Decision Model Innovation for Competitive Productivity (CP) in the Airport Industry

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Abstract

Purpose: The purpose of this paper is to explore the impact of Decision Model Innovation (DMI), set on the decision-making support for the customers, on customer satisfaction, and Firm's Competitive Productivity (FCP).

Design/Methodology/Approach: We operationalize the concept of DMI by developing a Decision Support Journey (DSJ) model for the airport industry, using the case of Zurich Airport and its ecosystem. We then explore how this DSJ impacts the FCP of Zurich Airport.

Findings: We find that applying DMI shows potential to improve talent management, resource management, and corporate culture, leading to a higher FCP. By centralizing the decision-making process of its customer and decision support, executives gain essential insights into the actual needs of their customers. This enables firms to adapt their products and services to the actual needs of the customer, which leads to higher performance.

Research implications: This study explores the complementarity between DMI and FCP, exploring how operationalizing the concept through DSJ impacts FCP elements, including talent management, resource management, and overall corporate culture. This extends extant work on improving non-aeronautical revenues in dynamic environments within airport ecosystems as a converging industry setting.

Practice implications: Existing airport digital applications providing minimal support should be expanded to provide an interaction and exchange platform for airport ecosystem players and customers. We find that the firm adopting DMI in the airport/airline industry can set up a win-win situation to achieve Competitive Productivity (CP) by providing decision-making support and valuable insights to its customers.

Originality/Value: This study is among the first to apply DMI towards improving FCP in the airport industry. It treats airports as an ecosystem of converging industries that can benefit by incorporating customer-focused digitally-enabled solutions to improve decision-making and customer satisfaction.

Keywords: Decision Model Innovation; Decision Support Journey; Competitive Productivity (CP); Airport.

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1. Introduction

Customers play an important role in contemporary business ecosystems. They provide immense knowledge that firms could link to their businesses in order to drive innovation (Blazevic and Lievens, 2008). Through such small data (Lindstrom, 2016; Nielsen and Lund, 2019), a firm can create significant advantages by getting direct access to market information since customers are directly engaged with retailers and distributors. Firms are increasingly becoming aware of this, which has led to a change in the role of customers from being passive to an active one (Fragidis et al., 2007). Further, customer satisfaction with a firm's products and services is crucial to be successful and competitive today. It helps improve performance by mobilizing the firms' resources effectively and efficiently (Beckers *et al.*, 2018), increases new customer acquisition at lower costs through the spread of positive information about the firm (Grewal *et al*., 2010), increases loyalty (Kandampully and Suhartanto, 2000) and consequently the firms' cash flows (Gruca and Rego, 2005). Further, this provides a cushion against short term shocks in the firm's external environment. In the context of the airline industry, customer satisfaction is measured as the gap between the perceived quality of the product or service and pre-purchase quality expectations, with customers being more satisfied when important service quality attributes – representing various dimensions of customer satisfaction – are met or surpassed (Chow, 2015; Forgas et al., 2010; Guo et al., 2017). This plays a vital role in influencing the likelihood that the relationship with the consumers is maintained with service providers (Brochado *et al.*, 2019).

However, the environment in which firms operate has been changing over the past years due to the increased volatility, uncertainty, complexity, ambiguity, and also known by the acronym "VUCA" (Bennett and Lemoine, 2014). The airport industry, without a doubt, has been subject to several regulatory as well as technological changes. The more liberal airline environment has made air travel more affordable, but it has proved to be challenging for the airports to attract and maintain services (Bush and Starkie, 2014; Gillen and Lall, 2004; Graham, 2013). One of the key reasons is the presence of increased airport competition, which has increased management reliance on non-aeronautical revenues from catering, shops, and other commercial facilities (Oxera Consulting LLP, 2017; Thelle and Sonne, 2018). Consequently, airports have evolved over the years on dimensions such as ownership model and type of ownership, economic regulation, the intensity of competition, business models, and differentiation (Graham, 2019). The wide-ranging changes in the macroeconomic, regulatory, and technological spheres have forced the airport industry to adopt new strategies, abandon the one-size-fits-all approach, and focus on non-aeronautical revenues. Given the disruption to the travel industry due to the COVID-19 pandemic, these aspects assume an even greater significance. At this juncture, it becomes crucial for airports to focus on understanding, analyzing, and improving customer satisfaction.

To cope with these challenges, executives tend to use data-driven approaches built on different

technological platforms and expect its integration to deliver higher overall financial and operational results (McAfee *et al.,* 2012). Technology is not only helpful for establishing collaboration between different entities of a business ecosystem but also for the interaction between customers and firms. Airports engage in an environment where significant volumes of customer data are available. By adopting the right processes, such data sources can create long-term advantages for an airport. However, airports so far have been using digital mobile/internet applications only to provide minimal support to their customers. Tremendous potential exists to learn from the journey customers make through interactions and activities and generate knowledge. Future value creation lies in generating insights from customers' data and providing support in their decision-making process. By centralizing the decision-making process of customers and providing support, executives can gain essential insights into the actual needs of their customers and shape terminals to be more profitable. This small data, in turn, enables a firm to offer products and services based on real customer needs leading to higher performance (Lindstrom, 2016; Saklani, 2017). In turn, firms can significantly assist them in their decision-making journey and provide better and customized products and services (Blazevic and Lievens, 2008). By undertaking such activities, the airports would be able to differentiate themselves, attract more customers, and increase their level of satisfaction. This leads the firms to focus on talent management, resource management and also create a customer-centric corporate culture, which is the key constructs of firm Competitive Productivity (FCP) at a meso level (Baumann *et al.,* 2019). A higher level of customer satisfaction leads to the overall success of all stakeholders across the industry. The studies in this field are slowly emerging, and it presents a considerable gap in extant research.

To enable firms in airport ecosystems to achieve this objective, we use Decision Model Innovation (DMI) as a theoretical lens in this research (Moser, 2018). DMI is a high-level approach for executives to evaluate the strategic outlook of a firm. It creates value for the firm's stakeholders based on transparency through advancements in the data value chain, information, and communication technologies. This requires firms to recognize themselves as parts of multiple ecosystems involved with various customer segments and carefully listen to their customers to understand their key decision-making needs. Two core focus areas differentiate DMI from other approaches. First is the emphasis of decision-making support to the customers in the data driven economy. Secondly, its emphasis on businesses to adopt all the key technologies, leading to better decision-making for customers. Therefore, we focus on the below-listed research questions (RQs):

> **RQ 1-** How can decision-making support be delivered for every customer of the airport and the firms linked with it?
> **RQ 2-** How can DMI lead to higher satisfaction at the customer level and thereby contribute to achieving higher FCP?

Drawing on extant literature, we operationalize DMI through the Decision Support Journey (DSJ), which applies it at the customer-firm level. The DSJ model developed in this paper allows airports to generate insights directly at the customer-firm level, leveraging the available small data towards improving customer satisfaction and thereby improving the FCP. We

develop and evaluate the conceptual model against the backdrop of the airport industry in the context of non-aeronautical revenues and explore how it can affect these revenues by taking the case of Zurich airport. This case suggests that a firm adopting DMI in the airport industry would be able to set up a win-win situation to achieve CP by providing decision-making support to the executives and valuable insights to the customers, leading to research and managerial implications on dealing with daily customers in the future to create long-term advantages. In doing so, we also advance the theory of Competitive Productivity (CP) and explore the complementarity between DMI and FCP.

This paper begins by reviewing extant literature on the concepts, including DMI and FCP in Section 2, starting with the importance of decision-making for customer value creation. It also gives background on the airport and aviation sector. Section 3 elaborates the adopted methodology and introduces the Zurich airport case. Section 4 presents the results of developing a DSJ model for the airport and discusses its constituent processes. Section 5 explores the complementarity between DMI and FCP, leading to a discussion on research implications, practical implications, and limitations with avenues for future research. Section 6 concludes the paper.

2. Literature review

2.1. Decision Making for Customer Value Creation

Executives need to understand what really matters and filter out unnecessary information to make profitable managerial decisions. In the past, research had proceeded without a theory of how the acquisition of information was linked to the creation of competitive advantages (Makadok and Barney, 2001). Makadok and Barney (2001) argue that most work in the field of managerial decision making has focused on answering the question, "Given a firm's strategic situation, what actions should it take?" while overlooking the logically prior question, "What information should a firm collect to understand its strategic situation?". In order to do so, firms need to access relevant information and then turn it into valuable insights.

The usage of data through analytical tools enables great potential for today's firms (Rengarajan et al., 2021). This *Value Creation Process* (see Figure 1) encapsulates a firms' journey in using data for improving its offerings. The first step concerns the ability to turn data into insights. It is incredibly difficult for executives to understand what kind of data a firm possesses and then to contribute to improving the managers' ability to use data (Ransbotham *et al.,* 2016). Many firms invest in information technologies and develop algorithms as well as other solutions to track, analyze, and predict consumer behavior. The resulting customers' data would manifest into big data, which has gained significant importance over the past years in both the academic and business communities (Chen *et al.,* 2012).

The second stage captures the process of how these insights are applied within the firm. Sharma *et al.,* (2014) state that insights emerge from the active engagement of business managers and analysts applying analytic tools to uncover knowledge. Further, they emphasize

that “a better understanding of the insight generation process is important for understanding how the use of business analytics leads to improved performance” (Sharma *et al*., 2014). In order to make use of the gained insights, they need to be transformed into decisions in order to create value. This represents an interdependency in which a firm needs to continuously gain the right insights in order to make profitable decisions and, in turn, adjust the decision-making process through the gained insights. Useful insights lead to better decisions (Chen et al., 2012). However, there is no certainty that one insight corresponds to one specific action. Insights rely highly on current trends, customers, suppliers, and even own operations, which leads to multiple courses of actions. Even though some insights indicate obvious actions, other courses of action may be an outcome of a broader and more extensive process by firms, which first needs to identify such options. Additionally, the internal decision-making processes, representing a characteristic of organizational behavior, are deeply embedded in every firm and thus difficult to adjust. These complex problems can be traced back to the fact that organizational decision-making processes are again influenced by a variety of factors and circumstances (Sharma *et al*., 2014).

The final stage focuses on the process, which creates value. The literature points out that value can be generated through big data, known for its social and economic value. The social value includes welfare in fields such as healthcare, education, public safety, and security (Cazier *et al.*, 2015; Newell and Marabelli, 2015). The economic value often relates to monetary benefits for firms resulting from an increase in profit, business growth, and competitive advantage by adopting big data (Davenport, 2006; Davis, 2014; Günther et al., 2017). Even though most of the focus in research is set on the potential benefit for firms through data analytics, there are, in turn, two uncertainties associated with transforming decisions to value. One uncertainty can be considered as the successful implementation of decisions, the second one as the overall success of the strategic action itself (Sharma *et al*., 2014). Considering the successful implementation of a decision, two criteria, namely the quality and the acceptance of the decision, are identified (Sharma *et al*., 2014). While the quality of a decision refers to the capability in achieving its objectives, acceptance, in turn, is an essential aspect in implementing the planned actions successfully (Vroom, 2000). Additionally, the level of influence, as well as the participation of key stakeholders, have a significant impact on the implementation process and thus needs to be considered.

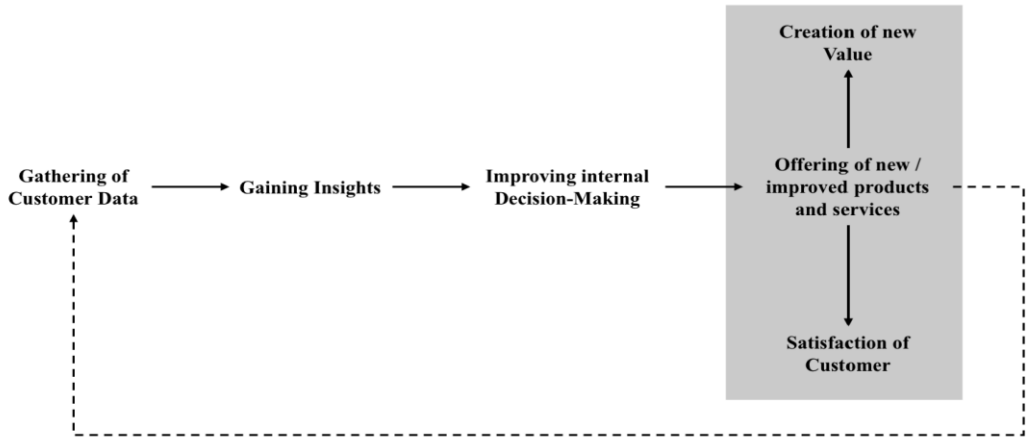

Figure 1: Value Creation Process

2.2. Decision Model Innovation and Competitive Productivity (CP)

The concept of decision model innovation (DMI) was first introduced by Moser (2018). Firms need to increasingly focus on the decision-making support of their customers in order to stay competitive and gain an overall advantage in the market. DMI suggests that by centralizing the decision-making process of every customer on their daily operational tasks and strategic outlook, firms would gain detailed insights on customer behavior. In turn, firms would be capable of providing more individual offerings resulting in a higher level of customer satisfaction. Further, it highlights the relevance of business ecosystems to combine all key technologies necessary for supporting decision-making of customers.

In recent years, changes in the business world have led to new challenges, and firms are forced to act in order to stay successful (Rengarajan et al., 2021). Moser (2018) identifies three main reasons why firms need to rethink their strategic choices going forward. Firstly, the technology-driven world provides more customer data than ever. Secondly, globalization has led to more comparable products and services worldwide and has increased competition. This has resulted in the quality of products and services surpassing the actual needs in most customer segments. Thirdly, customers can no longer be attracted by stand-alone products or services. Integrated solutions throughout different industries are needed to satisfy today's customer needs. The focus of DMI is to create value for firm's stakeholders by relying on the transparency provided by new developments along the data value chain (data gathering, data transmission, data storage, data analytics, data visualization). This enables firms to differentiate themselves from competition in the context of converging industries (Geum et al., 2016). For this, DMI requires a firm to consider itself as a member of multiple ecosystems catering to more than one customer segments with varying value propositions.

Concurrently, body of research on the concept of Competitive Productivity (CP) has been growing (Chen and Lin, 2020; Hoadley, 2020; Redding, 2020; Timming, 2020). At a meso level, Firm Competitive Productivity (FCP) has been defined as "both an attitude and behavior directed at outperforming competing firms, and the past performance through pragmatism"

(Baumann et al., 2019). The authors have identified four factors contributing to FCP, namely talent management, resource management, corporate culture, and brand management. The idea is that the firms which manage talent well, manage resources effectively, imbibe a customer-centric corporate culture, and manage their brands well would be able to generate and maintain FCP. Baumann *et al*. (2021) further elaborate on the social and economic factors that emerge from the application of CP behaviors, including improvement in market share, brand performance, innovation, and brand awareness. CP can be a useful tool to measure nations, firms or individuals' overall patterns of attitudes in relation to the potential of the system they belong to (Hoadley, 2020). It can be argued that the fundamental value proposition of DMI, to assimilate all the key technologies necessary for supporting decision-making of customers, could offer a valuable and complementary extension to extant research on FCP.

2.3. Airports and Non-aeronautical Revenues

Airports have been studied within the overarching aviation industry, which has been characterized by constant changes (Bieger and Wittmer, 2011). In general, industry participants are subject to factors not limited to regulations, integration of new business models, and technological developments while making strategic decisions. Further, the industry is not only influenced by the constituting players themselves but also by its surroundings and stakeholders. Airlines and airports are a core of the aviation industry and act as an essential link to the customers (see Figure 2).

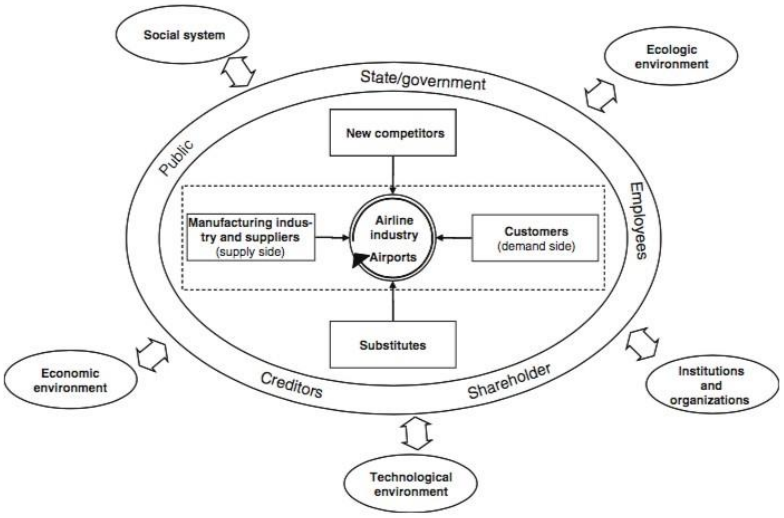

Figure 2: The Aviation Industry System (Wittmer et al., 2011, p. 26)

Airports are crucial for the overall success of the aviation industry, providing ground infrastructure for airlines as an essential part of the air transport system (Bieger and Wittmer, 2011). It is an essential entity on the supply side of the aviation system as it enables airlines to take-off and land as well as customers to embark and disembark aircraft. An airport is therefore positioned in two markets - facing airlines on the one hand and customers on the other. Appold and Kasarda (2011) consider such a market to consist of three elements, i.e., two sides and one platform. The two distinct sides derive benefit from interacting through the

common platform (Rochet and Tirole, 2003). However, such positioning also brings up difficulties since "airports have to satisfy the demands of passengers and airlines simultaneously and to offer sufficient incentives to keep them as customers" (Albers *et al.,* 2005).

Changes in regulatory aspects over the past couple of decades have led to airports facing new challenges, which in turn have forced them to look for new income opportunities and an increase in the dependence on non-aeronautical or commercial revenues (Graham, 2009). The expansion of low-cost carriers, privatization of airport ownerships, and the increased competition between airlines have modified the entire aviation sector and the airport industry. Consequently, the focus of revenue maximization has gradually been shifted from the primary focus on the traditional infrastructure to providing non-aeronautical offerings (Han et al., 2018; Morrison, 2009), i.e. activities not directly resulting through the operation of aircraft. This encompasses revenues from commercial activities within the terminals like food and beverage, retail, car parking, and rents for terminal space and airport land (Graham, 2009; Yokomi *et al.,* 2017).

These revenues match or even exceed the core aviation revenues of some airports today (Fasone *et al*., 2016; Fuerst *et al.,* 2011), driven by three main reasons (Staib and Hunt, 2006). Firstly, an airport represents a unique shopping environment. From an airport's executive point of view, the customer frequency increases with the continuous growth of the air traffic. Further, the customer flow can be influenced at discretion by airport authorities in a very safe and secure environment. Secondly, an airport attracts and can address customers who are wealthier than the average (Graham, 2009), since flying remains a costly option of traveling for many. Thirdly, airport regulations allow them to offer tax-free and duty-free products to their customers. At the same time, commercial revenues at airports can also be negatively impacted by factors like airport size, the volume of passengers, demand fluctuations (Graham, 2009), or the proportion of low-cost carrier passengers (Castillo-Manzano, 2010). Consequently, management of non-aeronautical revenues has become a critical issue in improving airports, with them even accounting for half the airport revenues in some cases (Fasone *et al.,* 2016).

While extant literature has suggested various ways to increase non-aeronautical revenues, such as the provision of personalized offerings or providing concessions, approaching them through holistic strategies are only sparingly suggested. Applying a DMI logic would, in such cases, lead to more collaborative information access from the travelers about their needs to provide personalized customer service, which could lead to higher customer satisfaction. Using customer data could thus improve non-aeronautical revenue streams and thereby help channelize firms' efforts to achieve FCP. In this study, we apply DMI to a specific case to examine its complementarity with FCP and understand the linkage between them.

3. Methodology

Given the exploratory nature of this study, we adopted a case study methodology (Eisenhardt, 1989; Yin, 1994). The lack of prior research limits the generation of a-priori hypotheses on how DMI and FCP complement each other, while the specific features of non-aeronautical revenues in the airport industry play a crucial role in the analysis. Therefore, we applied a theory elaboration approach (Ketokivi and Choi, 2014). This method involves situations where the researcher has identified a general theory but uses an empirical context for better understanding, investigating the general theory and context simultaneously. Theory elaboration can be done in multiple ways, like introducing new concepts, conducting in-depth interviews, or examining boundary conditions. (Whetten, 1989).

3.1. Research Context

As discussed earlier, airports are a complex, multiproduct, and multiservice enterprise (Appold and Kasarda, 2011) in a dynamic and converging industry setting. Given the increasing importance of non-aeronautical revenues, airports need to understand the requirements of customers to enable a high level of customer experience and satisfaction, which can lead to a high performance of the airport itself. Having frequent customer interactions and access to technologies make airports a conducive ground for this study.

Convenience sampling is well established in past studies (Brewis, 2014; Brochado et al., 2019; Chang, 2013; Lubbe et al., 2011). To select a particular airport within the industry, we chose Zurich airport based on three criteria viz. a firm having high levels of interactions with customers, situated in a convergent setting, and possessing an exploitable potential. The Zurich airport is among the most critical travel platforms for Switzerland and EU citizens, moving over 86,000 passengers with over 750 flight movements per day on average (Flughafen Zürich AG, 2020a), indicative of immense traffic. The incarnation of "Swissness" at Zurich Airport raises a considerable potential to attract passengers from all over the world and generate diverse non-aeronautical revenues, paving the way for a high level of industry convergence. In 2019, 83% of passengers had a dwell time over 60 minutes, including 54% who spent over 90 minutes at the airport (Flughafen Zürich AG, 2020b), contributing to a massive growth of non-aeronautical revenues from 39% in 2015 to over 45% in 2019 (Flughafen Zürich AG, 2020a), in line with the global average of about 39% in 2018 (Airports Council International, 2020). This is enabled by 137 retail stores, 49 food/beverage providers, and 28 promotion areas across 33,200 square meters (Flughafen Zürich AG, 2020b).

3.2. Data & Analysis

To have the capacity and to be able to provide a service for almost an additional 20,000 passengers per day over ten years, Zurich airport has to not only grow in size but also develop efficient processes. Against this background, the potential to leverage DMI was discussed not only with industry executives through workshops and semi-structured conversations but also with various stakeholders in the airport ecosystem through informal exchanges, including retailers, airport staff, traveling passengers, and other airport customers. This data was collected over a six-month period in 2018-19. Additionally, the authors engaged in participatory observations (Becker and Geer, 1957; Spradley, 1980) and mapped customer

journeys at Zurich airport (Lemon and Verhoef, 2016; Rosenbaum et al., 2017; Sigala, 2018) in the subsequent months. These observations, together with archival documents available from the case organization and from sources like news and media, comprised the primary source of data for deriving the results in this study. Triangulating with various data sources and drawing on discussions with industry experts also helps improve the validity, reliability, and relevance of the research (Gibbert et al., 2008; Gibbert and Ruigrok, 2010). This included archival data such as that on footfalls (Flughafen Zürich AG, 2020b), financial data from annual reports, and statements from executives (Flughafen Zürich AG, 2020a). The collected data and customer journey maps were analyzed by the authors in joint working sessions and through a series of workshops with various industry experts and stakeholders. However, it must be noted that we did not conduct formal interviews, and due to confidentiality reasons, only handwritten notes were documented in these sessions.

4. Results

While DMI is a high-level approach for companies on creating value and coping with future challenges, it was operationalized on a customer-airport level by developing a Decision Support Journey (DSJ) model based on the consumer decision journey approach (Court *et al.*, 2009). This represents the decision-making process of a customer from the first consideration until the purchase and additionally integrates the digital interaction points between the customer and the firm through its marketing activities. The rise of new interaction channels and access to diverse information, enabled by digitalization, has led to the consumer decision journey being an iterative process (Court et al., 2009; Lemon and Verhoef, 2016).

The DSJ model thus developed for the Zurich airport consists of three layers – two concerning its customers (blue and red lines), and one (black line) concerning the airport (see Figure 3). The first layer, Free Decision-Making Process, represents the process in which a customer can decide freely over next steps – such as the choice of a restaurant at the airport. The second layer concerning customers was termed as the Forced Activity Process, representing restrictions on the customer due to unavoidable regulations. For example, this process includes activities a customer goes through to board an aircraft, potentially with decision-making support from the airport like directions to the fastest line at the security check. The third layer, the Value Creation Process, concerns the airport and its interaction with the customers. It has the objective of gaining insights into customer behavior on the one hand and improve the customer experience through decision-making support on the other. This layer engages with every customer activity and thus can be applied for either or both customer layers. The tailored recommendation of a restaurant at an airport, based on the previous behavior and other (demographic) factors, could be an example. These three layers and their implications are elaborated and illustrated with examples below.

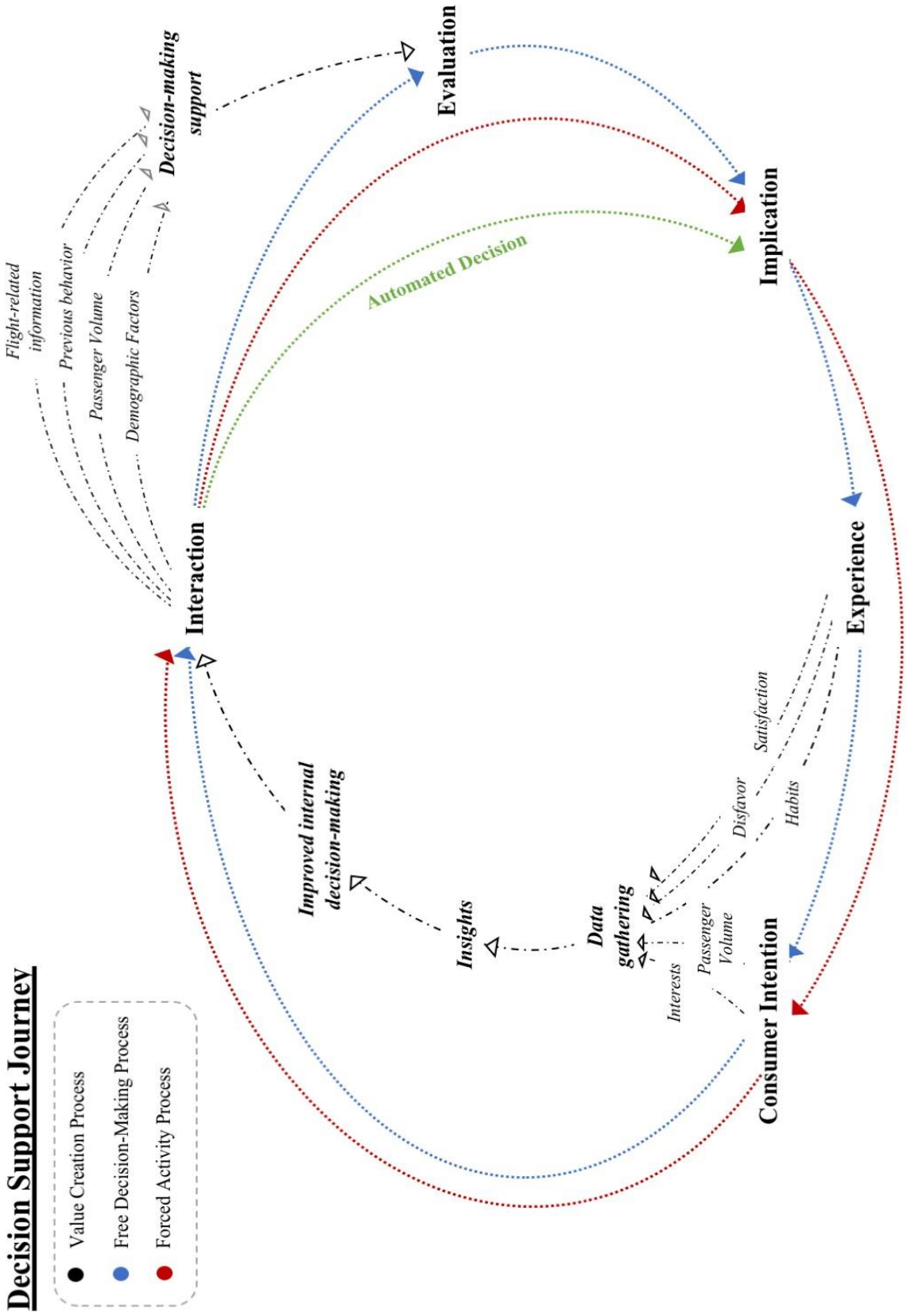

Figure 3: Decision Support Journey Model

4.1. Process 1: Free Decision-Making Process

The Free Decision-Making Process starts with the very first intention when the airport is involved and is continuously repeated until the next intention does not involve the airport anymore.

4.1.1. Consumer Intention

Every process starts with an intention from the customer and, is therefore, the origin of all the following steps. This step includes all activities which a customer can choose from freely. This mainly applies to the non-aeronautical activities of an airport, such as the choice of a restaurant, retail store, or even the type of public transportation to access the airport. As an example, we consider that a customer intends to eat at the airport. Unlike the existing customer behavior models, the customer in the DSJ model is actively supported while making the decision instead of deciding on their own, based on previous experiences, and more.

4.1.2. Interaction

The interaction step represents the core of DSJ and can be considered to be an exchange platform between customers and the airport, where the customer gets decision-making support. The objective is that customers receive the most suitable option to satisfy their needs as well as to improve their experience. This interaction point can be delivered to an already existing airport app or other technological tools, which then enable an exchange. In the example of the customer with the intention of eating at the airport, they can use the exchange platform to receive a couple of proposals that they could either deny or accept. The most suitable proposals are identified and delivered based on the customer's previous behavior of denying or accepting other non-aeronautical offerings as well as flight-related information, passenger volume, and transfer time.

4.1.3. Evaluation

While interacting with the exchange platform, a customer starts to evaluate the provided options. The customer can deny or accept one of the proposals and repeat this process until the most suitable option is found. This evaluation step is further influenced by the interaction step, which uses previously gathered data and supports the customer in evaluating the different options. Continuing the example, the customer evaluates the provided options and decides to eat at a restaurant serving a typical Swiss meal. After they makes the decision, the platform guides them to the location of the restaurant in the most time-efficient manner.

4.1.4. Experience

Once the customer engages with a non-aeronautical activity, they have an experience that can be either liked or disliked. The customer then has a chance to share the experience and give feedback via the exchange platform to complete their previous intention. This, in turn, enables the airport to provide more suitable options for the customer's next intention based on the experience of the implication step. With this step, the customer finishes the decision journey and restarts the process with the next intention.

The iterations of this process lead to the customer reaching a high level of satisfaction. This

results in a situation that the evaluation step is no longer needed and therefore skips this step, as shown with the automated decision. This was termed as the “Loyalty Loop” in the consumer decision journey and represents the goal of both the airport as well as the customer.

4.2. Process 2: Forced Activity Process

This process includes activities a customer is forced to engage in, mainly due to regulatory restrictions related to activities such as check-in, security check, or boarding. The time factor is the reason why these activities were also considered in DSJ. When more time is spent in regulated activities, less time is available for the customers to engage in non-aeronautical activities. Further, these activities do not necessarily increase the level of satisfaction. Therefore, the airport should focus on minimizing the time spent on regulated activities, which would provide more time for DSJ-enabled non-aeronautical activities, higher customer satisfaction, and higher overall airport performance.

As an example of this case, the customer's intention is to check-in over a counter at the airport. With this intention, customer enquires about the application and asks for support on the decision of which counters should be considered. The exchange platform receives the customer’s intention and evaluates the current passenger movement at the airport. Through this, the airport determines which lane is the most timesaving one and guides the customer to the respective counter for the check-in. The evaluation and experience steps are of lower importance and were hence not considered in this process. Hence, we argue that the services of regulated activities also need to be considered for overall satisfaction with the airport and its services. Similar to Process 1, the Forced Activity Process is also repeated until no further regulatory steps of a customer are necessary.

4.3. Process 3: Value Creation Process

This layer sets the focus on the airport itself and helps understand how the airport benefits from an immediate interaction by providing decision-making support to the customer. This layer represents the core of this model.

4.3.1. Data gathering

The first step here is the ability to gather customer-related data. This is essential for all the following steps as well as for providing decision-making support for the customers. The airport needs to gather data in a simple but also pervasive way. The challenge is to collect customer-related as well as non-aeronautical services-related (small) data and combine them with the significant volumes of flight-related (big) data already available to the airport. This data can be collected through the exchange platform based on customer intentions and experiences.

4.3.2. Insights

In this step, the variety of data collected from the different sources represents an unstructured source of information that needs to be analyzed and interpreted to gain insights into customer behavior. This can then be linked to information on non-aeronautical activities as well as

flight-related information. If further information on a particular customer is available from previous visits to the airport, this can also be combined with the newly generated data. For instance, in the last visit, the customer purchased Swiss souvenirs. The gained insight could then be that the customer has 1.5 hours to spend before boarding, and on the last visit, they bought Swiss souvenirs.

4.3.3. Improved internal decision-making

An essential aspect of this layer is to transform the insights gained to improve the decision-making and to not only provide suitable offerings to the customer but also to improve or even create new products and services. With the insights generated from previously gathered data, airports would be able to offer customized options for every customer over the exchange platform. Executives could also analyze the success of non-aeronautical offerings over time and discontinue existing or offer new non-aeronautical activities. As an example, customers interested in Swiss culture bought Swiss souvenirs in the past. Therefore, the Swiss souvenir store at Zurich Airport is successful and should be expanded. It needs to be pointed out that the improvement of internal decision-making can only be assured if executives understand the gained insights and adapt them towards profitable solutions.

4.3.4. Interaction

The interaction step is the actual and direct exchange with a customer. Via the exchange platform, the airport provides the best proposals based on the customer's intention. These suggestions result from the improved internal decision-making process based on the historical behavior of that customer, together with other insights like the current passenger volume. Therefore, the options not only represent a customer's preferences but also what is possible in the given period until the customer boards the aircraft. This not only increases customer satisfaction by providing suitable options but also allows the airport to manage passenger volume more efficiently. Given the customers' limited time, this is a crucial aspect to consider. For example, the airport would be aware that the customer interested in Swiss culture has 1.5 hours left before boarding and would like to eat something. Thus, a restaurant serving Swiss meals could be a proposal to that customer.

4.3.5. Decision-making support

While receiving different proposals, the customer has two options, i.e., either they accept or decline the airport's proposal. In the case of declining, the exchange platform would suggest another proposal that could suit them better, based on previously gathered information and insights. Through this, the customer's evaluation step is critically simplified, which leads to a higher chance of satisfaction.

4.3.6. Experience

The experience results in the last step of this process because valuable data is received from the customer. This entire process aims to set up a win-win situation with the airport and its customers. The experience of a customer provides precious data since this represents the satisfaction level of a customer with the provided solutions. Transforming such data back into insights to improve the internal decision-making of the airport results not only in customizing

offerings to a greater extent but also results in the actual creation of value for the airport.

5. Discussion

Drawing on the learnings from the case study, we develop propositions on the relationship between DMI and FCP in the context of the airport industry. Earlier sections explained how airport executives can create or improve value by gathering, analyzing, and interpreting big and small data. Airports serve as a transferring platform for thousands of people every day from which it could gather insightful data. All the data like flight schedules, passenger volumes, and passenger-related information can be used to improve the operational activities of an airport. In addition to this, digitalization enables airport ecosystems to gather granular small data at a micro-level to really understand individual customers (Fahey, 2019; Lindstrom, 2016). Further, such small data aggregates into big data given the large passenger volumes at major airports, which can be analyzed further for higher-order trends. Thereby, airports can offer valuable insights that can be leveraged to improve customer satisfaction. This presents an opportunity for airports to focus on the constructs that constitute FCP, viz. talent management, resource management, corporate culture, and brand management.

Proposition 1: Airports possessing the capability to gather big and small data from diverse sources and to use them in concert will achieve a higher FCP to outperform their past performance and that of their competitors.

The increasing scale of industry convergence (Geum et al., 2016) causes major challenges for airport industry executives. In turn, this also enables offering new products and services in airport ecosystems. Customers can no longer be satisfied just with stand-alone products since overall solutions are much more lucrative (Moser, 2018). Currently, only a few converging activities have been identified at airports. This presents an advantage for airport executives to cope with the challenges of the industry convergence actively. Even though this could be a lengthy process, we emphasize that airports that identify and pursue such converging opportunities will have a competitive advantage compared to other airports worldwide. This proactiveness would push the airports to manage their resources better and also cultivate a culture to focus more on converging opportunities leading to customer satisfaction.

Proposition 2: Airports offering integrated solutions in their ecosystem will achieve a higher FCP through greater customer satisfaction leading to better management of resources and improvement in corporate culture.

Since airports are keystone players in their business ecosystems, they have a strong influence on the overall performance and health of the ecosystem. Ensuring a good performance of the keystone player implies that the performance of airlines and the retail areas need to be ensured for the airport to stay competitive. Offerings new products in converging industries will lead to more attractiveness of an airport and, thus, to overall better performance of the business ecosystem. Considering that business ecosystems are self-organized, entities with low

performances are automatically replaced with other, more lucrative players. Thus, participants who are unable or unwilling to provide collaborative solutions will no longer be part of the ecosystem. This would also ensure that the remaining companies act swiftly in the selection, retention, and training of their staff to serve the customers better. Hence, talent management becomes indispensable to improve the level of airports' customer satisfaction.

Proposition 3: Airports ecosystems with participants having a strong talent management focus will achieve a higher FCP by delivering a high level of customer satisfaction leading to overall success for all stakeholders.

While the insights gained through data is of high use for an airport, decision-making support puts the focus on the improvement of services for customers, which in turn improves the customer experience. Applying DMI, therefore, implies that the journey of every customer does not start at an airport but much earlier. Therefore, the supporting process ought to start not only when the customer arrives at the airport but as soon as a customer makes a decision in which an airport is involved. Issues such as what transportation options should be chosen, what the most time-saving way of traveling to the airport is, or questions about baggage restrictions at foreign airports are avenues for providing customer support. Existing apps only offer high-level support to their customers and hence are unable to analyze and track customer behavior and decision-making. This, in turn, means that airports cannot generate essential insights, which results in a loss of a possible long-term advantage. In this regard, building a customer-focused corporate culture at airports can lead to innovations in its offerings.

Proposition 4: Airports offering limited decision-making support to their customers will have lower FCP due to a lesser detection of additional value creation opportunities by failing to create a customer-focused corporate culture.

5.1. Research implications

Our study applies the concept of DMI (Moser, 2018) in the context of airport ecosystems to chart a pathway towards Competitive Productivity (CP), specifically at meso level for firms (Baumann et al., 2019; Baumann et al., 2021), and makes multiple contributions to the extant work in these fields. First, among these, we propose that though DMI and FCP have been explored separately till now, there is an immense scope of connecting them. DMI focuses on making the processes of a firm more customer-focused, whereas FCP aims to create a behavior that outperforms the firms' past and also the competing firms. Our study is the first to explore the complementarities between them, showing that being customer-focused and achieving Competitive Productivity (CP) can be intersecting objectives for a proactive firm.

Additionally, as more and more firms are now situated in VUCA environments (Bennett and Lemoine, 2014), considering the inputs of the customers and catering to their needs becomes highly relevant. This study extends the existing literature on FCP for firms operating in VUCA environments. In this context, findings indicate that FCP can be achieved in the VUCA environment by focusing on the customer, thus improving customer satisfaction (Brochado et

al., 2019; Chow, 2015; Guo et al., 2017) and helping airports secure and grow their non-aeronautical revenue streams in the process (Graham, 2009).

To this end, we add to the literature on customer decision making in the aviation industry by implementing DMI in airport ecosystems. The case study demonstrates how DMI was operationalized by developing DSJ processes in this context, both for the customers as well as for the airport. The developed model and results are indicative of the immense potential in the volumes of customer-generated data, which can create long term advantages for the ecosystem. Focusing on the DSJ helps create customized value offerings for each customer, thereby increasing their satisfaction. Concurrently, it enables the airport to gain insights and improve their offerings by gathering and processing all the big and small data available.

5.2. Managerial implications

This study also has important implications for practitioners. Airports can be seen as a keystone player in their business ecosystems by contributing to the overall success and performance of the aviation industry. Airports are environments in which customers need a certain degree of decision-making support, not only in flight-related but also in non-aeronautical activities. This could be extensively achieved through digital applications. If an airport can set up a platform for interaction with its customers, it leverages a win-win situation for all parties involved by supporting a customer at every decision involving the airport, leading to better decisions regarding the customer's needs. On the other hand, the airport can develop a more nuanced understanding of a customer's needs, which can be turned into valuable insights to improve the internal decision-making processes and consequentially improved offerings. Additionally, passenger volume can be better managed, and unnecessary waiting times reduced. Considering the industry convergence within airport ecosystems, developing such overarching solutions across different players at an airport can be more intuitive to implement.

We find that airports are ideal platforms to implement DMI through DSJ. An airport engages in an environment in which significant volumes of customer data are generated. By adopting the right processes, such data sources can be used to create long-term advantages for an airport. Moreover, the decrease in global non-aeronautical revenue generation implies that the airport executives need to start understanding what actual requirements customers have in order to increase the non-aeronautical income. The majority of airports today already use basic applications to provide minimal support to their customers. This could be expanded to function as an exchange and interaction platform between an airport and its customers. Through the decision-making support, airport executives would be able to identify the actual needs of their customers and shape terminals to be more profitable. In turn, the level of satisfaction of an airport's customers is increased since tailored solutions can be provided.

5.3. Limitations and future research

While these are important implications for research and practice, this study also has some limitations. Foremost among them is that the application of DMI and the developed DSJ is limited to meso-level Competitive Productivity (CP) (Baumann et al., 2019). Future research

can extend the analysis to the micro and the macro levels and also explore the interplay across these levels on the overall impact. At the same time, this paper treats DSJ as one uniform aspect. It would also be logical to investigate how its characteristics, like the proportion of big and small data, impact the individual elements of FCP.

We also recognize that the generalizability of the findings is limited by our focus on one case in one particular industry. Future research could extend the application of DMI to other customer-facing and converging industry settings to investigate context-specific nuances. Adopting methodologies such as action research could help understand issues in the application of DSJ models and the challenges in this process.

Finally, the COVID-19 pandemic also offers further avenues. Since the outbreak of the pandemic, the travel sector has been deeply disrupted and non-aeronautical revenues have gained added significance within airport ecosystems. The additional safety and hygiene regulations also have an impact on the customer journeys through the airport and the related decision-making approaches. It is still unclear what the long-term impact of these changes will be, when the pandemic eventually is brought under control. These uncertainties provide a further interesting point of departure to study the impact on airports' FCP and the adoption of DMI.

6. Conclusion

This study adopts the concept of DMI in the dynamic airport industry environment, exploring its implications for the elements of FCP against it. Particularly, the focus was on the non-aeronautical revenues of an airport for which we developed a DSJ model by operationalizing DMI on the strategic-airport level and on the customer-airport levels. By centralizing the decision-making process of its customer and providing support, executives gain essential insights into the actual needs of customers. This enables firms to offer products and services based on real customer needs, which leads to higher satisfaction. Based on this, we develop propositions that show the complementarity of DMI and FCP. Implementing the DSJ model can thus help achieve FCP by focusing on talent management, resource management, and improving corporate culture.

We believe that DMI also represents a promising approach for companies in different customer-centric and converging industries since it has no requirements concerning the type of company and its customers. While DMI advises executives on the strategic level, the DSJ model applies DMI directly at the customer-company level, which simplifies its adaptation. However, companies need to develop internal capabilities of dealing with large volumes of relevant data and customer-focused culture. Traditional companies thus need to change their view of conducting business and adopt a more technology-enabled outlook.

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