is not only offering a lower price for equal experience but also offering your customer a unique experience for which he or she is willing to pay a higher price (Porter & Advantage, 1985). Average airfare prices are expected to decline even more in 2017, add that to the continued growth in competition (Icelandair Group hf., 2017) and that a large part of the growth is coming from low-cost airlines which are undercutting the average airfare (Birkir Hólm Guðnason, Chief Executive Officer Icelandair, personal communication, interview, 23rd March 2017). It's apparent that Icelandair's ability to create superior value from a unique experience is possibly more important than ever. Information technology has for many years been used to create competitive advantage (Porter & Millar, 1985), on-board Icelandair aircraft one of those superior values has been thought to be the on-board Wi-Fi system which is regarded as a service to the passengers and a competitive advantage (Ingigerður Erlingsdóttir, Lead Project Manager Icelandair, personal communication, interview, 30th January 2017).

On-board Icelandair aircraft digital development's drivers to create competitive advantage have been to follow what the industry is doing, creating opportunities to make processes on-board more efficient and streamlined, and to provide better service or experience to the passengers (Ingigerður Erlingsdóttir, Lead Project Manager Icelandair, personal communication, interview, 30th January 2017). But while the low-cost airlines have been able

to advance their market share by being more agile, Icelandair has been historically tied to bigger Global Distribution Systems (GDS), which makes it slower to respond and has led to Icelandair becoming a market follower (Birkir Hólm Guðnason, Chief Executive Officer Icelandair, personal communication, interview, 23rd March 2017).

Other important challenges for Icelandair are fuel prices and what has recently been referred to as the Trump effect. After the United States of America (USA) presidential election of 2016, there was a decrease in online travel searches and an actual drop in bookings to the USA. Terrorism and politics are becoming a standard factor which generally increases the planning uncertainty and affects bookings. The current phase is expected to last six to 12 months before potentially clearing up (Birkir Hólm Guðnason, Chief Executive Officer Icelandair, personal communication, interview, 23rd March 2017).

2.4 Digital development and data

2.4.1 Digital Labs and the digital customer journey

Digital Labs is a relatively new division within Icelandair, managed by the Director of Digital Business Development, Guðmundur Guðnason. It was established in early 2016 and strategically placed under Finance and Administration in a support role for the organisation as a whole. About six months before the establishment of the department an outside consultancy group, Gartner, was hired to perform a review of the company status. The consultancy group generated a heat-map which highlighted the strong and weak points of the organisation compared to some of its main competitors, the result from that analysis ultimately led to the establishment of the department (Birkir Hólm Guðnason, Chief Executive Officer Icelandair, personal communication, interview, 23rd March 2017). Digital Labs consists of several multidisciplinary teams that are focused on working with stakeholders to create a new cutting edge digital infrastructure for Icelandair (‘Our Approach | Icelandair Digital Labs’, n.d.) and building up a foundation that would allow Icelandair to respond more quickly and develop in-house instead of relying mostly on outsourced knowledge (Guðmundur Guðnason, Director Digital Business Development Icelandair, personal communication, interview, 27th January 2017). This foundation is Icelandair’s answer to changes in customer’s behaviour and expectation (Svali Björgvinsson, SVP Human Resource and Strategy Icelandair, personal communication, interview, 11th April 2017).

In the first phase of Digital Lab's digital development the department is developing a new website for Icelandair and introducing a new cloud based CRM system, Salesforce, to keep track of the customer data (Guðmundur Guðnason, Director Digital Business Development Icelandair, personal communication, interview, 27th January 2017).

To analyse and map out the customer journey from when the customer gets the idea to travel and to when the customer arrives back, an in-flight team was created. The in-flight team consists of cross department stakeholders to discuss and tackle the overlapping factors in the customer's journey (Guðmundur Guðnason, Director Digital Business Development Icelandair, personal communication, interview, 27th January 2017). The overall goal of the in-flight team is to synchronise/harmonise the experience for the passenger regardless of the touching points: Website, on-board Wi-Fi, IFE, Icelandair mobile App, etc. (Birkir Hólm Guðnason, Chief Executive Officer Icelandair, personal communication, interview, 23rd March 2017).

The customer data from the CRM system could further enable Icelandair to personalise their marketing efforts (Philip Kotler, Kevin Lane Keller, Mairead Brady, Malcom Goodman, & Torben Hansen, 2012) through social media, email, and other mediums (Guðmundur Guðnason, 2016), enabling Icelandair to make their marketing efforts more efficient and recapture the customer before his or her next customer journey (Philip Kotler et al., 2012). However, gathering personal data and using it for personalised marketing, introduces questions and concerns about personal privacy and how it can affect the customer's trust (Culnan & Bies, 2003).

Digital Lab's attention seems to be focused on the Marketing and Sales division. In Michael A. Bryan's opinion, such an approach risks missing a lot (Michael A. Bryan, Captain and Principal of Closed Loop, personal communication, e-mail, 6th March 2017). In relation to general project performance, previous research suggests that not only is cooperation between Research & Development (R&D) and marketing positively related to project performance, but also cooperation between R&D and operations (Olson, Walker Jr., Ruekert, & Bonner, 2001). A resource like Digital Labs should be directed to consider the whole organisation (Michael A. Bryan, Captain and Principal of Closed Loop, personal communication, e-mail, 6th March 2017).

Michael A. Bryan emphasises "This type of "siloed" thinking not only risks digital strategies but every other project that airline departments develop and at the extremes, the very

survival of carriers in the hyper-competitive environment in which we all exist." (Michael A. Bryan, Captain and Principal of Closed Loop, personal communication, e-mail, 6th March 2017).

2.4.2 Digital strategy

In recent times, information technology has had a significant impact on economic growth, business processes, skill and organisational structure (Brynjolfsson & Hitt, 2000). Organisation's information technology can play a significant role in its success by increasing productivity, profits, customer satisfaction and the organisation's ability to respond to changes (Mithas & Lucas, 2010). It can create a competitive advantage if used effectively by business users (Porter & Millar, 1985), allow recognition of customer-based opportunities (Roberts & Grover, 2012) and the strategic effect can influence operational efficiency and help the organisation sail through more turbulent environments (Pavlou & El Sawy, 2006).

For an airline, a digital strategy is a plan or roadmap on how to take the information that flows within the aircraft, cabin, flight deck, ground services, technical services, marketing, and operations, and make it available within the company structure. It is all about the data, most of the data is already flowing within the airline but it needs to be connected, so it can be extracted for value and injected back into the business (Michael A. Bryan, Principal Closed Loop Consulting, personal communication, interview, 1st March 2017). These opportunities exist not only on the consumer side but also in the business to business sector. In the end those who will excel in this area are the ones that will have the competitive advantage (Birkir Hólm Guðnason, Chief Executive Officer Icelandair, personal communication, interview, 23rd March 2017).

A 2015 presentation for Icelandair's digital strategy focuses solely on digital development of processes and departments which directly relate to the customer and are part of the Marketing & Sales division (Icelandair, 2015). Icelandair operates a Digital Executive Committee which consists of the SVP Finance and Administration, SVP Marketing and Sales, Director Marketing and Business Development, Director Distribution and eBusiness, and Director Digital Business Development. The committee was set up this way to ensure coverage for the sales, marketing, information technology, and distribution parts of Icelandair (Birkir Hólm Guðnason, Chief Executive Officer Icelandair, personal communication, interview, 23rd March 2017). The committee meets once every week, its role is to oversee the implementation

of Icelandair's digital strategy, decide on high-level decisions and initiatives, provide support for the Director of Digital Business Development, and to include views of different stakeholders (Svali Björgvinsson, SVP Human Resource and Strategy Icelandair, personal communication, interview, 11th April 2017). Recently the Digital Executive Committee visited the airline Finnair, which is currently putting a lot of effort into digital development. Helgi Már Björgvinsson, a member of the committee, believes that Icelandair is ahead of Finnair in many aspects of digital development, but nevertheless lagging behind in others (Helgi Már Björgvinsson, SVP Marketing and Sales, personal communication, interview, 24th April 2017).

Icelandair's current digital development initiatives are emphasising on the customer side: Understanding the customer, making the user experience friendlier, finding new ways to reach the customer and meeting the demand for personalised and immediate access to information from a new generation of customers (Birkir Hólm Guðnason, Chief Executive Officer Icelandair, personal communication, interview, 23rd March 2017).

This development is being carried out by the Digital Labs department, its director Guðmundur Guðnason says that the department is currently focused on digitalising processes which directly interact with the customer but as their long-term project they want to improve processes from other departments by using the same methodology (Guðmundur Guðnason, Director Digital Business Development Icelandair, personal communication, interview, 27th January 2017).

Furthermore, senior management has taken some strives to eliminating the usage of printed paper at the office level, with the implementation of electronic billing and significant advancements have been made in recent years with the transformation of printed tickets to electronic form (Dagur Egonson, Director Business Intelligence and Hlynur Elísson, SVP Finance and Administration Icelandair, personal communication, interview, 27th February 2017).

Birkir Hólm Guðnason the CEO of Icelandair says that digital development has relevance within the whole value chain for the airline (Birkir Hólm Guðnason, Chief Executive Officer Icelandair, personal communication, interview, 23rd March 2017). However, the VP of Flight Operations notes that the whole organisation may not be adequately benefitting from the current digital development initiatives. This relates to projects which are being undertaken by the Digital Labs department, which will be a part of or touch processes from departments

like Flight Operations, Cabin Operations, or Technical Services but they are not officially part of the projects and potentially not adequately covered in analysis of listed system requirements (Hilmar B. Baldursson, VP Flight Operations and Captain Icelandair, personal communication, interview, 3rd February 2017). A 2016 digital business development presentation from Digital Labs names the Flight Operations department as one of their stakeholders to Digital Labs' efforts (Guðmundur Guðnason, 2016), but even so the Flight Operation department has not been involved in relevant projects which directly relate to processes for which it is responsible for. Processes which are most often highly regulated by authorities and require strict scrutiny before any change (Hilmar B. Baldursson, VP Flight Operations and Captain Icelandair, personal communication, interview, 7th April 2017).

While the digital initiatives of Icelandair are focused on the customer, there are several other components which can be considered overarching pillars to a digital strategy: EFB project and connected cabin services being two of the most significant ones. Others are network control, connectivity of the airplane, operations, and electronic technical log (Michael A. Bryan, Principal Closed Loop Consulting, personal communication, interview, 1st March 2017). A 2016 study by Accenture, a global management consulting firm, into the digital readiness at airlines around the world, observed the following.

> That many airlines have concentrated their digital investments on the "customer-facing" side, like websites and mobile interfaces. Whilst that will remain very important, it is key to not neglect the operation and recognise the vast potential for efficiency and cost reduction that digital technology can bring in this industry (Accenture, 2016, p. 10).

Hilmar B. Baldursson, the VP of Flight Operations describes how at the start of the EFB project a cross-departmental meeting was held to pull in all the stakeholders so that they were able to get a holistic and companywide approach to the implementation of the EFB project. In his opinion the reaction from that meeting was very positive but once the Flight Operation department was on track to successfully implement the EFB project, other departments have not kept up for various reasons, and are not involved enough so that they could contribute or receive value from the project. Potentially there is a breach in communicating the strategy or authority to enforce cooperation in relation to digital development coming from the top management (Hilmar B. Baldursson, VP Flight Operations and Captain Icelandair, personal communication, interview, 3rd February 2017).

A digital strategy cannot be a department strategy, serving only a single division like Marketing and Sales, or departments like Flight Operations, Ground Operations, or Technical Services alone. It needs to be driven from the top down and implemented from the bottom up throughout the whole organisation (Michael A. Bryan, Principal Closed Loop Consulting, personal communication, interview, 1st March 2017). The current setup where relevant departments are not part of digital development initiatives from the beginning, when the organisation's overall goals and strategies aren't clear, understood, and accepted by everyone, has led to the organisation not being as efficient in working together for the common goal (Jens Þórðarsson, VP Technical Services Icelandair, personal communication, interview, 23rd February 2017).

A weakness of many airlines is that their departments often function as very independent silos and that is perhaps the greatest threat to successfully implementing a digital strategy. Requirements need to be analysed in a pan-organisational way, projects which are initiated without careful consideration throughout the organisation can end up restraining or even derailing other projects (Michael A. Bryan, Principal Closed Loop Consulting, personal communication, interview, 1st March 2017). Inside Icelandair there needs to be more discipline, it is important that before projects are started that their scope and objectives are defined, so that they fit together and support each other for the overall goal. It is very common that projects are initiated in a rush without sufficient preparation and analysis, which ends up leading to the projects not returning the expected value (Einar Ingvi Andrésson, Manager Fuel Efficiency Icelandair, personal communication, interview, 24th March 2017).

A key to implementing a strategy which affects the whole organisation, is the support of senior management. This can be applicable to any strategy for that matter, given the right scope. The strategy should be driven from the top down but implemented from the bottom up. Most often a strategy cannot simply be a department strategy, serving only selected divisions or departments. There are however no reasons why specific components of a strategy cannot be first initiated in stages within the company´s entities (Michael A. Bryan, Principal Closed Loop Consulting, personal communication, interview, 1st March 2017).

Moreover, airlines have the tendency to be influenced by each other's actions, in what is called a herd mentality (Ingigerður Erlingsdóttir, Lead Project Manager Icelandair, personal communication, interview, 30th January 2017). Which could possibly be one of the reasons why no airline has successfully implemented a digital strategy, or eEnablement strategy as it is

often referred to within the industry. The airline Cathay Pacific came closest some years ago, but ended up failing catastrophically and that has had a very deterring effect on other airlines (Michael A. Bryan, Principal Closed Loop Consulting, personal communication, interview, 1st March 2017).

2.4.3 Data

The equipment needed to process and store data is getting cheaper every year, which introduces opportunities for big data and data driven decisions which require a large amount of data. Decisions which are based on data are most often better decisions (McAfee, Brynjolfsson, Davenport, Patil, & Barton, 2012). Using data for decision making can be associated with higher productivity and higher market value, and that data driven decisions have positive correlation with Return on Equity (ROE) and asset utilisation (Brynjolfsson, Hitt, & Kim, 2011). Getting the data as quick as possible off the airplanes can help the organisation optimise its operations. Today the technology is about making the data from the airplanes available but the future is about being able to use that data to be smarter and make data driven decisions (John Schramm, Chief Executive Officer iJet Technologies, personal communication, interview, 21st February 2017).

The current EFB project will make it possible to gather and transfer data from the airplane and it has revealed new opportunities concerning data from the airplane, which not only concern the flight operation and marketing department but also the financial department and the technical service department (Hilmar B. Baldursson, VP Flight Operations and Captain Icelandair, personal communication, interview, 3rd February 2017).

To take advantage of these new opportunities, there needs to be an infrastructure and flow of information, so relevant departments and stakeholders can discover and understand the value to create new opportunities. Furthermore, the support and a push from the top management to maximise the value from these opportunities is missing (Grétar Már Óðinsson, EFB Administrator and Captain Icelandair, personal communication, interview, 14th March 2017).

The Technical service department has for example seen opportunities where the data from the aircraft could be used to prevent and catch faults early or before they happen, a process named aircraft health monitoring. Their main challenge is to decide how to interpret, present, and act on the data. Current Technical Service department’s processes are often based on trend

analysis, where maintenance on parts is carried out before they fail based on previous trends. An aircraft health monitoring system based on data streamed from the aircraft in-flight and on ground could allow the Technical Services department to have a much higher utilisation of aircraft parts and be more operationally efficient (Jens Þórðarsson, VP Technical Services Icelandair, personal communication, interview, 23rd February 2017).

On the other hand, some key information systems like the maintenance system being used by the Technical Service, were not designed, and developed to easily import or export data. Some success has been made in exporting data from these systems, on the other hand the technical service department has not been able to create an automated interface to import data into the systems (Jens Þórðarsson, VP Technical Services Icelandair, personal communication, interview, 23rd February 2017). In future development, Icelandair has the opportunity to enforce integration capabilities when designing or evaluating new information systems for the company (John Schramm, Chief Executive Officer iJet Technologies, personal communication, interview, 21st February 2017).

The processing of data within Icelandair is often project based, and there is no coherent strategy or system by design in place which deals in a structured manner with the flow of data into, inside, and from every part of the organisation (Dagur Egonson, Director Business Intelligence and Hlynur Elísson, SVP Finance and Administration Icelandair, personal communication, interview, 27th February 2017). The data being created in-flight both by the airplane and flight crew is relevant to most of the other parts of the organisation. It is very important that the cabin crew has access to the information about the customer from the organisation's CRM system and equally important is that other parts of the organisation have access to information about the customer that was created on his or her customer journey with Icelandair (Hilmar B. Baldursson, VP Flight Operations and Captain Icelandair, personal communication, interview, 3rd February 2017).

Big data is a term that is often mentioned in relation to aircraft data. Big data in its most basic form "seeks to glean intelligence from data and translate that into business advantage" and differs from previous data driven ideologies by three factors: volume of data, velocity of the data and variety of the data (McAfee et al., 2012).

John Schramm, the CEO of iJet Technologies emphasises that big data should function at the Icelandair Group level. The aircraft can be a source of data for the larger part of the big data effort and it is very important for optimising the airlines processes. Airlines are moving

farther away from running their own systems and servers, they are migrating more into cloud technology where the service is bought from a provider. It is likely that big data will follow the same path. Airlines are not going to be running their own big data processes, instead they are going to benefit from the scale by renting the big data services from providers (John Schramm, Chief Executive Officer iJet Technologies, personal communication, interview, 21st February 2017).

Adoption of big data enables organisations to analyse vast amounts of real-time data (Romao, 2013) from websites, social networks, cell phones, images, machines and more (McAfee et al., 2012). Organisations that have the right leadership, talent management, technology, decision making, and company culture can fully utilise big data to create competitive advantage over their competitors (McAfee et al., 2012).

Making all that data from the airplanes available also opens up the discussion to data security (John Schramm, Chief Executive Officer iJet Technologies, personal communication, interview, 21st February 2017). Previous research shows that data security has a direct and significant effect on consumer trust which is positively related to consumer commitment (Casaló, Flavián, & Guinalíu, 2007).

2.4.4 Original equipment manufacturers (OEM) monopoly

Original Equipment Manufacturers (OEM) such as Boeing, have a strategy to monopolise the in-flight data from future aircraft which is a threat to the digital development of airlines (Hilmar B. Baldursson, VP Flight Operations and Captain Icelandair, personal communication, interview, 3rd February 2017). John Schramm says that Boeing has explained their reasoning is to prevent security breaches, as a significant breach could be very damaging to their whole business case. On the other hand, he believes that Boeing is using that reasoning to monopolise the control and service to the data so airlines will be forced to buy their service (John Schramm, Chief Executive Officer iJet Technologies, personal communication, interview, 21st February 2017). Boeing is aware of the airlines discontent with their strategy and it is believed that they are willing to change, but it’s not clear today if they are capable of changing their strategy (Jens Þórðarsson, VP Technical Services Icelandair, personal communication, interview, 23rd February 2017).

2.4.5 Legislators

For new technology to be used by Icelandair in its airplanes it needs to be approved by both the European Aviation Safety Agency (EASA) and the Icelandic Transport Authority (ICETRA). Their process of getting new technology approved is very slow and can take many months or years, especially if the technology is a part of the airplane and for example is able to feed information to the airplane (Grétar Már Óðinsson, EFB Administrator and Captain Icelandair, personal communication, interview, 14th March 2017). Other processes like maintenance aren't much better as for example the use of electronic signatures has yet to be allowed, slowing down the drive towards reducing the usage of paper (Jens Þórðarsson, VP Technical Services Icelandair, personal communication, interview, 23rd February 2017).

3. Status analysis

3.1 Applied diagnostic models explained

Select diagnostic models were used to conduct the analysis of the company. Along with getting access to company reports and information, we conducted a SWOT analysis, used Porter´s five forces and performed in-depth interviews with select Icelandair personnel and industry experts.

3.1.1 Porter´s five forces

The model is named after Michael E. Porter who in 1979 wrote an article on "How competitive forces shape strategy". It details five competitive forces that affect an industry and can be used as a tool to determine its weaknesses and strengths (Porter, 1979). Porter’s five forces model has long been an economics standard when analysing an industry. Porter’s model explains the attractiveness of an industry and how it can dictate long-term profits of the industry (Philip Kotler et al., 2012).

- Threat of new entrants, which is explained by the entry barriers to new competitors when entering a market;
- Bargaining power of suppliers, which is explained by the ability of suppliers to influence or affect by various means;
- Bargaining power of customers, which is explained by the leverage customers have on an organisation;

- Threat of substitute products or services, which is explained by the customers' power to substitute products or services;
- Rivalry among existing competitors, which can limit the profitability of an industry.

(Porter, 2008)

3.1.2 SWOT

The internal factors, strengths and weaknesses, lie within the organisation itself while the external factors, opportunities and threats, lie on the outside of the organisation, both the internal and external factors cannot be influenced in the short-term (Houben, Lenie, & Vanhoof, 1999). Houben, Lenie and Vanhoof further describe strengths as factors that "thereby relate to the competitive advantages and other distinguishing competencies which can be exploited by the company on the market" while they describe weaknesses as factors that "are limitations which hinder the progress of a company in a certain direction". The external factors relate to political, economic, social, technological and competitive environment to identify opportunities and threats (Dyson, 2004).

3.2 Porter's five forces analysis

In 2011 IATA sought assistance from Michael Porter to analyse the airline industry. Porter's presumption was that there are few industries where the forces are as influential as in the airline industry (IATA, 2011). A look at the Icelandic aeronautical industry and how it is moving in relation to Porter's five forces indicate that the environment of all these forces are not moving in a positive direction for Icelandair.

3.2.1 Threat of new entrants

The entry barriers for entering the market are virtually non-existent as shown by more airlines flying to and from Keflavik Airport every year. Another indication of the declining entry barriers is that a relatively new Icelandic airline, WOW Air, has been able to enter and capture a large percentage of the market in a relatively few years.

3.2.2 Bargaining power of suppliers

The power of suppliers in the air industry has always been high as concluded by Porter, with powerful labour unions, few aircraft and engine manufacturers and fewer choices of service with the concentration of suppliers (IATA, 2011). As Icelandair operates aircraft from only one manufacturer, Boeing, it can be expected that its power over Icelandair is relatively high. Boeing's strategy to monopolise access to in-flight data on Icelandair's next generation of aircraft is already a proof of that. At the same time, there is only one realistic choice of airports in Iceland, Keflavik airport.

3.2.3 Bargaining power of customers

Porter concluded that the bargaining power of the buyer is high in the airline industry as services are mostly sold on the basis of price and not brand and that switching cost is low (IATA, 2011). In the Icelandic market the customer's leverage has never been higher with lowering of average airfares, more airlines expected to fly to Keflavik airport in 2017 than ever before. ISAVIA predicting a passenger growth of over 28% for 2017 and leading travel search engines which increase price transparency in Iceland ('Factsheet', 2016) which could further fuel the buyer's bargaining power.

3.2.4 Threat of substitution

The threat of substitution was concluded by Porter to be rising with web-conferencing becoming more widely available and competition from high speed rail increasing (IATA, 2011). The threat of substitution may be the one force which is not as easily transferrable to the Icelandic market with the only realistic passenger transportation to and from Iceland being air travel but on the other hand web-conferencing is as easily accessible in Iceland as in other places.

3.2.5 Competitive rivalry

Porter concluded that high competitive rivalry in the airline industry can be attributed to economics like low margins and high sunk cost but also governmental constraints (IATA, 2011). It can be expected that competitive rivalry in the Icelandic market is rising with more competition and the lowering of average airfares.

3.2.5 Summarised table

Table 1 Porter's five forces: Summary of the forces	
Threat of new entrants	Low entry barriers More airlines every year Processes easily copied
Bargaining power of suppliers	Single supplier of aircraft Strong unions Single international airport
Bargaining power of customers	Lower average airfares More supply of seats Low switching cost Web price transparency
Threat of substitution	Web-conferencing
Competitive rivalry	Lower average airfares More competition

Table 1 Porter's five forces table

3.3 SWOT Analysis

A thorough SWOT analysis was conducted which had the aim to identify the internal and external factors which can affect the organisation from a digital development perspective. In-depth interviews, internal documents and reports were then used to identify and categorise these factors. The objective of the SWOT analysis was to bring out the underlying quality (strengths) of the operation and shed light on the potentially problematic (weaknesses) sides of the company processes, programmes and/or departments.

3.3.1 Strengths

Experienced employees

Michael A. Bryan described his experience of Icelandair's employee's competence being very positive. The average working age and employee satisfaction is high. By keeping all critical processes in house, the company has built up a very capable resource in its employees, its

aircraft are operated and maintained by Icelandair employees, marketing and sales, project management, research, human resources, management, and now digital development are carried out by Icelandair's employees.

Digital resources

Establishment of an in-house digital development department like Digital Labs has in the last year created a valuable resource for future digital development. Current projects of the department involve designing and implementing a new website for Icelandair which will introduce a completely new experience for the customer and implementing a new CRM system as a single source of information resource about the customer.

The currently successful EFB project being undertaken by the Flight Operations department will open up the possibility of streaming real-time data to and from the aircraft which could help Icelandair create a competitive advantage by streamlining their processes, save on cost and providing a better service by having a more personal interaction with the customer.

Introduction of a new Wi-Fi system on-board Icelandair's new aircraft will support all future in-flight digital development and able Icelandair to provide better in-flight service with faster network speeds and a connection to the IFE system.

Culture

Icelandair has a very favourable project culture and the company is structured in such a way that diverse projects can be initiated and carried out simultaneously. Communication channels inside the organisation between employees vertically and horizontally are informal and expedient as experienced by Michael A. Bryan.

Situational awareness

The CEO of Icelandair and management of Icelandair's departments which are directly involved in the organisation's main processes understand the importance of digital development to the future competitiveness of the organisation.

3.3.2 Weaknesses

Organisational structure

A department like Digital Labs is considered both by internal and external stakeholders to be a valuable resource organisation wide, for current and future digital development. Digital Labs' current focus on Marketing and Sales division projects could limit access for other divisions and departments to its resources and hinder the development of valuable digital initiatives.

SILO culture

Internal stakeholders have described the flow of information between departments as being at times non-existent and that departments are not cooperating as much as they possibly could and should be doing. Awareness about programmes, projects and strategies across departments is low.

Resource ownership

Important resources like the aircraft on-board communication equipment which includes the Wi-Fi system, is in the ownership of the Marketing and Sales division. Internal and external stakeholders have described concerns about that setup as it could lead to the resource not being fully utilised by projects and programmes which support the digital development of the company.

Lack of roadmap/support

During the interview process the interviewees on several occasions expressed concerns about the apparent lack of strategy and top-down drive for future digital development. A possible explanation for this is that they have not been fully included in current digital initiative being pushed by the top management. For example, the Digital Executive Committee does not include any member representing the Operations division.

Icelandair's current digital strategy seems to be focused on operations related to the external customer only. There isn't a roadmap for the digital development of Icelandair which is fully known and accepted by all stakeholders. Furthermore, Marketing & Sales stakeholders have not been adequately involved in projects being undertaken by departments in the Operations division, which relate to digital development.

Industry specialists have described worries about this kind of setup which doesn't include all relevant stakeholders at every part of the process, which could limit the value of the programme or possibly derail it, like in the case of Cathay Pacific Airlines.

Data flow and integration

No coherent strategy for the flow of data is available throughout Icelandair. Data flows and processes are often project or department based, maintained manually and not easily accessed. Some current information systems which are a valuable part of Icelandair's business processes have been shown to be mostly incapable of integration, as in the example of the current maintenance system.

3.3.3 Opportunities

Competitive advantage, flexibility and efficiency

Academic research and consultants describe huge opportunities to increase productivity, profits, customer satisfaction, flexibility, competitive advantage, and operational efficiency by incorporating a pan-organisational digital strategy which considers departmental and pan-organisational requirements, and pushing for better information flow across departments and divisions.

Data and integration

The EFB project has set the initial stage for select aircraft operational data being available to the company providing both value and efficiency as it delivers operational and aircraft data to the ground in near-real time where it can be instantly analysed and processed.

Furthermore, the Electronic Technical Log project, has the potential to significantly provide value to the company as it facilitates efficiency and delivers valuable aircraft technical data to the ground in near-real time where it can be instantly analysed and processed.

Current projects will make it possible for Icelandair to collect and connect relevant, operational and customer data inside a single database or data warehouse. Creating an infrastructure for that data to flow throughout the organisation opens up the possibility for departments throughout the organisation to take advantage of the opportunities that lie within

the data and the potential for increasing efficiency and productivity, personalised marketing, and data driven decision making.

Internal and external stakeholders have highlighted the importance of information systems being capable of integration. Icelandair has the opportunity to enforce integration capabilities when designing or evaluating new information systems.

3.3.4 Threats

OEMs and suppliers

Internal stakeholders and external consultants have highlighted the threat of OEMs and suppliers controlling access to data as being a roadblock for the integration of systems. Boeing's current strategy is to control the access to in-flight data in Icelandair's new generation airplanes, even though they have shown that they are willing to change there is not much belief in their capability to do so.

Herd mentality

Michael A. Bryan described the failures of Cathay Pacific Airlines hardware and digital strategy, or digital development programme, to have deterred other airlines to undertake digital development efforts seriously. Michael A. Bryan also said that he believes that no airline has successfully implemented a pan-organisational digital strategy which could deter airlines which have been described to have a herd mentality.

Data security

John Schramm and Michael A. Bryan highlighted the importance of data security and listed it as a threat to future digital development efforts. A breach in data security and privacy issues could have a serious effect on consumer trust and commitment to Icelandair. John also highlighted his opinion that data security could be used as a scapegoat by aircraft manufacturers to monopolise service to process in-flight data.

Legislation

Internal stakeholders have described governmental legislation, both European and Icelandic, in relation to digitalisation of in-flight or maintenance processes, to be very in slow in

development and implementation. Their participation and understanding of digital programmes can in some cases be described as non-existent.

Cost savings

Porter's five forces emphasise the hard conditions Icelandair faces with factors like the lowering of average airfares and the rising competition. At the same time the recent political changes in the USA and the rising strength of the Icelandic krona have further affected Icelandair's profits. If the current trend continues and the demand for cost savings rises, digital initiatives could slow down significantly or be cancelled.

Keflavik Airport

Keflavik Airport is at this moment the only viable choice in Iceland as Icelandair's international hub. The airport has several on-going projects which can support Icelandair's digital development efforts. It is worrying though, that the airport does not mention how it can support the airlines' digital development in its masterplan. If Keflavik Airport is not able to provide the necessary support, it could delay Icelandair's future digital development around its central hub.

3.3.5 Summarised table

Table 2
SWOT: Summary of the factors

	Strengths	Weaknesses
Internal factors	Experienced employees Digital resources Culture Situation awareness	Organisational Structure SILO mentality/Culture Resource ownership Lack of roadmap/Support Data flow and integration
	Opportunities	Threats
External factors	Competitive Advantage, Flexibility and Efficiency Data and integration	OEM and Suppliers Herd mentality Data Security Legislation Cost Savings

		Keflavik Airport

Table 2 SWOT table

3.4 Analysis summary

The results from the Porter's five forces analysis show that four out of the five forces are especially influential in the market which Icelandair competes in. Even though Icelandair is experiencing an unprecedented growth in passenger numbers, competitive rivalry is growing with the lowering of average airfares and more competition. Entry barriers seem to be low or non-existent and with the competition growing every year, the bargaining power of customers is growing with more informed customers. The bargaining power of suppliers is high with few options available to the airline. The only force which does not seem to be influential is the threat of substitution, with Iceland being an island, which is understandable.

The SWOT analysis brings out several strengths that Icelandair possess' for digital development. Its experienced employees have already proven themselves in previous projects and to outside consultants. Digital development with high level support is already in progress at certain areas in the organisation and the informal and expedient information channels alongside management's awareness of digital development's importance are valuable to future digital development. Even so, the analysis is overwhelmed by weaknesses, like certain aspects of the organisation's structure, the information flow between divisions and the ownership of resources which are valuable to digital development. On top of that, there is a limited in scope pan-organisational strategy on data management throughout the organisation and a potentially inadequate digital strategy which lacks pan-organisational scope and the involvement of all relevant divisions and their departments.

Digital development offers Icelandair valuable opportunities to distribute data and information throughout the organisation, to make processes more efficient and flexible, use personalised marketing, and to create a competitive advantage. Digital development also introduces a large number of threats which could possibly halt or derail its progress. Threats like OEM's dominance of data, data security, privacy concerns, lack of legislators' efforts to keep up with development, airlines mentality to follow but not lead, lack of commitment from Keflavik Airport, and the demand for cost savings.

4. Conclusion

Previous research, aviation consultants, and internal stakeholders all support the statement that digital development offers Icelandair opportunities to create a competitive advantage and to make their operations more efficient and flexible. Icelandair's current digital development efforts are focused on the marketing and sales processes which directly relate to the external customer. These efforts are being undertaken by the Digital Labs department and are supported by Icelandair's CEO and its Digital Executive Committee. While they are very ambitious and have the full support of the higher management, the Operations division and its departments such as the Flight Operations, Technical Services, and Cabin Operations have not been significant participants in this process.

A common thread throughout these interviews was a belief in the importance of digital development and the great value it promises to all corners of Icelandair. This was evident in the interviews that were conducted, whether it was the consultants, managers, or the CEO of Icelandair that were being interviewed. On the other hand, when the interviewees described their experience of the current digital development efforts in relation to their departments or business processes that they are responsible for, the thread was not nearly as synchronised. Stakeholders which are a part of Icelandair's current digital development efforts which mainly relate to marketing and sales are confident about Icelandair's current digital development efforts, while stakeholders that are not included in part or fully of the processes are worried about being left behind in the current efforts and their opinion is that the organisation may not be utilising the digital development opportunities to its optimum potential.

The aviation consultants that were interviewed agree with the latter, they believe that it is critical that the pan-organisational requirements are analysed with all relevant stakeholders included. Further, they emphasise the importance of a strategy or a roadmap to digital developments success.

A crucial strength for Icelandair's current and future digital development efforts is that its top management understands the importance of digital development and Icelandair's CEO emphasises that digital development is crucial for Icelandair to excel over its competitors.

That being said, Icelandair's strategy, mission, or vision do not mention digital development once and the term is barely mentioned in the Icelandair Group's 2016 annual report, appearing only once under goals and strategic initiatives (Icelandair Group, 2016). It is apparent, that even though Icelandair's higher management understands the importance of

digital development, a digital strategy which considers the pan-organisational requirements that is known, understood, and accepted by everyone has not been developed.

Following our analysis on Icelandair's digital development efforts and its impact on their operational efficiency, we believe that it is vital for Icelandair to focus on digital development in order to gain or maintain a competitive advantage. We however believe that Icelandair's current approach to digital development inhibits the organisation to take full advantage of its opportunities.

For Icelandair to take full advantage of the digital development opportunities, we propose a few adjustments to the programme.

4.1 Proposals

Our proposals are divided into seven main points.

- Revisit the pan-organisational requirements.
- Review the digital strategy.
- Reorganise the Digital Executive Committee.
- Establish a Digital Consultative Forum.
- Supervision of digital strategy resources.
- Pan-organisational data management strategy.
- Pan-organisational information flow strategy.

4.1.1 Revisit the pan-organisational requirements

We propose that Icelandair revisits the requirements analysis in relation to digital development, but at the pan-organisational level, both at the Icelandair and the Icelandair Group level. As the CEO of Icelandair described during the interview, external consultants were brought in to perform this type of analysis, but there is evidence that the focus of that analysis was on the Marketing and Sales division and the Operations side of the business has been largely ignored. The risk and cost is that this may set parts of the current digital efforts back by a few months. The key point however is that this analysis will set the stage for a more precisely developed digital strategy which considers the whole organisation and all relevant stakeholders.

4.1.2 Review the digital strategy

We propose that Icelandair reviews its digital strategy and includes the pan-organisational requirements. The strategy needs to define what Icelandair's pan-organisational objectives and scope are for digital development and the roadmap to achieving these objectives. It is important that the strategy considers how digital development efforts of individual divisions and their departments affect each other and how they support the overall pan-organisational objectives. The strategy needs to be introduced and available to all the relevant stakeholders so that the overall goal is clear, understood and accepted.

4.1.3 Reorganise the Digital Executive Committee

We propose that stakeholders for the Operations division be added to the Digital Executive Committee to represent and uphold relevant top-level operational requirements and perspectives. Specific considerations should be given to representation from the Flight Operations department, Technical Services department, and Operations Efficiency department.

4.1.4 Establish a Digital Consultative Forum

We propose a creation of a Digital Consultative Forum which includes representatives or project managers from all relevant department stakeholders to Icelandair's digital development. The forum would be responsible for the implementation of Icelandair's digital strategy on a day to day basis and answers to the Digital Executive Committee. The goal is to break down the silo culture by enforcing more cooperation and information flow in relation to Icelandair's digital development efforts at the department level. Furthermore, we suggest that a representative from Keflavik Airport be included in the forum at appropriate times.

4.1.5 Supervision of digital strategy resources

We propose that resources which are deemed critical to Icelandair's digital development efforts by the requirements analysis be moved under the supervision of an administrative force which can act as a neutral decision maker and ensure that their utilisation is in compliance with and in the best interests of Icelandair's digital strategy. Ownership of resources which are important to Icelandair's digital development needs to reside with the organisation but not be restricted by any specific divisions or departments.

4.1.6 Pan-organisational information flow strategy

We propose the creation and implementation of a pan-organisational information flow strategy, simultaneously to the digital strategy review to ensure the flow of information in relation to current and future digital development efforts between divisions, departments, and relevant stakeholders.

4.1.7 Pan-organisational data management strategy

We propose the creation and implementation of a pan-organisational data management strategy, simultaneously to the digital strategy review to support current and future digital development efforts. We further propose that a pan-organisational data requirements analysis is performed, which includes all divisions and departments which are participants in Icelandair's digital development efforts or can benefit from the data being created and made available to the wider company stakeholders.

4.2 Limitations

This thesis is based on information which has mostly been collected with in-depth interviews and from internal data from Icelandair. While they offer the advantage of getting a deeper understanding of the relevant subjects, they can make it harder to separate facts from partial opinions. The airline industry is a large, collection of slow moving entities which are often resistant to change, which consequently has led to peer reviewed research into digital development of airlines being in short supply. Previous research which we use to support our findings of relevant subjects was often performed on different industries or organisations and therefore not necessarily the best representative of the airline industry or Icelandair.

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