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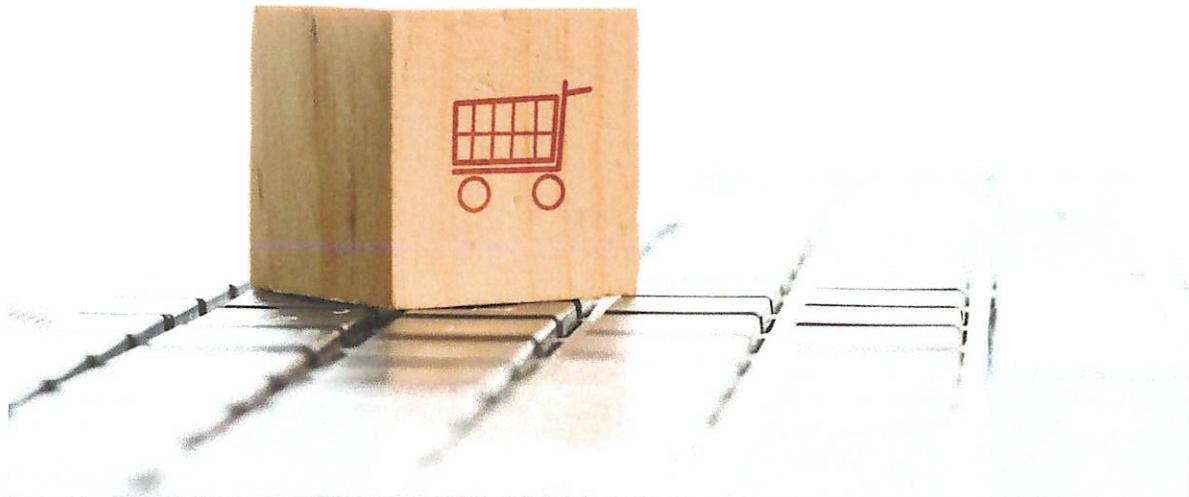
Market Study

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1 Exec Summary

Hitit has announced through public filing of main shareholder Pegasus Airlines that it is considering an Initial Public Offering (IPO). This is a significant development in the market for airline commercial IT systems, as this sector is currently going through a structural change which is resulting a consolidation of players. Hitit's potential IPO may be regarded as a response to the current market movements and thus, Travel in Motion GmbH (TiM) is taking a closer look at Hitit and how it is positioned within the industry.

This document provides a view by TiM of Hitit as an IT supplier for airline commercial systems. TiM's assessment is based on market research, information publicly made available from Hitit, and data established by TiM through numerous engagements during the last years.

Since 1994, Hitit has been providing IT services to the airline industry. From the beginning, the company has achieved constant business growth, only interrupted by the Covid-19 pandemic which hit global aviation heavily. With the effects of the pandemic slowly receding through the high degree of vaccinations, the industry is experiencing a gradual recovery. This could an ideal moment for Hitit to execute a strategic growth plan, as basis for further corporate developments, such as acquisitions or an IPO, especially as airlines are restarting their business and the willingness to invest has returned.

Hitit provides numerous IT services to its global airline customer community with the Passenger Service System (PSS) being the most important and strategic one. Thus, TiM's assessment focuses on this key market, especially as the traditional PSS market is changing. Legacy PSS services are being commoditized as airlines are opting to modernise their sales and distribution approach. While a few years ago there has been a healthy spread of vendors in all sizes and geographies, the vendor community now moves into two very opposite directions. On one hand, three large suppliers dominate the market, but are often perceived as (too) big, slow and in some cases as not innovative enough. On the other, a number of smaller suppliers, often with very low business volume and thus lacking the ability to innovate, populate the market. Hitit is at a stage where it will either move towards the big suppliers or will stagnate within the community of smaller suppliers.

Additionally, airlines are thriving to move away from transaction-centric distribution of flights towards a customer centric and retail driven business model. Providers of commercial airline IT systems such as Hitit need keep pace with the industry evolution and aim to position themselves as thought leaders to support the airline community in this transition.

It is TiM's perception that Hitit has understood these challenges and is addressing them with two main streams of execution:

1. Hitit is executing a growth strategy by winning additional airlines either in Hitit's traditional market segment of tier three and four airlines. More significant is Hitit's entry into the tier two market segment. This contains airlines with over 10 million passengers boarded (RPB) per year and are often more complex full-service carriers. Sales successes over the past years have proven that Hitit is able to succeed.
2. Hitit has taken the challenge to support the new ways airlines sell their services and products. Based on its PSS, Crane.PAX, Hitit is executing a product roadmap towards offer and order management that will provide solutions enabling airline to become retailers. Meeting latest industry certification by IATA is a proof point of Hitit's successful execution. This will also offer entry into new markets, such as NDC-based content aggregation.

With the opportunities Hitit has created, Hitit's willingness to adapt to changing market requirements, the company's response to the Covid-19 crisis and, most importantly, Hitit's proven ability to win gives an excellent starting point into the next chapter of Hitit's path forward.

In summary Hitit is very well positioned to further grow the business. Hitit has chosen to challenge the group of the "Big Three." With the recent successes in winning new airline logos, executing the roadmap and positioning as alternative vendor Hitit has excellent chances to become a very solid and trustful alternative to on the market of commercial airline IT.

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2 Background and Methodology

In this report, TiM analyse Hitit's strengths and weaknesses. This includes a view of the product suite, market position and Hitit's competitive landscape.

This research was conducted by analysing documentation publicly available from Hitit, own documentations, and through market research.

From a solution perspective, this study focuses on Hitit's position in the market of airline commercial systems, especially in the area of Passenger Service Systems (PSS), as Hitit's Crane PSS is a major pillar of Hitit's business activities.

PSS is regarded as the core IT System of an airline's commercial operations. A PSS covers many functions required within the planning, sales, and travel processes where these are related to the traveller. The two key components are Reservations and Departure Control (DCS), each having several sub-components. PSS may differ in scope and definition for each vendor, thus TiM has attempted to normalise the definitions as per Figure 1: Passenger Service System[1]. Several sources also refer to a PSS with this scope as "core PSS".

The PSS landscape is undergoing considerable change. The traditional PSS solution and data architecture is morphing into a retail-focused environment as opposed to a transactional processing utility. Airlines are adding "value-add" features in components sitting outside of the PSS, thus in many cases utilizing less of the overall (core) PSS functionality. The trend is clearly to minimise the influence of the traditional PSS – largely commodity solutions – and focusing on offer and order management with greater flexibility for the airline, new solution providers and a somewhat heterogenous landscape. These offer and order management solutions are closely related to modern retailing and ecommerce solutions, moving from a transactional-based process to a customer and product centric process.

With the industry moving towards a retail focus in airlines sales, the current systems are only partially fit for purpose. To stay relevant in the market, suppliers such as Hitit have to adapt to support the airline's path to become retailers. The vendors who do not follow this transformation now will struggle in the coming years as the procurement of airline commercial systems changes. As this shift in airline commercial systems will be a gradual one over time, the industry and its suppliers have to continue supporting the required and well-established legacy structures and at the same time, supporting the transition from old to new by filling capability gaps with existing solutions which better integrate with more traditional airlines and their systems.

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[1] See paragraph 3.

To provide the readers of this report additional industry insight related to the importance of the digital transformation the airline industry is going through, section 3 outlines the traditional PSS environment as well as the modernised commercial system needs. This is followed by a detailed look into the overall aviation market with a focus on PSS and the results of the pandemic. In this chapter Hitit's PSS solution will also be compared to competitive PSS in terms of volume and overall product maturity.

Based on this initial review of airline retailing and the PSS market this study will further focus on Hitit's capabilities and market potential by analysing the maturity and development direction of Crane PSS, its roadmap, user community model, as well as Hitit's roadmap and key differentiators.

The study closes with TiM's assessment of Hitit's position in the global market for airline commercial systems.

3 Airline Commercial System Environment

As the core system of an airline commercial IT environment, PSS is tightly integrated into other IT systems. A typical major global network airline environment consists of between 200 and 300 different systems, with about 30% to 50% of those being related to the commercial IT. These related systems typically all depend on PSS in some form – either as data recipients or data providers.

TiM categorises the overall airline IT landscape into five areas.

	COMMERCIAL	Commercial systems focus on providing core offer and order management solutions, pricing as well as ancillary product catalogues. Customer interactions at the airport are included, as these have become sales touchpoints.
	CUSTOMER	The customer solutions provide the capabilities required to collect, store, and manage customer data, generate customer insights, and manage customer interactions and marketing.
	OPERATIONS	Flight and operations planning, crew management, fleet planning and MRO are key components of the operational solutions as are capabilities required by operations control for day-to-day operations.
	CORPORATE / ENTERPRISE	Corporate or enterprise solutions include HR and ERP systems as well as training platforms, asset management solutions and digital management dashboards.
	WORKPLACE	Workplace solutions for the employees at the headquarters, but also tools for crew and airport employees.

The airline's PSS is part basically the core of the commercial solutions. The (traditional) PSS can be further broken down as per the illustration below.

Figure 1: Passenger Service System

Figure 1 provides a generic overview of traditional PSS functionalities or capabilities. While some may argue that Departure Control System (DCS) is not a part of the PSS, in TiM's definition, it is included as it is essential to passenger handling. This is also the case if the DCS is provided by a different provider than the reservation component of the PSS. Reservation services include Schedules, Inventory, Availability, Seating, Fares & Pricing for own flights, Passenger Name Record (PNR), Ticketing and Electronic Miscellaneous Documents (EMD).

The Departure Control System consists of Check-In Services, Boarding Services and – in many cases – aircraft Weight and Balance.

Other services, such as Fares/Pricing/Shopping for 3rd party flights, Revenue Management, Revenue Accounting, airline.com or Direct Connect are tightly connected to and integrated into a PSS, and in some definitions, they are included. In TiM's definition, these are connected and dependent (both ways in some cases) but not part of the core PSS.

However, as mentioned previously, there is a transformation taking place. A modernised PSS, or sometimes referred to as a retailing system or offer and order management system (OMS), has a different structure.
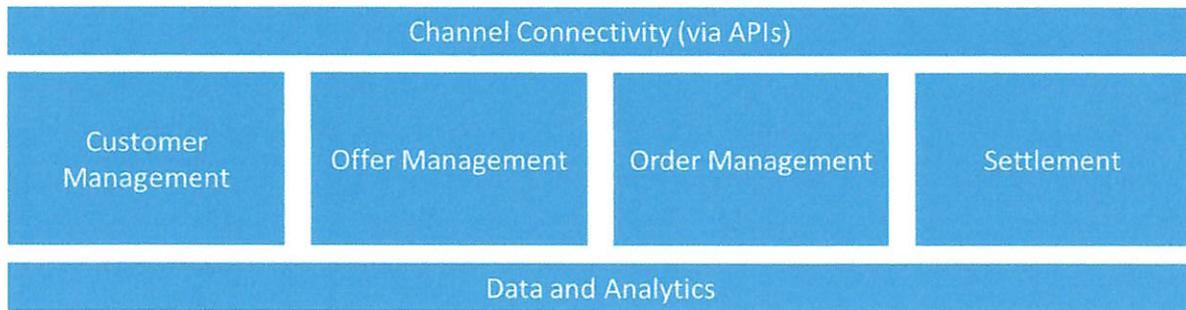
Channel Connectivity (via APIs)			
Customer Management	Offer Management	Order Management	Settlement
Data and Analytics			

Figure 2 - Simplified view of modern airline retailing solution or OMS

In the simplified structure above, the grouping is closely related to the "Shop – Order – Pay" process used within consumer retail. Each of the areas has various capabilities and solutions, however these are defined in different ways by different entities.

3.1 Airline Retailing

Airline retailing is the term used to describe the airline industry's change in behaviour when it comes to selling their products and services. It is the amalgamation of trends which could be observed over the past years – an increase in various products and services sold (ancillaries), a stronger focus on customer service, an aim to increase customer experience and loyalty, driving the need to collect more customer data to help with purchase and service behavioural predictions.

On an industry level, IATA has defined a set of projects within the Airline Industry Retailing (AIR) initiative. Therein are various well-known concepts such as the New Distribution Capability (NDC), ONE Order, and Dynamic Offers. However, the AIR initiatives also encompass or at least interact with the Future of Interline work as well as with the concepts related to Settlement with Orders (SwO). All these industry initiatives driven forward by IATA, the member airlines and many of the key vendors, are slowly enabling the airlines to introduce true retailing capabilities into their day-to-day business processes and customer interactions.

3.2 Airline Distribution

The history of airline distribution from the 1960's until today outlines GDS distribution and the transition to airline-controlled distribution. TiM has defined five stages of airline distribution:

1. Pre-1960s with manual reservations, none to very little automation.
2. The rise of automation – from 1960 to the 1970s allowed somewhat automated own sales and through sales agents having direct access to content (agency terminals).
3. The rise of the Global Distribution Systems (GDS) in the 1980s as the airline Computer Reservation Systems (CRS) becomes a GDS.
4. The age of internet bookings, through Online Travel Agencies (OTA) and airline Internet Booking Engines (IBE).
5. The age of airlines retailing starting in 2015 onward – attempting to align airline sales to global omni-channel retailing and commerce.
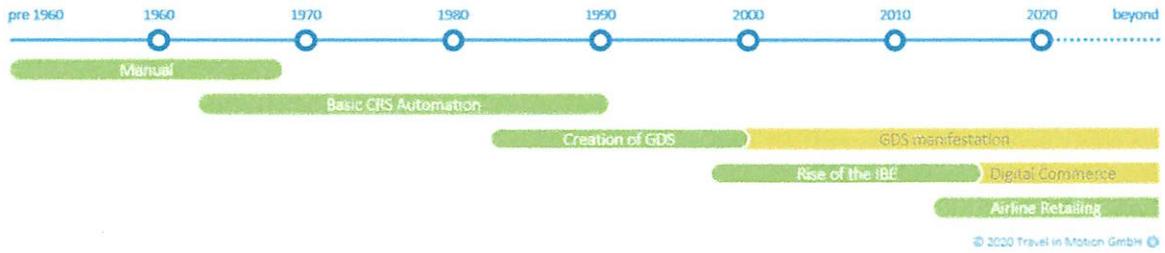

Figure 3: Five Stages of Airline Distribution.

As an industry, we are well into stage five. However, we must also admit that stages three to five all run concurrently and will continue to do so for considerable time. It is also essential to recognise that to serve all three ages and stages, airlines must become more efficient and combine the systems used for offer and order creation and management.

In many cases today, airlines treat the three stages completely independent from each other in commercial, procedural, sales and marketing, distribution, and technology terms. This is not sustainable.

At the same time, this creates complexity for the travel agencies and other subscribers of the content, as they must start considering which channel to use in which situations, and for which airline. Some of these channels have no integration with their mid- and back-office systems, thus increasing their administrative complexity greatly.

3.3 The Importance of Ancillaries

Distribution has been changing in another way as well – the sale of ancillary products, both flight and non-flight ancillaries. For clarity, we refer to flight ancillaries when the product or service is directly related to the flight experience and is offered directly by the airline. This would include things such as priority boarding, lounge, fast track security, extra-legroom seats, Wi-Fi on board or baggage. Some of these have been sold for a long time, mainly seats and bags. Non-flight ancillaries refer to products and services typically offered by third parties. Examples are transfer services such as the London Heathrow Express, rental cars, hotels, tours, or baggage delivery services. Most of these are what we refer to as "commissionable ancillaries" as airlines will earn a commission from the supplier for selling the service.

The reasons airlines offer ancillary services are twofold. First and foremost, it is an additional revenue stream. The second reason – at least for some ancillaries – is to enhance the customer experience and thus tie the customer to the airline even more. Initially introduced by the Low-Cost Carries (LCC) to help

compensate for rock bottom airfares, the notion of ancillaries has been widely adopted by all airline in the meantime. As a matter of fact, the Full-Service Carriers (FSC) were almost forced to adopt the flight-ancillary concept to unbundle the product, thus being able to reduce the airfare to more competitive levels with the LCCs, offering the flight with no extras, and upselling flexibility and service such as baggage and seat selection. Still addressing ancillary revenues differs also by geography. Airlines, regardless of business model, in Europe and the Americas achieve significantly higher ancillary revenues compared to airlines in APAC and MEA.

2019 Ancillary Revenues		Europe	Americas	APAC	MEA	Total
Network	per Pax	$11.98	$8.60	$2.33	$2.92	
	Total	$7.4b	$8.3b	$2.4b	$694m	$18.8b
Hybrid	per Pax	$13.14	$12.35	$6.42	$11.42	
	Total	$1.3b	$3.0b	$1.7b	$470m	$6.5b
LCC	per Pax	$22.20	$37.07	$11.90	$11.22	
	Total	$6.6b	$1.5b	$1.9b	$250m	$10.25b

Figure 4: Ancillary revenues by region and airline business model.

Note: Numbers include a la carte and commissionable ancillaries. Frequent Flyer and Credit Card Revenues have been excluded. Source: IATA, IdeaWorksCompany, TiM research.

Ancillary revenues are becoming one of the largest EBIT contributors for airlines. Although the industry has already embarked on this profit stream, geographical differences are significant. Especially in South America, APAC and MEA, per passenger revenue numbers are far behind Europe and America. This is applicable for all airline models.

In addition, commissionable ancillaries still carry a huge potential for profitable growth. The non-flight ancillaries are focused on revenue generation; these have become important elements for the airlines, especially in their digital direct channels. With commissions from sales ranging anywhere from 5% to 20%, these revenue streams are welcome additions to the airline's overall revenue targets, especially as they are typically not too complex to implement and manage.

With the advent of more and more unique ancillaries, many IT systems are unable to cope. Previously, with mainly the sale of seats, bags, and other simple ancillaries, these could be managed within the PSS. However, as airlines are getting more innovative and creating products such as Air New Zealand's SkyCouch™ and other products, these are getting more difficult to manage within PSS. This prevents airlines from implementing various ancillaries. In podium discussions and during events, both Lufthansa and Air Canada have stated that their "path to freedom" may well be to move to an order management system, utilising a PSS only for a skeleton booking to ensure operations, however, to utilise a retail order which contains all products and services. This restriction has even led to Air Canada stating that they have had several ideas in the past, however, to merely experiment their market acceptance would have cost hundreds of thousands of dollars and up to a year of development time. That is not a viable path to test new products, and thus these ideas are then dropped.

4   The Airlines' Need for New Revenue Streams

The airline industry is constantly seeking to increase its revenue through sales of additional products and services through as many channels (direct and indirect) as possible. This can only be achieved if the retail strategies of the airlines are built on several key strategic factors – the customer journey, customer demand spaces, distribution channels, products and services, and markets.

This leads to considerable changes taking place in the airline product and service distribution landscape globally. Airlines are aspiring to become travel retailers, or in some cases even, retailers of any type of products. There are two key reasons for this trend – the airline's need to increase revenues on one hand, and consumer behaviour on the other. For the traveller, the cost of air travel has decreased significantly over the past years. Margins for the airlines remain low – and volatile, while slightly improved in the last few years prior to the COVID-19 crises thanks to the drop of oil prices. Thus, airlines have been keen to find additional revenue streams. This is achieved by unbundling products, through the introduction of additional products and services as well as retailing products from third-party providers, generating commissions and incentives to support bottom-line earnings.

Consumers, especially the younger generations, have become accustomed to new purchasing behaviours. Due to the sheer number of options available to shop and compare - all from the comfort of a laptop computer, tablet, or mobile phone anywhere in the world - consumers have moved to an online world for purchasing. Often, they no longer look for the level of service and recognition of a trusted travel agent. This behaviour aligns well with consumer behaviour when purchasing other goods as well, be it consumer electronics, household wares or any number of other products.

These factors are driving major changes in the industry, and the industry has already reacted pre-COVID with methods to simplify and enhance airlines' distribution capabilities.

4.1   Industry Direction

The methods and processes used in the distribution of airlines products have changed drastically over the past years, with the industry finding itself transitioning to the fifth generation of airline distribution. The order creation is slowly following step, however often still caught in the legacy world to ensure backwards compatibility to the industry. However, continuing down this path, the airline industry is stifling innovation. Several airlines and IATA are strongly pushing forward the concept of the order and true order management. While ONE Order is a few years behind NDC in terms of maturity, it is at the stage where vendors can, and should, develop solutions for the airlines. It is very important that the vendors take and create initiative in this area, promoting their own ideas and concepts, and especially focus on several elements of the solutions:

1) Efficiency – how will the order management system make the airline more efficient, more automated or provide more and better data.
2) Customer centricity – how will the solution focus on the customer, enabling the airline to increase the level of and improve the quality and scope of self-servicing, customer information, journey management and similar aspects.
3) Transition – how will the vendor support the airline in transitioning from the legacy-based solution to an order-based solution, ensuring the lowest possible risk approach is taken. It is key that the airline can guarantee operation continuity during this transition, and the costs can be managed.

While the eCommerce vendors on the market (companies such as Datalex, OpenJaw and Farelogix, now part of Accelya) have done better than the traditional PSS vendors in keeping their technology and

systems current, they only have a limited influence on airline business processes related to offer creation and offer servicing due to their role within the airline solution landscape. Currently, this role is largely limited to sitting in front of a traditional PSS system to serve the "airline.com" IBE channel as well as a limited number of direct connect channels such as via NDC. They do not have the capability to independently serve as a "reservation" system for airlines, since they (generally speaking) do not have some of the critical PSS components, namely airline inventory, seating, ticketing, industry messaging and in some cases, pricing. Furthermore, they have relied on the PSS for most, if not all, airline booking servicing features, irregular operations capabilities, and product management capabilities. At the same time, more and more, airlines are looking at the consumer retailing model for distribution, both in terms of process management and technology. These generic retailing systems may not be aligned to the airline industry yet, but some do excel in retailing products via many different channels.

5 Offer and Order Management Systems

The "new world" of airline commercial systems is moving towards offer and order management. While these systems generally somewhat align to traditional PSS in terms of capability, the move towards offer and order management implies a change of airline business behaviour as well. Commercial system vendors will need to adapt to this new world, combining these concepts with the current airline reservation terminology and methodology to ensure backwards and industry-wide compatibility.

Figure 5 - Travel in Motion Digital Retailing Environment (DRE), Offer and Order Management Solution Architecture.

5.1 Offer Management

The offer management capabilities are typically the first direct interaction with an airline during the sales process. Optimally, an airline will utilise a single offer process as opposed to various processes and solutions by channel as is often the case. The offer management environment consists of several key components, namely a product catalogue for ancillaries, flight inventory, pricing and shopping and integrations to revenue management and third-party content. More advanced solutions have the ability to apply personalisation, segmentation, and contextualisation to the shopping processes. Bundling of products is typically possible, however several airlines are moving to dynamic offers which includes dynamic bundling of products. This is well beyond most system's capabilities at this time.

Figure 6 - Travel in Motion Digital Retailing Environment (DRE), Offer Management capabilities map.

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A further step into the retail future is the implementation or integration of dynamic pricing, or systems capable of calculating dynamic prices. Optimally, this calculation will consider the complete offer with ancillary services, however this is currently beyond the ability of most airlines and system vendors.

5.2 Order Management

Typically, an Order Management System (OMS) encompasses all capabilities related to creating, servicing, and managing an order. This includes payment, managing changes to the order and delivering order information to third parties (systems or companies) for further use (e.g., governments, catering, departure control, etc.). From a capability perspective, TiM has subdivided the order into the capabilities as per the capability matrix below.

We consider the creation of the order (via, for example, the IATA OrderCreate API) as the trigger to the order management functionalities. This can be with or without payment, and payment can be direct or indirect. The order may also only be provisional, as there may be time limits for payment, inventory hold or other reasons to not fully confirm the order.

Basically, one set of capabilities is related to payment, utilising payment service providers and utilising alternative payments via vouchers and other means.

The second set are directly related to the order creation, and the management thereof. It is to be noted that the TiM capability map also has capabilities related to the transition state, allowing order management systems to synchronise the order with a legacy PSS. These are captured in the "Booking and Ticketing" capability block. Further, this model assumes non-traditional Departure Control System (DCS) usage, thereby an exchange of related messages via "Airport and Journey Interactions". However, in the current situation, airlines will need to cater for traditional interaction with the legacy DCS systems using traditional message exchange methods such as PNL/ADL exchange.

Figure 7 - Travel in Motion Digital Retailing Environment (DRE), Order Management capabilities map.

From a system component perspective, the order platform consists of two key elements – the order platform solutions and the service delivery solutions. Furthermore, there are additional interfaces (via IATA APIs or proprietary interfaces) to accounting systems and customer service systems.
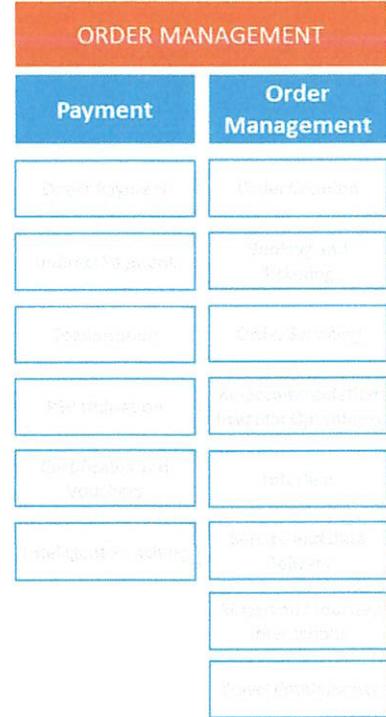
6 The Changing Market for Airline Commercial Systems

The Covid-19 crisis has heavily hit global aviation. Although the domestic markets in geographies such as mainland China or the USA have partially recovered, the overall volumes are recovering slowly. In 2019, 4.6 billion passengers boarded commercial aircraft, with a traditional year-on-year growth averaging 5%. The volume dramatically shrank in 2020, with various sources estimating[2] between 55% and 60%. It is assumed by IATA that the recovery to pre-COVID volumes will not happen before 2024. Thereafter, if an average year-on-year growth of 5% is assumed as in the pre-Covid environment, it is estimated that by end of this decade global passenger volume will be 6.1 billion.

Volumes are calculated in Revenue Passengers Boarded (RPBs) in the following texts and charts.

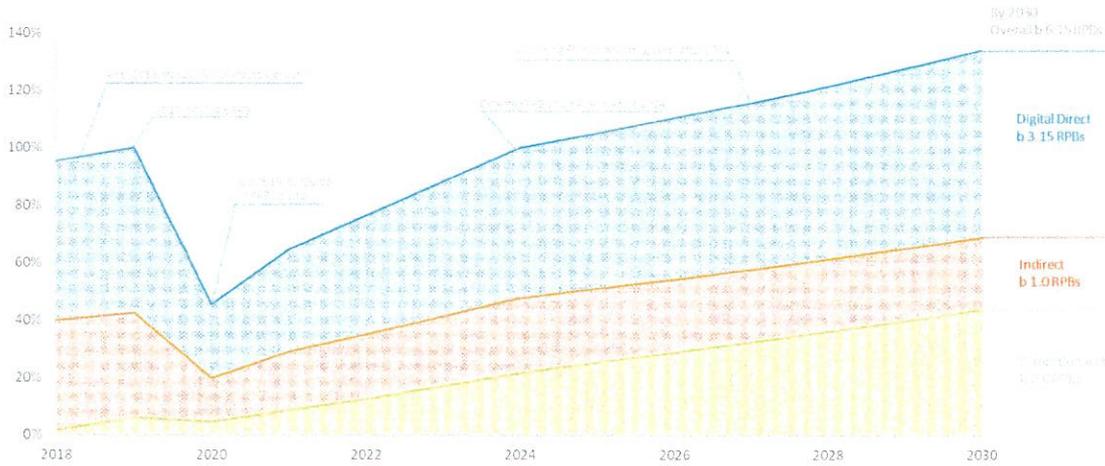Global Volume of Revenue Booked Passengers (RPBs) in billion

Figure 8: Expected RPB volumes

For clarification, TiM uses following terminology to describe the distribution methods:

- Digital Direct – airlines directly distribute content to consumers / travellers via their website, mobile application, etc.
- Direct Connect – airlines distribute content to consumers via travel agencies and other intermediaries; however, these are directly connected to the airline's content systems (booking system, product catalogue, etc) allowing the airline to create specific offers. This channel includes NDC, or API based distribution through GDS.
- Indirect – traditional distribution via the travel agencies with an intermediary which construes the flight price and any ancillaries through internal databases. These are only updated a few times per day, and the airline has no control over what is offered and how. A typical example for the channel is legacy, EDIFACT-based GDS distribution.

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[2] https://news.un.org/en/story/2021/01/1082302.

6.1 The Landscape of Airline Distribution

At the same time that the market is changing, the landscape of distribution is also changing. Through the implementation of Offer and Order Management Systems and NDC, the split of distribution channels is shifting with traditional indirect distribution losing share, in favour of lower cost and better to control Digital Direct or Direct Connect channels.

TiM's prediction on the overall market recovery and distribution mix is based several assumptions related to current trends and observations. The key observation is that there is a faster recovery on the digital direct channel and a continued focus on the direct connect channels while the indirect channel using traditional GDS messaging (via EDIFACT) is slowest to recover. Airlines will try to maintain this channel shift as it is beneficial to their business. For this study, TiM assumes an additional annual 2.5% channel shift from Digital Direct to Direct Connect and an additional annual 7.5% channel shift from Indirect to Direct Connect, but it is important to mention that there will be considerable global variances.

The Digital Direct channel will recover and grow faster in comparison to indirect distribution. TiM estimates that by 2030 more than 50% of all RPB will be distributed through Digital Direct. Thus, Digital Direct will become the most important sales channel for airlines, although a higher yield might be addressed through Indirect, as Indirect remains an important footprint in the business traveller market. TiM estimates that the volume of Direct Connect will reach up to 2 billion RPB by 2030 while Indirect will carry an estimated volume of 1 billion RPB in 2030.

6.2 A Market View of PSS Suppliers

Currently, traditional PSS suppliers still dominate the market for commercial airline distribution systems. The market is dominated by three Tier 1 suppliers, namely Amadeus, Sabre and Travelsky. TravelSky's volume is based on its business in Mainland China. Due to de-facto trade restrictions non-Chinese PSS suppliers are heavily disadvantaged in doing business there. Thus, Travelsky is a de-facto monopolist, but with very little presence outside China. In 2019 and 2020 they had a market share of roughly 75%, which has been continuously growing from 70% in 2016. In addition, the ongoing consolidation of PSS suppliers has further increased the dominance of the *"Big Three"* Amadeus, Sabre and Travelsky. Amadeus acquired LCC specialist Navitaire while Radixx was acquired by Sabre.
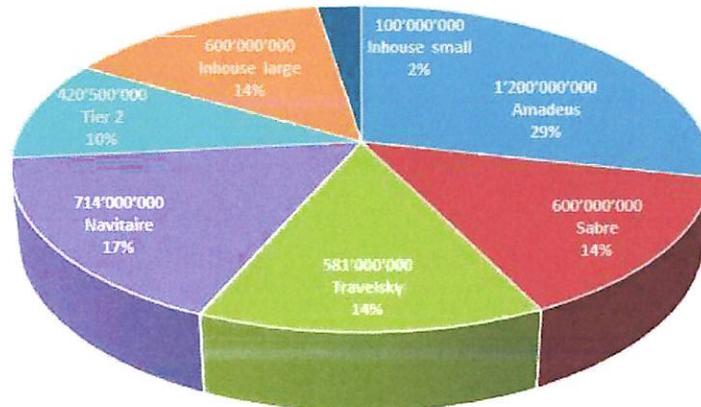

Figure 9: Market Share of PSS Suppliers pre-Covid, 2019.

Source own research, IATA, ch-aviation, annual company reports.

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However, not all airlines are using third-party PSS services as SaaS. About 17% of all RPBs were handled on an airline's in-house PSS systems in 2019. Some of the largest airlines, such as Delta, United (licensed version of DXC's PSS), Emirates and Turkish provide PSS services inhouse, with Delta also hosting Virgin Atlantic.

At the other end of the market, about 35 PSS suppliers operate the remaining volume of about 10% of RPB. Excluding the three tier 1 vendors and the airline inhouse systems, a multitude of PSS suppliers are in the market, many of these directly competing with Hitit. The ongoing shift in airline retailing from PNR-based systems to Offer and Order Management is challenging. They vendors tend to react in one of two ways:

AeroCRS, Bravo, DXC, ISA, Intelisys, KIU, SITA (exiting the market), Sirena, TTI, Videcom and Worldticket still operate PNR based systems with the intention to continue using them as their core. They jointly handled about 173m RPBs in 2019. TiM assumes that due to further price erosion and marginalization of legacy PSS these group of suppliers will undergo further consolidation.

Darwin, Hitit, IBS, Radixx and Takeflite are operating (least partly) an Offer and Order Management based system or are currently transitioning to it. In total this group of PSS vendors operated roughly 150m RBP in 2019. They are generally better positioned to address the future structure of airline commercial systems. Their corporate setup and environments, however, differ tremendously:

- Darwin and Takeflite are relatively new market entrants with very little business volume and often "niche" airlines as customers, as both have not yet had any highly marketable customer acquisitions
- Radixx was acquired by Sabre. It is still unclear into which direction the acquisition will lead and how independent the system will remain.
- Hitit and IBS are addressing future airline distribution by moving toward offer and order management-based systems. Both companies are well established, independent, and have been achieving constant growth. Their offering also consists of further IT services for the aviation industry.

6.2.1 The Effects of the Covid Pandemic

The volume of RPB dropped significantly in 2020 due to the pandemic. This greatly affected PSS suppliers. The three large suppliers lost approximately 60% of the RPB volume with Amadeus suffering a loss of about 68%, Sabre (not including Radixx) of about 61% and Navitaire of about 60%. Travelsky, which has its business focus on Mainland China, volumes decreased by "only" 36%, which is mainly based on the relatively fast recovery of domestic Chinese traffic. All other PSS suppliers, including in-house ones, lost around 42% of their pre-Covid RPB. In essence Covid-19 hit volumes of the big suppliers harder than the smaller suppliers. This is most likely due to the fact that many smaller providers serve regional and domestic airlines which were less affected by international travel bans.

6.3 A Forward-looking Market View on PSS

TiM groups PSS systems into three tiers. Note that this is a system-based evaluation as opposed to a provider-based evaluation. This is to ensure that systems such as Navitaire, Radixx and Quick are reflected as individual systems although they are owned by the big three vendors.

- Tier 1 PSS systems are all provided by the *"Big Three"*. These are Amadeus' Altea, Amadeus' Navitaire, Sabre's SabreSonic and Travelsky PSS. Each company operates hundreds of million RPB annually, and leverages GDS based, indirect, distribution in their business relationship with

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airlines. It is fair to say that this structure has elements of an oligopoly, and the market has traditionally been heavily controlled by them.

- Tier 2 PSS systems have a reasonable size, with at least 20m RPB annually (pre-Covid). They have greater functional maturity than the tier three, however in most cases not the functional richness which the tier one providers can offer. They have embarked towards modern offer and order-based airline distribution. TiM places Hitit's Crane solution, IBS' iFlyRES and Sabre's Radixx into this group. In 2019 all three systems had between 35m and 65m RPB with Hitit being the largest in volume.

- Tier 3 PSS systems are solutions that either have a very small customer base or remain on a PNR based legacy system and comparatively low functional maturity (for network and alliance airlines). With few exceptions, tier three PSS systems only operate a very small volume of RPB, generally not reaching more than 10m per year. TiM places AeroCRS, Bravo, Darwin, DXC, ISA, Intelisys, KIU, SITA, Sirena, Takeflite, TTI, Videcom and Worldticket into this group with SITA currently exiting the market. TiM expects further consolidation in this segment

TiM's segmentation into three tiers of PSS systems is, to a certain extent, a discretionary one. Some suppliers have attributes that could fit numerous supplier groups, although they are regarded by TiM as tier 3 PSS systems:

- PNR based Intelisys operates more than 20m RPB per year, but the volume is very depended on VietJet as a single anchor client.
- Sirena handled about 40m PRB in 2019, but mainly focuses its business on CIS countries.
- Darwin and Takeflite are based on a modern architecture, addressing the new structure of airline distribution, but struggle to gain remarkable market share.

Figure 10: TiM PSS Maturity Index

The graph above illustrates TiM's clustering of the different PSS systems in three tiers. While the systems provided by the *Big Three* are far ahead in volumes, their product maturity is only a competitive advantage for airlines which are pure network carriers and in a global airline alliance.

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7   Hitit's Position

Hitit has been providing IT services to its airline customers since 1994. Hitit's solutions do not only cover commercial systems for airlines. Hitit offers a broad scope of solutions for the airline and travel industry. An airline can procure a wide range of products from Hitit to cover a large part of their operational and commercial systems. Besides the core reservations system, Hitit covers Operations Planning, Accounting and Cargo. In the past years, Hitit has also expanded their product suite with several powerful point solutions such as the Travel Merchandiser and others – many of which can be used independent of the core PSS. Especially smaller airlines can procure most of the required IT systems from Hitit in a *one stop shop* approach to reduce multi-vendor complexities. Thus, Hitit's customer base also consists of airlines that are using other solution then the Crane PSS.

7.1   The Passenger Service System Crane.PSS

Hitit's Crane.PAX is the core portfolio solution, consisting of seven modules. It has continuously grown its volume and currently handles up to 65m RPB (2019 pre-Covid figures). The pandemic, and its effect on the airlines, caused an intermittent dip of passenger volumes in 2020 to 32m RPB. This is a lower decrease in volume compared to the larger competitors, partially due to the markets and airline segment which Hitit currently mainly serves. Currently, Hitit currently hosts over 30 airlines on Crane.PAX and has had some significant wins over the last two years. In total, 40 airlines have migrated, are currently migrating, or scheduled to migrate onto Crane PSS since 2016.

Hitit's Crane.PSS supports all commonly required legacy PSS functionalities, such as e-ticketing and EMD, IATCI, interlining, various codeshare methods, and operates a DCS supporting specific security requirements for more than 40 countries. The solution also provides numerous integrations to/from 3rd party systems such as GDS connectivity, Revenue Accounting (Rapid, Maureva), Revenue Management (AirRM, RTS, Maxamation and an ongoing implementation of PROS O+D) and loyalty systems.

In addition, Hitit's core IT system has taken first steps towards offer and order management systems. Several of the capabilities outlined in *Figure 5 - Travel in Motion Digital Retailing Environment (DRE), Offer and Order Management Solution Architecture.* are already supported. The next few years will give Hitit the opportunity to further move towards an airline digital retail environment with the implementation of full offer and order management as an extension to the current strong core PSS portfolio. Hitit has started moving towards providing new offer and order management based commercial processes of airlines, while continuing to support traditional legacy concepts.

7.2   Growing Client Base

Hitit positions its PSS as a solution suitable for all type of airlines, from tier 4 carriers to large and complex airline which are integrated into an alliance. Hitit can also cover the various airline business models from a low-cost airline, an airline applying the hybrid model to a full-service carrier. Although Hitit has not yet implemented a large alliance carrier, the company does have a detailed understanding of the required functionalities. Hitit was in the position to review and validate these requirements during a recent and far advanced sales process with an alliance carrier. While the sale could not be closed due to the effects of the pandemic, Hitit gained enough insight and information to create and execute a committed roadmap to close the remaining open alliance requirements. It is in these sales processes and detailed workshops with airlines where it proved invaluable to have a skilled team with knowledge not only of the own system, but with a solid airline background, helping to understand the airline processes and challenges.

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Hitit has been able to boast a solid and steady customer growth over the past years. In just the space of five years, Hitit has increased its processed volume by roughly 40% in a combination of new clients and organic growth of the existing customer base. In the last five years in total 40 airlines have been migrated or are due to be migrated onto Crane.PAX, while only four airlines have been de-migrated to other PSS systems.
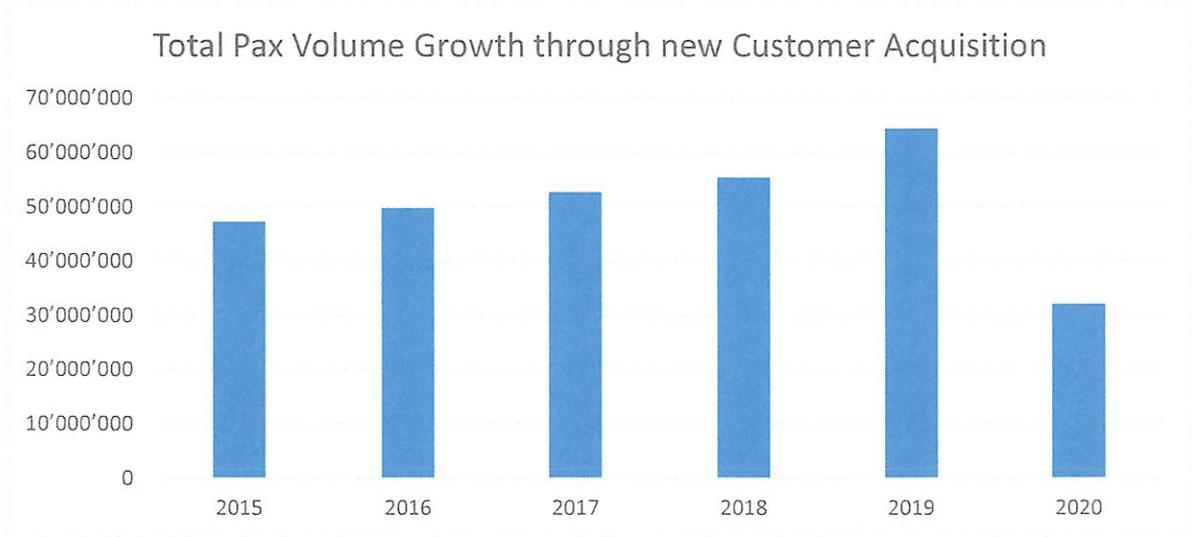
Total Pax Volume Growth through new Customer Acquisition

Figure 11 - Volume growth through acquisition

In the most recent past, Hitit has also proven that it has taken a large step from being a large tier 3 PSS provider to becoming a significant tier 2 PSS provider. TiM defines the tier by a combination of processed volume and functional maturity. The latter is already beyond some of the tier one providers, and it is only a question of growing volumes to enter the realm of the tier one's. While the gap is still rather substantial, recent wins have proved that Hitit is a serious contender. Pakistan International Airline has already migrated from tier one PSS Sabre, and currently Royal Brunei is migrating from Amadeus, the market leader, to Hitit. Both airlines are network carriers with considerable functional and procedural complexity needed as an airline fitting into a route network with other airline partners through codeshare and interline agreements. It worth emphasising that HITIT has been the only PSS provider that has managed to win full-service carriers from Sabre and Amadeus in the last few years.

In the past, Hitit has had its focus on the EMEA market. However, with recent wins in the Americas and in APAC, Hitit is extending its business geographies. A special focus is put on Latin America and Central Asia where Hitit also considers engaging local partners as sales channels. Both Asia Pacific and South America are rapidly growing markets, and it is expected that they will grow over proportionally as the pandemic fades.

Figure 12 - Hitit global customer base. Source: Hitit

7.3 Constant Innovation

Learning from customer engagements provides significant input to Hitit's product road map. Analysing past losses in terms of functional gaps has enabled Hitit to win larger and more complex airlines. A focus on learning from the loss, and defining what can be changed, updated, or developed to improve the product offering has allowed the product to mature considerably, and has brought Hitit in striking distance with the tier one PSS providers. This process is driven by sales, business development and the product team working jointly on ongoing customer engagement and feeding the results back. In addition, Hitit has always worked towards keeping a single codebase for the various customers to keep maintenance and operations efficient. Hitit splits its research and development budget into three dedicated areas: 40% of the budget is available to user community governance. 30% is reserved for industry innovations and invested at Hitit's discretion while the remaining 30% are dedicated to meet new or changing industry mandates and government regulations.

It is within the first 40% mentioned above where Hitit differentiates itself from the major PSS vendors. While with most vendors' community models, the "voting power" of the community is prorate based on the airline's size, Hitit has a model which promotes equality. Each customer airline has equal voting rights, ensuring that the smaller airlines also have a voice in the community.

Recently, Hitit has also put an increased focus on NDC, recently obtaining IATA's NDC Level 4 certification as an aggregator. This enables Hitit to further strengthen its ability to aggregate content for travel retailers. Hitit is already connected to 80'000 agents, 45 airlines and numerous hotels, car, and tour providers (see section 8.1.1 below).

Hitit's offer and order management components are currently not sold stand alone, they are part of the overall PSS offering. Therefore, Hitit is not competing with standalone offer and order management providers such as Accelya, Datalex or OpenJaw. At the same time, an airline utilising Hitit typically will not have a need for the use of one of those systems, which is often the case for airlines using Amadeus or Sabre. The mobile app and internet booking engine are sold as standalone solutions, however there is not a large market for these as standalone products; they are typically sold in conjunction with PSS.

7.4 Staff and Operations

Based on TiM's industry research it is assumed that Hitit has grown its employee base over the years, well in line with the publicly announced customer growth. Based on TiM's interaction with Hitit, while running a procurement on behalf of an airline and during several public discussion at industry events, TiM regards of education background of Hitit's staff as well balanced, however additional skills from an aviation background may be helpful for airline focussed vendors, in general. There is a massive opportunity in the market for such skills currently due to the considerable airline restructuring as a result of Covid-19.

In general, the industry perceives that Hitit has a very strong and experienced management team, with a wealth of industry background and knowledge of the market as well as the market needs and developments. Due to the stability of the organisation over the past decade and more, the executive team has been able to build upon the knowledge and ensure that the employees have pride in working for a company which is growing sustainably, and keeping step with the industry, challenging the major players more and more.

Hitit regards itself as an agile company which operates very close to its airline customers and is therefore able to develop and enhance the PSS is a very fast manner. TiM could not take an in-depth look at the DevOps processes within Hitit and cannot make a qualified statement in this regard. However, this approach generally reduces time to market for solutions and new functionality. In addition, Hitit has operated its Crane.PAX on hybrid cloud since 2017. The strategic planning foresees to have the solution suite fully cloud based in the near future, enhancing scalability, performance, and meeting data location requirements.

8 Assessment of Opportunities and Challenges

TiM has carefully assessed all available information during the market research of Hitit and its position in the industry as a provider of airline commercial and operational systems. While Hitit does provide additional solutions, these were not weighted in the same way as the core solution, PSS. However, these have been considered in the section 8.1 below (Opportunities).

As a result of the assessment, TiM has identified opportunities and challenges for Hitit in the coming years. Addressing the challenges early will allow Hitit a more seamless growth and enable the company to not only strengthens its position as the top tier two PSS provider, but also move it closer to the tier one providers. The gap in terms of volume and market presence is considerable, thus a realistic target over the next five years is to close the gap to an extent both in terms of volumes and system maturity, and to increase the gap to the main competitors in a first step. The identified opportunities can further expedite this trajectory should Hitit define a clear execution strategy for growth over the next years.

8.1 Opportunities

8.1.1 Aggregation Market

Hitit has traditionally connected numerous travel agencies to its core system, offering an airline direct-connect methodology. In total, more than 80'000 agencies have a direct connection to airline content via Hitit's platform. In addition, Hitit provides content of 45 airlines and numerous hotels, cars, and tour providers. With Hitit's recent Level 4 certification as NDC Aggregator for its Crane Agent Portal Plus (Crane APP) solution, Hitit is in the position to provide content, based on latest industry standards, to its travel agency community. The great benefit of this solution which other tier two and three PSS providers cannot provide is the ability to connect non-hosted airlines via NDC, thus increasing the content available to travel retailers considerably. This enables Hitit to partially replace GDS based distribution channels in certain markets. Hitit's position as aggregator in Pakistan is a successful example of the company's capability to grow this complementary business sector. Hitit's airline customer base and its extensive network of agencies connected provides an excellent base to further achieve business growth in this area by entering a new market segment. While there is competition in this space from companies such as Duffel, Atriis, Travelfusion and others, the market is by far not saturated as the airlines shift away from higher-cost GDS distribution. A clever strategy in terms of commercial agreements, further acquisition of retailers and further connection of non-hosted airlines will allow Hitit a new, additional, and typically very profitable revenue stream.

8.1.2 Organisation

Hitit's size and organizational structure is set up to enable adaptability. The pandemic has proven the resilience of the organisation in changing market conditions. The move towards NDC and content aggregation shows Hitit's ability to adapt to market requirements. Quick decision and approval processes as well as an agile organization support Hitit's airline community to shorten the time to market. As Hitit is headquartered in Turkey and provides most of the labour-intensive work out of Istanbul, Hitit has a cost advantage compared to some of its peers. In addition, Hitit's close relationships to local universities provides easier access to talent and provides opportunities to innovate in technology areas such as machine learning and artificial intelligence, areas of great relevance in the future.

8.1.3 High Growth Potential

Hitit has executed a strong line of acquisitions of new airlines for its Crane.PAX PSS. With SITA exiting the PSS market, Hitit was an early beneficiary, acquiring more airlines than any other tier 2 or tier 3 PSS supplier. In addition, Hitit has won carriers from Amadeus, Navitaire, Mercator, Sabre, Radixx, TTI and Videcom over the past five years, in total 40 migrations executed or due to be executed, while only four airlines were de-migrated to other PSS providers. Winning Royal Brunei from Amadeus und Pakistan International Airlines from Sabre has shown Hitit's ability to accommodate network airlines which operate a more complex environment than regional airlines or LCCs. In addition, Hitit has been able to close transactions in geographies where it previously had no business. This growth in South America and Southeast Asia will allow Hitit to establish a market presence to drive further growth. The current pipeline consist of promising opportunities and its successful delivery will communicate further strength to other airline targets, also including mid-size airlines and a select number of large, global carriers which are currently hosted by tier one PSS suppliers. With its growing airline base and handled RPB volume, Hitit is able to leverage economies of scale for further competitiveness.

There are two additional drivers to expedite the growth opportunities. PSS modernisation towards retail - a journey already started – and utilising the opportunity outline in section 8.1.1 above to complete with Amadeus and Sabre by adding an element of distribution to the negotiations. Adding a distribution landscape and access to travel retailers can be of considerable value to an airline, especially if this has an effect on the overall distribution cost.

8.1.4 Innovation

Hitit's certifications for NDC both as an IT solution provider and as an aggregator demonstrate that the company is following industry trends and direction. Hitit's ongoing expansion in terms of functional capabilities and products such as Travel Merchandiser and Agency Portal Plus, and the continued investment in Crane.PAX demonstrate Hitit's investment and mindset towards innovation.

With its speed and agility, Hitit could also grasp the opportunity to be a leading vendor driving the industry agenda towards offer and order management. The offer management capabilities are largely covered with the Hitit products as well as the partnerships with the various revenue management vendors. The strategy to move towards order management, and thus removing most traditional PSS concepts and data structures, is not yet well elaborated. However, the larger PSS providers have much more complexity to transform this area, and Hitit could well have a head start if a strategy is formulated and executed as quickly as possible. This would underline Hitit's drive towards being one of the most agile and innovative PSS players in the market.

With the planned migration onto full cloud infrastructure, Hitit's will remain competitive and further support scalability and innovative solutions, and potentially have a strong technology partnership to build on for the areas mentioned previously – machine learning and artificial intelligence experimentation.

8.1.5 Consolidation

There is a host of tier three PSS providers in the market as can be seen in the chart in section 6.3 above. Many of these are struggling to invest into their systems at the rate they should be, others are challenged with finding new customers due to the lack of sufficient sales resources and capabilities, lack of market presence or lack of solution maturity. Consolidation of third tier PSS vendors may offer opportunities for Hitit. This, however, would typically result in considerable migration costs to move small airlines from one system to another with only marginal volume growth with each one. There are some vendors who have exceptionally large airlines such at Intelisys hosting VietJet or Bravo hosting Edelweiss, both carriers with over 1 million RPBs in normal times. However, neither of these vendors is open to merger or acquisition discussions. As a matter of fact, there is no golden opportunity at this point in time. Nonetheless, we outline the consolidation aspect as we also feel Hitit must remain aware of market movements and when an opportunity should arise, consider it, potentially even if it is just to avoid a competitor gaining "easy" market share.
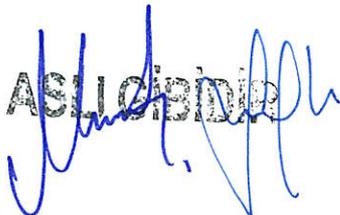
8.2 Challenges

8.2.1 Geopolitical Position

Being a Turkey-based company, Hitit's location might be regarded as less economical than vendors which have outsourced their development to countries such as India, Brazil, China, or others. However, this can be counteracted with a skill and efficiency gain. The larger challenge may be the perceived political stability and political relationships of Turkey compared to other PSS providers headquartered in the European Union or Northern America. One measure to counter this – the move to a fully cloud hosted solution with local data – is already in planning. Also, since Hitit already has a liaison office in Amsterdam it could expand this operation and start to serve at least some customers in certain regions directly from of the European Union.

A further factor which may be seen as detrimental by some potential airline customer could be the fact that much of Hitit's client base includes airlines in economically and politically challenged countries and geographies. This typically lends to some uncertainty towards the company's overall stability. However, as the customer base is growing with additional airlines, this will be less of a challenge going forward.

8.2.2 GDS Negotiating Power

Hitit's does not provide a legacy GDS. Distribution through GDS is still a major channel for airline sales especially outside of Europe and North America. Amadeus, Sabre and Travelsky provide globally GDS services to the airline community and can therefore provide distribution through all channels. This is often used to enhance the commercial proposal by the companies which are both PSS and GDS providers. These "inclusive" agreements will make the difference in a "like for like" comparison, as they can be worth more than the PSS costs over a span of five years.

Hitit can mitigate this challenge in two ways. One path would be by reviewing the opportunity to create a strategic collaboration with Travelport, the only major global GDS which does not provide a PSS. This could potentially be a win-win situation, as Travelport has lost market share to Amadeus and Sabre in the past years and should have a vested interest in clawing back as much as possible. Further, Hitit may benefit from Travelport's global sales capability and representation. However, this would also result in a collaboration with a large and less agile company, and without clear rules of engagement, may slow Hitit's growth and agility.

The other option is simpler, however may be less effective in the short term. This would be to further strengthening the capability to distribute directly using the NDC aggregator as a strategic pillar as outlie in section 8.1.1 above, thus growing the aggregation business and looking at this as a key strategic element over the next years.
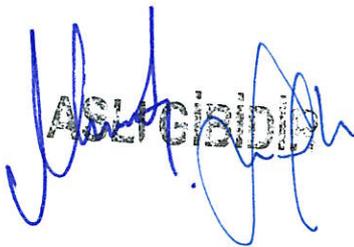
8.2.3 Alliance Logo

Although Hitit has had numerous significant successes in winning more complex carriers, the company still has to win a big alliance network carrier to prove to the market that it is able to meet the required complex business processes and the heightened integration challenges. Hitit has been very close to signing an alliance airline, however the transaction was not completed due to the pandemic, with the airline opting to extend their contract with their current provider to mitigate migration costs at this time. Hitit needs to continue to close as many alliance-functionality gaps as possible (without a customer) to ensure that with the next opportunity, the remaining gaps are not enough to deter the potential airline to select Hitit. Once Hitit has an alliance carrier on board, the last major hurdle to becoming a tier one PSS supplier will have been overcome. Strategically, it may be wise to proactively approach certain alliance airlines which are not as tied into the complete alliance complexity, and which at the same time are a better fit for Hitit than Amadeus or Sabre. These are airlines such as Croatia Airlines which have a secondary status within their alliance.

8.2.4 Overcoming legacy PSS centricity

Hitit's core offering is based on Crane.PAX which in many parts is still a somewhat traditional PSS. While this is still needed in today's market and can greatly support the transition to the offer and order concept, Hitit must continue its diversification in supporting commercial requirements by airlines by executing its offer and order management road map. This roadmap is not well enough defined and should be built to offer at least a three-year high-level outlook.

8.2.5 Pegasus

Pegasus Airlines is Hitit's biggest customer and a major shareholder. Thus, airlines competing with Pegasus might have reservations against a service provision by Hitit and perceive Pegasus' influence as a danger to their own business. This could be either because they are uncertain about the access to data or due to the perception that the largest customer and shareholder drives the product development agenda, and there is no room for individual needs.

Hitit repeatedly states that its corporate governance prevents such conflict of interest, and TiM has not discovered any indications to the contrary. However, this must still be made more transparent to provide more confidence to potential customers. Also, potential ownership evolutions, such as an IPO, could further minimize the influence of Pegasus Airlines and provide greater transparency on the organisation and the governance as a whole which will also improve this situation considerably.

Nonetheless, Hitit must stay vigilant to address potential conflicts of interest and communicate its mitigation to potential airlines targets.

9 About Travel in Motion

Creative. Efficient. Trustworthy.

TiM focuses on airline digital distribution, eCommerce, IATA AIR programmes (NDC, ONE Order, and Dynamic Offers), PSS transformation, revenue management, airline retailing and customer experience related travel topics. We support our customers in creating business strategies and translate those into business solutions.

Travel in Motion will accompany their customers from ideation to strategy creation, from business process modelling to requirements definition and finally from solution definition to vendor and partner selection.

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