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9B21M041

SATS Ltd.: BUILDING CAPABILITIES FOR THE FUTURE

Sarah L.Y. Cheah, Kritesh Patel, and Matthew Lim wrote this case solely to provide material for class discussion. The authors do not intend to illustrate either effective or ineffective handling of a managerial situation. The authors may have disguised certain names and other identifying information to protect confidentiality.

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On June 5, 2019, Khoo Seng Thiam, senior vice-president of SATS Ltd. (SATS), Asia’s leading provider of food solutions and gateway services, was studying the *2019 Digital Carrier Connectivity* report published by the online freight booking platform Freightos.[[1]](#endnote-1) The report compared the digital maturity of the ocean cargo and air cargo industries and found that the ocean carriers generally matured more than their air counterparts. As a crucial logistics industry, the air cargo industry transported over 35 per cent of the global trade by value, accounting for only 1 per cent of the global volume in 2018.[[2]](#endnote-2) After the 2008 financial crisis, demand for air cargo had normalized, and a steady annual growth of 4.9 per cent was forecast for the next five years.[[3]](#endnote-3) However, the industry faced multiple headwinds. The growing influence of e-commerce giants such as Amazon.com Inc. (Amazon) in the logistics industry coupled with the strong supply-chain expertise of vertical integrators such as DHL International GmbH (DHL), United Postal Services Inc., and FedEx Corporation had intensified competition in the industry. Backed by strong financial power and enabled by the latest digital technologies, these companies had disrupted the existing air cargo industry, which was in dire need of digital transformation.

A leading player in the industry, SATS had always been ahead of its competition in identifying trends and leveraging opportunities. Its pioneering development of the cargo management system COSYS Intelligent Solutions (COSYS) as early as 2010 was a testament to its strategic foresight capability, winning accolades such as *CIO* magazine’s 2017 CIO 100 Award for its innovative utilization of information technology to create and deliver business value.[[4]](#endnote-4) SATS was also awarded the title of “Best Air Cargo Terminal in Asia” at the 2013 Asian Freight and Supply Chain Awards. In recognition of its innovative use of smart watches for technical ramp operations, SATS had also emerged as the winner of the 2018 Ground Handling Conference Innovator Competition, organized by the trade association of the world’s airlines, the International Air Transport Association (IATA).[[5]](#endnote-5) However, the turbulent nature of the air cargo industry would not allow SATS, or any other established terminal operator, to rest on its laurels. SATS had set its sights on two initiatives to address industry challenges and leverage opportunities: cargo automation and digitalization.

The first initiative would require SATS to invest in robotics and artificial intelligence (AI)[[6]](#endnote-6) to fully automate its cargo picking and packing operations in order to address the issue of an aging workforce while improving operation efficiency. However, the development of robotics technology for the logistics sector was still in its early stages, where the possible range of technological applications was wide, the risks of technology obsolescence was moderate to high, and the demand for high-skilled labour to program, operate, service, and maintain the robotics would pose new challenges. On the other hand, the second initiative would allow SATS to build on its prior experience with COSYS implementation to undertake digital transformation to sustain its competitive advantage. However, the initial capital investment to re-engineer and integrate operation processes with digital technologies such as radio-frequency identification (RFID),[[7]](#endnote-7) the Internet of things (IoT),[[8]](#endnote-8) and big data would be prohibitive, with a relatively long payback period.

While both initiatives seemed equally important and urgent for SATS to develop its capabilities for the future, Khoo knew that he had to prioritize SATS’s investment and resource allocation.

The AIR CARGO INDUSTRY

Overview of the Air Cargo Value Chain

The air cargo value chain typically consisted of six major entities: shipper, freight forwarder, regulatory authority, ground handling agent, carrier, and consignee (see Exhibit 1). The shipper could be an individual or institution that initiated the transport of the goods. At the origin end, the freight forwarder was the first party of the logistics services in the supply chain, and its primary task was to contract with a cargo airline company or carrier for air delivery of the consignment (i.e., a batch of goods destined for or delivered to someone). After collecting the consignment from the shipper, the freight forwarder would deliver the consignment to the airport ground handler, which would then load the consignment onto the airplane. At the destination end, the airport ground handler would unload the consignment from the airplane, and the consignment would be picked up by a local freight forwarder to make the final-mile delivery to the consignee. The freight forwarder’s responsibilities were limited to the land side of the logistics chain.

Located on the air side of the chain, the ground handling agent would provide warehouses to accept, handle, prepare, and tag cargoes (including mail) upon their receipt from the freight forwarder at the origin end. The ground handler would perform loading, unloading, sorting, and customs declaration of cargo entering and leaving airport and transit operations. It would work with the regulatory authorities to perform screening and customs checks on the moving cargo.

Industry Dynamics in Singapore

By 2019, Singapore’s Changi Airport had been ranked the world’s best airport for seven consecutive years by London-based research firm Skytrax.[[9]](#endnote-9) In 2018, Changi Airport moved 2.15 million metric tons of cargo and 65.63 million passengers.[[10]](#endnote-10) The ground handling services were provided by two key players⎯SATS and Dnata Singapore Pte. Ltd. (Dnata Singapore). Established in 1972, SATS was a wholly owned subsidiary of Singapore Airlines (SIA) before it was divested from SIA in 2009.[[11]](#endnote-11) Dnata Singapore, on the other hand, was incorporated as Changi International Airport Services in 1977 and then fully acquired by Dubai-based Dnata Group in 2007.[[12]](#endnote-12) By 2016, SATS dominated Singapore’s ground handling market with approximately 80 per cent share at Changi Airport.[[13]](#endnote-13) It managed close to 45 million passengers and about 133,000 flights annually, while Dnata Singapore handled three million passengers and 40,000 flights.[[14]](#endnote-14) On the state of competition, Mark Edwards, the former chief executive officer (CEO) of Dnata Singapore, remarked in 2016, “I am still struggling to understand the strategy of my competitor, which only seems to be about cutting prices, even as costs continue to escalate amid headwinds and the manpower shortage.”[[15]](#endnote-15)

For a full-service carrier, the turnaround cost of operating a 180-seater Boeing 737-800 involved cabin cleaning, cargo and baggage handling, and refuelling. Such costs had been cut down to between SG$1,500[[16]](#endnote-16) and SG$1,600 in 2016 from about SG$2,000 a few years earlier.[[17]](#endnote-17) Beyond Singapore, competition between SATS and Dnata Singapore remained intense in the global ground handling market. Since 2016, Dnata Singapore had made acquisitions of cargo terminal operators that enabled its entry into the United States, Canada, and Brazil.[[18]](#endnote-18) A sizable portion (68 per cent) of the company’s US$3.6 billion in revenue in 2018 was attributed to the progress of its international business. The growth Dnata Singapore achieved through acquisition had shifted its strategic relationships with its airline customers.

For the past two decades, the duo had witnessed new players’ attempts to enter Singapore’s ground handling market. In 2005, the Switzerland-based ground handler Swissport International Ltd. entered the market but found its local operation “not of sufficient size to ensure its sound profitability.”[[19]](#endnote-19) It went on to incur losses of up to SG$50 million before exiting four years later.[[20]](#endnote-20) Attracted to the growing aviation market in Singapore and Asia, US-headquartered ground handler Aircraft Service International Group (ASIG) arrived in 2011 but only managed to secure its first airline contract with Jetstar Airways Pty. Ltd. in 2014. However, ASIG ended the contract due to commercial disagreement before exiting in 2015.[[21]](#endnote-21) The president of Dnata Singapore, Gary Chapman, attributed ASIG’s swift exit from the country to its wrong strategy of engaging in a price war: “ASIG came thinking it could do the work for half the price. They got it completely wrong. It was crazy.”[[22]](#endnote-22) Chapman highlighted the knock-on effect that the flawed price war strategy had on the expectations of airline customers: “It’s very easy to reduce prices, but very difficult to increase.”[[23]](#endnote-23)

In the broad cargo industry, air cargo operators competed against their ocean cargo counterparts. As the operational costs per kilogram of cargo was higher in the air cargo industry than in the ocean cargo industry, shipments using the former were generally lighter and less bulky than those using the latter. Although air freight was, on the whole, faster than ocean freight, it was significantly more expensive.[[24]](#endnote-24) For example, a US$195 ocean shipment could cost US$1,000 by air.[[25]](#endnote-25) Safety regulations were stricter and more extensive for air cargo shipments than for ocean counterparts. For instance, multiple items that were prohibited on air cargo delivery routes were permitted for ocean cargo, such as gases (e.g., lightbulbs) and magnetic substances (e.g., speakers).[[26]](#endnote-26) There had been an increase in less-than-container-load cargo shipments by ocean as opposed to full-container-load shipments by air, thereby enabling faster and cheaper ocean cargo services to compete with air cargo services. Driving this trend was the upgrading of ships and canals, as well as improvements to ocean tracking.[[27]](#endnote-27)

Air cargo operators’ customers were primarily made up of airline companies handling cargo deliveries. Most airlines would enter into fixed contracts with air cargo terminal operators, while some would prefer to perform cargo handling functions internally. One such example was the decision of Hong Kong–based airline Cathay Pacific Airways Ltd. (Cathay Pacific), through its wholly owned subsidiary Cathay Pacific Services Ltd., to design, construct, and operate the new air cargo terminal Cathay Pacific Cargo Terminal at Hong Kong International Airport, with air cargo throughput capacity of 2.6 million metric tons and a common-use facility open to all airline customers. The HK$5.9 billion[[28]](#endnote-28) facility commenced in February 2013 and accounted for over 20 per cent of the Cathay Pacific’s revenue.[[29]](#endnote-29)

In Singapore, there were over 500 freight forwarding agents, ranging from small and medium-sized enterprises to big multinational corporations such as Panalpina Welttransport Holding AG (Panalpina), Kuehne + Nagel International AG, and CEVA Logistics.[[30]](#endnote-30) With a large number of players, the air freight forwarding sector was highly competitive and saw frequent mergers and acquisitions (M&A).[[31]](#endnote-31) Despite the air cargo industry’s growth, operators faced mounting pressure to digitalize to stay relevant within the industry.[[32]](#endnote-32)

Given the significance of air trade routes to economic growth, the public policy-makers of most cities developed their aviation industry in an effort to attract international business trade and investment. Singapore’s economic policy reflected its prioritization of the logistics and air cargo industry. In 2017, Singapore’s Ministry of Trade and Industry announced the air transport industry transformation map, a national blueprint to upgrade the capabilities of aviation companies through 2025 to boost productivity in the industry by 40 per cent.[[33]](#endnote-33) Ng Chee Meng, the second minister for transport, affirmed his intention to augment “smart” applications in the air transport industry to enhance industry’s competitiveness: “Systems will talk more to each other, and more autonomous systems will support our work. We want to track every piece of baggage, cargo and equipment moving across the airport in real time.”[[34]](#endnote-34)

CHALLENGES OF the AIR CARGO INDUSTRY

During 2018, the global air cargo industry achieved growth of 3.5 per cent in cargo volume.[[35]](#endnote-35) Estimates from IATA forecast industry growth of 4.9 per cent over the next five years.[[36]](#endnote-36) Despite its growth, the industry faced several challenges.

The air cargo industry was labour intensive for operations such as cargo handling and delivery. As the labour market faced acute shortages, rising demand for skilled labour had led to escalating labour costs. This crisis was expected to worsen as global labour shortages of 85.2 million skilled workers were projected by 2030 across all industries, resulting in potential lost revenue opportunities of US$8.452 trillion.[[37]](#endnote-37) If left unchecked, such labour shortages could restrict the growth of the industry, potentially putting many players out of business. In many developed countries, the challenge of labour shortages was exacerbated by falling birth rates, which gave rise to an aging workforce.

With the increasing convenience of e-commerce, driven by advances in social media and electronic payment technologies, the air cargo industry saw rising customer expectations of the performance of air cargo delivery service providers. Both consumers and businesses expected to receive goods faster, in a more flexible and transparent manner, and at lower delivery prices.[[38]](#endnote-38) A study conducted by the National Retail Federation found that 75 per cent of consumers surveyed demanded same-day delivery but were not willing to pay for the service.[[39]](#endnote-39) The customer expected an e-commerce-like experience where services, information, and transactions were made available online and in real time. It was apparent that the sector was under growing pressure to deliver quicker and better services at lower costs.

From terrorist attacks to geopolitical positioning, the air cargo industry was one of the industry’s most vulnerable to safety and security risks.[[40]](#endnote-40) To address these risks, the governing bodies had heightened measures to improve the safety and reliability of the industry. However, these measures came at an increase in compliance costs that were partially borne by the logistics operators. The related security expenses, cargo screening costs, training, and delayed transit times were estimated to exceed US$4 billion for the industry.[[41]](#endnote-41)

Compared to the ocean cargo industry, the air cargo industry was found to have lagged on three fronts relating to digital connectivity: customer connectivity, online experience, and transformation.[[42]](#endnote-42) Customer connectivity pertained to the ability of customers to be serviced on a suite of functions through digital technology comprising documentation, shipment tracking, invoicing, and online payment. The online experience would thus follow, focusing on creating a business-to-consumer kind of e-commerce experience for customers. While the second dimension built on the first, it also included door-to-door delivery functions and request-for-quotation forms. Finally, transformation referred to a top-down focus on improving systems, processes, and cultures both internally and externally through business information technologies that could make the value chain more seamless. This digital lag of the air cargo industry resulted in a loss of cost competitiveness to its ocean cargo rival. Major electronics companies such as Telefonaktiebolaget LM Ericsson (commonly known as Ericsson) and Sony Corporation admitted to shifting their transport operations from air to sea modes due to costs.[[43]](#endnote-43)

THE THREE Cs

To address the challenges in the air cargo industry, the existing players had responded in various ways. According to the management consultancy firm McKinsey & Company, three trends were observed in the industry.[[44]](#endnote-44)

First, there had been an increase in M&A among the incumbents. One example was DSV’s acquisition of Panalpina to form DSV Panalpina A/S in 2019 for US$4.6 billion, the largest acquisition the industry had ever witnessed.[[45]](#endnote-45)

Second, a digital wave was imminent on the freight forwarding industry’s horizon, as the disruption caused by three groups of new players was placing increasing pressure on traditional players to adopt digital technologies. The first group involved digital forwarding specialists (e.g., the software-as-a-service company Fleetmatics Group PLC) offering solutions for one or two elements of the value chain and providing airline operators with information on vehicle location, mileage, and other relevant metrics. The second group comprised digital forwarders, such as Amazon, offering as wide a range of logistics services as traditional forwarders but with better customer experience and at a relatively lower cost. The third group consisted of airlines building their own digital channels, to serve customers directly rather than relying on traditional freight forwarders to reserve space on flights (e.g., Brussels Airlines Cargo developing cargo slot booking application with its digital partner BRUcloud).[[46]](#endnote-46)

Third, the air cargo industry players were expected to embrace digital transformation in front- to back-end processes to reduce internal costs and enhance customer experiences. All surviving forwarders would be more digitalized by 2025, while those lagging behind on digitalization and collaboration were expected to struggle and decline.[[47]](#endnote-47)

According to Khoo, these trends of the air cargo industry could be summarized by three Cs. The first C would represent the *competition* heating up between traditional operators and the new digital forwarders. The second C would capture the *consolidation* of the existing industry players through M&A. The imperative of *collaboration* among the air cargo industry players across the value chain would be expressed by the third C. Khoo was confident in SATS’s market positioning:

Because of our unique position in the market, a very neutral position, we [SATS] are not competing with the freight forwarders, and we are not competing with the airlines. In fact, we are either a service provider to the entire community, or we are the key enabler to the community. We can help to build a platform that is collaborative in nature, and everyone can run on it and play in a fair playing field.[[48]](#endnote-48)

To address industry challenges and leverage opportunities, SATS chose to focus on cargo automation and digitalization initiatives.

SATS’S INITATIVES

Automating Cargo Operations

In 2014, the Civil Aviation Authority of Singapore (CAAS) launched the Aviation Challenge, with the objective of developing innovative solutions to automate labour-intensive processes in airport operations. Its second iteration called for contestants to propose solutions for labour-intensive cargo handling operations through automation in breaking down and building up cargo pallets and containers. Singapore-based system integrator Singapore Technologies Dynamics Pte. Ltd. (ST Dynamics) and TUM Create Ltd. Singapore (TUM Create)⎯a partnership between the Technical University of Munich, in Germany, and the Nanyang Technological University, in Singapore⎯were two of the challenge’s finalists, presenting the world’s first AI-enabled robotic solutions that could scan, build, and break down non-standardized cargo in the palletization process.[[49]](#endnote-49) The two finalists were awarded SG$4 million in funding to develop their prototypes, which were expected to reduce workers’ loads by 30 per cent and to improve storage space efficiency by 4 per cent.[[50]](#endnote-50) The promising potential of the finalists’ robotic solutions caught the attention of SATS. Having envisioned that the future air cargo industry would harness the power of AI, computer vision, IoT, and robotics to enhance its productivity, SATS had worked closely with CAAS to actively provide industry requirements for the Aviation Challenge, as well as to evaluate and review the participants’ proposed solutions for the challenge. Khoo remarked,

Just imagine that in five years, 10 years, 15 years from now, where are you going to find people? This is dealing with the labour workforce for the longer-term planning . . . as we progress, automation and efficiency become a lifeline for any organization. So, TUM Create is another work in progress, knowing that the future is going to be as such. It’s about what we need to do to start preparing for right now, so that we will be able to deal with various scenarios in the future.[[51]](#endnote-51)

Building COSYS

In 2010, SATS launched a cargo terminal management system, COSYS, jointly developed with New Delhi–based NIIT Technologies Ltd.[[52]](#endnote-52) With access to real-time and accurate information for tracking cargo movement, SATS’s partners could improve their operational efficiency.[[53]](#endnote-53) By 2019, SATS extended the availability of COSYS to its joint ventures in Asian countries such as China, Taiwan, and Bangladesh, as well as its strategic partners in South American countries such as Brazil. As more partners utilized the information system, they became contributors to its network of information, creating positive network effects for present and future corporate users. The success of COSYS was evident in the accolades that SATS had received. As Khoo reflected, “Owing to its innovation in the digital front, SATS was felicitated with a CIO 100 Award from IDG’s [International Data Group’s] CIO [chief information officer] in 2017. This award honoured the top 100 organizations around the world that used information technology innovatively to create and deliver business value.”[[54]](#endnote-54)

To address the increasing need for digital connectivity among the players of the air cargo value chain, SATS was contemplating the integration of COSYS with cloud-based technology to reach out to new users.

BUILDING CAPABILITIES FOR THE FUTURE

As SATS formulated its strategic plans, it knew it would be imperative to continue building capabilities for the future, particularly in the active adoption of robotics and AI in cargo automation for managing a diverse and aging workforce, as well as in IoT and big data in cargo operation for digital transformation.

Cargo Automation with Robotics and AI for Managing an Aging Workforce

Like many other developed countries, Singapore faced the challenges of an aging workforce. In 2016, there were about 4.7 citizens of working age (between the ages of 20 and 64) for every older adult (over the age of 64); this was a steep decline from 6.3 citizens of working age per older adult in 2006.[[55]](#endnote-55) The demographic shift in Singapore had led to labour shortages and wage increases.[[56]](#endnote-56) While automation in the logistics sector was a relatively new trend, it had already become a norm in the manufacturing industries, where robots were deployed to work alongside human workers to improve efficiency. One of the first industries to spearhead automation was the automotive industry, which accounted for half of the world’s industrial robots, achieving a 16 per cent increase in vehicle production since 2010.[[57]](#endnote-57)

In recent years, the air cargo industry had seen some of the most labour-intensive functions partially automated. For example, in 2016, DHL built close to 100 automated parcel-sortation bases across Germany to reduce manual handling and sorting by human personnel. Many other important functions such as delivery, warehousing, loading, and unloading had yet to be automated, giving transportation and warehousing the third-highest automation potential of any sector.[[58]](#endnote-58) By 2014, Amazon spent US$775 million on installing robots made by Kiva Systems across 13 fulfillment centres to automate picking and packing processes at large warehouses.[[59]](#endnote-59) The deployment allowed Amazon to cut operating costs by 20 per cent, reduce cycle times by 45 to 60 minutes, and free up inventory space by 50 per cent, translating into cost savings of US$22 million per fulfillment centre.[[60]](#endnote-60) Apart from robotics and automated systems, other technologies such as AI were reported as critical for the logistics industry.[[61]](#endnote-61) The global mobile logistics robot market was forecast to reach US$11,269.1 million by 2025, registering a compound annual growth rate of 21.2 per cent from 2018 to 2025.[[62]](#endnote-62)

As one of the leading providers of air cargo handling services, SATS had an excellent track record in technological integration. At the Changi Airfreight Centre, SATS operated six cargo terminals, with a floor space of 150,000 square metres and annual capacity of 2.2 million metric tons.[[63]](#endnote-63) To add to its capabilities, in 2017, it inaugurated the SATS eCommerce AirHub—a SG$21 million 6,000-square-metre fully automated airside mail sortation facility co-funded with CAAS—to improve productivity by increasing (a) the mailbag processing capacity from 500 mails an hour to over 1,800 mails an hour and (b) processing speed by 50 per cent. [[64]](#endnote-64) Building on this capability, SATS could invest in robotics and AI to fully automate its cargo picking and packing operations in collaboration with TUM Create or ST Dynamics to address the issue of an aging workforce while improving operational efficiency.

However, the development of robotics technology for the logistics sector was still in its early stages, where the range of possible technological applications was wide (e.g., pick-and-place robots, autonomous vehicles, drones), and the risk of technology obsolescence was moderate to high. It would therefore be crucial to identify the right robotics technology and the right processes to automate for long-term commercial viability. As robotics solutions with AI software programs required regular software updates and hardware maintenance, the required skills would have to be procured externally from a limited pool of vendors and at relatively high costs.[[65]](#endnote-65) While automation could curb the need for low-skilled labour, it would also bring about the demand for high-skilled labour to program, operate, service, and maintain the robotics.[[66]](#endnote-66)

**Cargo Operation with IoT and Big Data for Digital Transformation**

New technologies such as big data, machine learning, and IoT could help companies digitalize to improve operational efficiency and enhance customer experience.[[67]](#endnote-67) Digital technologies would enable firms to capture critical data about consumer behaviours, leading to better forecast capacity in response to changing consumer preferences and thereby presenting opportunities to build long-term customer relationships.[[68]](#endnote-68) Up to 5 per cent return on sales could be achieved for firms that were able to make creative use of their existing data and embed analytics in their daily functions.[[69]](#endnote-69) The use of digital platform and mobile connected devices combined with IoT in the cargo warehouse would make the booking, tracking, and monitoring of shipments easier and more accurate.[[70]](#endnote-70) The use of RFID in warehouses was gaining momentum at pallet- or item-level tagging. Once tagged with an RFID unit, the cargo could be tracked not only within the warehouse but also end-to-end through the entire supply chain.[[71]](#endnote-71) Such technologies would help satisfy customer demand for greater shipment visibility.

Digitalization was expected to address the connectivity issue of the air cargo industry by improving the industry’s competitiveness over its ocean cargo counterpart. Its implementation could tackle safety and security concerns across the industry by automating the cargo screening and tracking processes, thereby reducing cycle time and compliance costs.[[72]](#endnote-72) Significant improvement in performance was forecast for companies that adopted digitalization to reduce operational costs by 3.2 per cent over five years.[[73]](#endnote-73) For example, Brussels Airport launched the BRUcloud initiative in 2016 to bring the region’s transport players together onto a common data cloud to share real-time shipment data so as to facilitate seamless shipment tracking across the value chain.[[74]](#endnote-74) Luc Jacobs, the CEO of DHL Global Forwarding, commented,“We firmly believe that an increasing transparency and reliability will decrease the overall supply chain costs in the future. We support initiatives as the community platform BRUcloud, to support the industry in creating innovative tools to improve the logistic chain.”[[75]](#endnote-75)

The industry had seen an increasing number of legacy players collaborate with new emerging technology start-ups to add digital capabilities within their ranks.[[76]](#endnote-76) For instance, Lufthansa Cargo AG acquired the Portland-based digital logistics firm Fleet Logistics in 2018 to provide an online freight marketplace to connect businesses to freight forwarders and other shipping service providers.[[77]](#endnote-77) By enabling businesses to send requests, gather quotes, and review and compare freight services on its fleet marketplace, the company aimed to enhance the freight booking experience by improving shipping transparency and standardization. By adopting digital capabilities in early stages, the air freight industry could save between US$30 billion and US$50 billion in operation costs over the next decade.[[78]](#endnote-78)

As more companies started to invest in the digital transformation of their supply chain and logistics operations, industry spending on connected logistics solutions was forecast to grow to US$20 billion by 2020 (see Exhibit 2). On average, the logistics sector allocated almost 5 per cent of its annual revenue to developing their digital operations, comparable to the weighted average of investment across all industries, which stood at 5 per cent.[[79]](#endnote-79) According to consulting firm PwC, first movers in digital investment were far more likely to achieve both revenue gains of more than 30 per cent and cost reduction of more than 30 per cent at the same time.[[80]](#endnote-80)

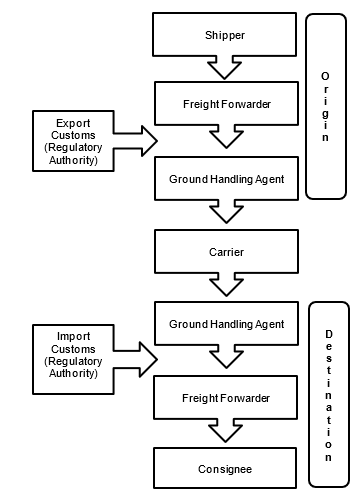
With its prior experience with COSYS implementation, SATS would be well positioned to undertake digital transformation to sustain its competitive advantage. COSYS had enabled SATS to drive collaboration among not only its partners in the domestic market but also the overseas markets including Indonesia, China, and India. The success of the COSYS platform would enable SATS to develop a more advanced cloud-based cargo management system, COSYS+, to augment real-time cargo visibility along SATS’s digital corridors in the Asia-Pacific region.

However, the initial capital investment to re-engineer and integrate operation processes with RFID, IoT, and big data would be high, with a relatively long payback period. On average, it would take over five years for a firm to gain a healthy return on investment in digital technologies.[[81]](#endnote-81) To fully reap the benefits of digital transformation, it would be critical for SATS to build strong capabilities in digital technologies to ensure the design, development, and maintenance of a robust but agile cloud-based system that would enable the advanced digitalization and integration of the horizontal value chain with customers, suppliers, and other value-chain partners.[[82]](#endnote-82) As digital systems could be vulnerable to security and privacy threats, SATS would also need to build its cybersecurity capability to protect and harden its systems against intrusion from hackers, terrorists, cybercriminals, mischief-makers, and others who wished to inflict damages.

MOVING FORWARD

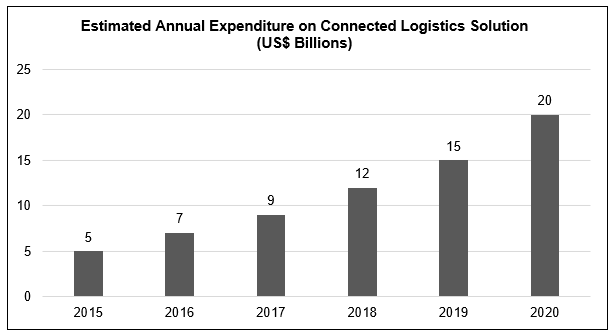
By embarking on robotics and AI in cargo automation, SATS would be poised to tackle the challenges presented by an aging workforce and rising labour costs. On the other hand, the call for digital transformation with IoT and big data in cargo operation would merit immediate attention. While both initiatives seemed equally compelling for building capabilities for the future, Khoo knew that he had to prioritize investment and resource allocation. Should SATS invest in the design, development, and maintenance of robotics and AI systems to fully automate its cargo picking and packing operations in collaboration with TUM Create or ST Dynamics? Or should the company focus on the design, development, and maintenance of IoT and big data systems to expand the functions of COSYS+ to fully integrate its air cargo value chain?

EXHIBIT 1: AIR CARGO INDUSTRY VALUE CHAIN



Source: Created by the authors based on “Paperless Air Cargo and Logistics Solution to Boost Productivity across Supply Chain,” Civil Aviation Authority of Singapore, accessed May 31, 2019, www.caas.gov.sg/about-caas/newsroom/Detail/paperless-air-cargo-and-logistics-solutions-to-boost-productivity-across-supply-chain/.

EXHIBIT 2: GROWING EXPENDITURE ON IoT-Based SOLUTION IN the LOGISTICS SECTOR



Note: IoT = Internet of things

Source: Created by the authors based on Andrew Meola, “How AI and IoT Devices Will Revolutionize Supply Chain Logistics and Management,” Business Insider, January 14, 2020, accessed July 30, 2020, www.businessinsider.com/internet-of-things-logistics-supply-chain-management-2016-10/?IR=T.

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6. AI was the simulation of human thinking processes by machines or computer systems through learning, reasoning, and self-correcting. [↑](#endnote-ref-6)
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