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STARHUB LtD.: PAVING THE WAY FOR INNOVATION

Sarah Lai-Yin Cheah and Maw-Der Foo 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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It was February 14, 2018. StarHub Ltd. (StarHub) management had just finished presenting their company’s 2017 results to market research analysts in an open briefing at StarHub Green, the company’s headquarters in Singapore. StarHub’s chief executive officer, Tong Hai Tan, acknowledged that, in 2017, total revenue was relatively flat at about SG$2.4 billion,[[1]](#endnote-1) while net profit after tax saw a drop of 27 per cent. However, he was upbeat about the recent growth in revenues from data, Internet, and voice services, which were up by 21 per cent in the fourth quarter of 2017, compared to the same period in 2016. A review of StarHub’s recent business strategies indicated that the company had explored various areas of growth in search of new revenue sources. Among these areas, two seemed to have garnered strong interest from key industry stakeholders.

The first area involved the launch of the Smart Retail Solutions initiative in 2016, which offered bundled services of connectivity and smart-retail analytics to small and medium enterprises (SMEs), as part of StarHub’s move into the retail and food-and-beverages (F&B) industries. The second area offered automation for the hospitality industry. StarHub’s Smart Retail Solutions initiative seemed promising in enabling the F&B operators to increase their competitiveness. However, given it had a high churn rate of between 20 and 30 per cent, would the retail industry be able to appreciate the value of StarHub’s retail solutions? Would this initiative warrant new investments in staff development?

Although StarHub’s automation solution would address the staffing crunch problem and improve the efficiency of the hotels, the hospitality industry was suffering from an oversupply of properties, which could lead to industry consolidations and exits over time. Was it the right time for StarHub to invest time and resources on not only building its knowledge base but also developing and customizing its automation solutions to cater to a variety of hotels—with vastly different operational routines, floor layouts, and building styles (e.g., elevators, stairs, number of floors, and number of rooms)? StarHub needed to decide whether to focus these resources and efforts on either the hospitality or food and beverage industry.

STARHUB AND SINGAPORE’S TELECOMMUNICATIONs INDUSTRY

Established in 2000, StarHub was the second-largest of three telecommunications operators (telcos) in Singapore. StarHub provided mobile services, pay-television (TV), fixed broadband services, and fixed voice services for the consumer and corporate markets. A pioneer for “hubbing”—the ability to deliver integrated, converged services to its customers—StarHub was known for innovation in the region. With its swift implementation of the latest products and services to keep abreast of new developments, Singapore’s telecommunications industry had outperformed many of its counterparts in the Southeast Asian region. Partly because of the country’s relatively small population and land area,[[2]](#endnote-2) the expeditious growth of the telecommunications sector meant that it was fast approaching saturation. From 2012 to 2016, the mobile phone penetration rate hovered between 151.8 per cent in 2012 and 149.8 per cent in 2016.[[3]](#endnote-3) Eventually, growth in mobile subscribers had levelled (see Exhibit 1).

To maintain its market share, StarHub adopted the hubbing strategy, which involved bundling television, home broadband, and mobile services at a discount. This approach worked—the number of triple-service households subscribing to the integrated service rose from 200,000 in 2010 to 214,000 in the span of two years. Competition remained strong among the three incumbent operators— Singapore Telecommunications Ltd. (SingTel), StarHub, and M1 Ltd. (M1)—which had invested billions of dollars in the maintaining and upgrading their mobile networks and infrastructure. As of 2016, SingTel, StarHub, and M1 had spent a total of $1.6 billion, $1 billion, and $1.8 billion, respectively, to upgrade their mobile networks.[[4]](#endnote-4) These numbers remained consistent—and in some instances, increased—as the three competitors strove to outdo each other. However, the competition intensified when various over-the-top (OTT) players entered Singapore’s market with service offerings previously exclusive to the telcos, such as short message service (SMS), voice calls, and video and music services. According to the blended average revenue per user (ARPU) figures, which measured the income generated by businesses given the size of their customer base, there was a downward trend among the incumbents between 2014 and 2016[[5]](#endnote-5) (see Exhibit 2). To attract new subscribers, the telcos lowered tariffs, resulting in price wars for new subscribers that had negatively affected the ARPUs.[[6]](#endnote-6)

Mobile

SingTel became the dominant operator in Singapore’s mobile market. In the fourth quarter of 2016, it enjoyed a 48.6 per cent mobile market share, with StarHub at 27.4 per cent, and M1 at 24.0 per cent.[[7]](#endnote-7) Given its strong brand name and bundled service offerings, SingTel’s dominance in the market persisted, which made it difficult to unseat its leading position in the market. This trend was worrying for the other operators, as SingTel continued to expand its lead market share at their expense. Although market growth continued from advanced telecommunications services, all three operators reported decreasing minutes of use—a trend largely attributed to falling voice usage due to an increasing use of social media and free messaging applications.[[8]](#endnote-8)

The telcos also faced external threats from the growing popularity of OTT service providers, which resulted in revenue being diverted from mobile services. Traditional SMS and voice calls were increasingly substituted by alternatives such as WhatsApp, Inc. (WhatsApp), Line Corporation’s application (app) Line (LINE), Tencent Holdings’ WeChat, and by social media such as Facebook, Inc. (Facebook) and Twitter, Inc. (Twitter), all of which resulted in a significant decline of SMS usage (see Exhibit 3).To partly offset the threat from OTT players and price competition, SingTel offered unlimited usage of services from Facebook, WhatsApp, LINE, WeChat, and Opera Software AS’s Opera Mini with no additional charges, while StarHub included WeChat and LINE social plans to its products. In 2014, StarHub also launched its Rich Communications Services, an all-in-one app that allowed its users to SMS, instant message, make calls, and easily share multimedia.

Broadband Services

Singapore had the second-highest broadband penetration in Southeast Asia. By the end of the first quarter of 2016, the city-state had 11.992 million broadband subscriptions, averaging two subscriptions per person.[[9]](#endnote-9) The 221 per cent broadband penetration rate suggested that Singapore’s broadband market was rapidly approaching saturation. According to the industry watchdog, the Info-communications (Infocomm) Media Development Authority (IMDA) of Singapore, the number of fixed-line subscribers totalled 2.02 million in December 2015, a mere 1.2 per cent increase from 2014.[[10]](#endnote-10) The IMDA also reported a sustained decline for fixed-line services after reaching a peak of 2.017 million subscribers since the second quarter of 2012. SingTel, StarHub, and M1 had dominated the broadband market until 2010, when the emergence of new fibre broadband entrants such as MyRepublic and ViewQwest Pvt. Ltd. (ViewQwest), in 2011 and 2012, respectively, intensified competition and paved the way for price wars. In 2012, StarHub’s broadband services recorded a 1 per cent fall in its subscribers since 2011, while SingTel maintained the upper hand with a 2 per cent increase in subscribers in 2012.[[11]](#endnote-11)

Competition continued to heat up, as new entrants decided to move away from offering only broadband services. As of 2017, MyRepublic launched its mobile services, a move that aimed to leverage its 70,000 fibre broadband subscribers to garner a 5–6 per cent market share in five years.[[12]](#endnote-12) These plans worried the largely domestically established incumbents. Apart from offering fibre and voice over Internet protocol (VoIP) services, ViewQwest had plans to enter the “smart-home” market.[[13]](#endnote-13) In 2017, ViewQwest set up its first security operations centre (SOC), a move that allowed it to go after bigger clients, thereby pitting itself directly against the telcos.[[14]](#endnote-14) While SingTel, StarHub, and M1 had already established their own local SOCs by then, ViewQwest’s new initiative heightened the competitive jostle for a share in the cyber-security market.[[15]](#endnote-15)

Pay-TV

After its merger with Singapore Cable Vision in 2001, StarHub became Singapore’s only pay-TV provider. StarHub maintained its leadership position in the pay-TV segment, but only until SingTel launched IPTV SingTel TV in January 2007 and M1 launched its online media entertainment service, 1box, in 2010. When SingTel obtained the rights to the highly popular Barclays Premier League (BPL) football matches from 2010 to 2013, its TV subscribers increased by 109,000 in 2010 and by 89,000 in 2011.[[16]](#endnote-16) Despite StarHub losing 1,000 subscribers in 2010 and adding 7,000 in 2011, it maintained its market dominance as Singapore’s largest pay-TV operator (seeExhibit 4). The IMDA eventually ruled that SingTel must share its BPL content with StarHub under the cross-carriage regulation. StarHub was provided with a platform to carry BPL content alongside SingTel, but the latter continued to maintain its monopoly on broadcast rights until 2016, thereby controlling the price and package of the content and billing StarHub’s customers directly.[[17]](#endnote-17)

Netflix, Inc. (Netflix) and Amazon.com, Inc. (Amazon)’s Prime Video soon came into the picture and began offering online video-streaming services. These OTT players offered local subscribers a wide range of on-demand content from international markets over the Internet. The telcos’ coverage was limited, however, to TV programs from Mediacorp Pvt. Ltd. (Mediacorp)’s free-to-air channels via set-top boxes. For a flat monthly subscription fee of $10.98, Netflix provided access to unlimited content with the flexibility of cancelling subscriptions anytime, while StarHub’s packages were tied to fixed contracts with an entry-level fee of $27.00. While these OTT players did not offer local and sports content, they did shake up the incumbents’ hold on the market. Since the entry of the OTT players in 2016, nearly 89,000 pay-TV subscribers had withdrawn from pay-TV services. This trend was expected to continue into 2018 for all telcos, where higher-end subscribers to OTT and pay-TV would begin to exit pay-TV services due to a perceived lack of benefits.

Although StarHub kept its earnings relatively stable in the face of the slowing global economy, the company’s total revenue and net profits grew at a moderate pace. Between 2012 and 2016, StarHub’s EBITDA[[18]](#endnote-18) experienced slowing or levelling growth (see Exhibit 5).The mounting competition in its main business lines compelled StarHub to explore new sources of revenue growth.

STARHUB’S JOURNEY INTO INNOVATION

In response to intensifying competition, StarHub sharpened its focus on innovation, particularly in the domains of cyber security and data analytics. The organization also fostered emerging businesses that leveraged the resources of its main business units in the area of the Internet of things (IoT).[[19]](#endnote-19) StarHub appreciated its clients’ growing dependency on the security, availability, and resilience of its underlying network infrastructure. As a result of increasing connectivity through cloud computing and a rising threat of cyber breaches, the robustness of StarHub’s networks and systems would be of paramount importance to mitigate the risk of outages that could disrupt services. Security resilience would also be critical to fortifying StarHub’s client organizations against the loss of information and breaches of regulatory and contractual obligations. As customers became more technologically savvy, consumer insights and analytics became a crucial differentiator in deepening customer engagement and achieving operational efficiency.

Recognizing rising demand for expertise in security and big data, in November 2013, StarHub hired cyber-security and analytics expert Dr. Lim Woo Lip, from the Ministry of Defence of Singapore, to be vice-president of SmartHub. Dr. Lim’s role was to spearhead StarHub’s development of analytics and cyber-security capabilities. He was also responsible for forging strategic collaborations with government agencies, institutes of higher learning, and private firms. In May 2016, The StarHub Cyber Security Centre of Excellence (CoE) was launched as a platform for the organization to co-create telco-centric cyber-security services that were integrated with its core infrastructure.

In 2014, the Singapore government launched the Smart Nation initiative to “support better living, stronger communities, and create more opportunities, for all.”[[20]](#endnote-20) The plan was to deploy sensors and smart devices connected by a national IoT sensor communication backbone.[[21]](#endnote-21) These objects could range from indoor public utility meters to outdoor vehicles. The data collected would enable smarter management of energy, urban security, and transportation.[[22]](#endnote-22)

Establishing i3 to Leverage New Growth Domains

To support the Smart Nation initiative, StarHub conducted trials of new network technologies and services to enable the implementation of IoT devices in 2015 through its innovation arm, i3—“Innovation, Investment, and Incubation.” This initiative would eventually form the backbone of the sensor communication network that was critical for Smart Nation data collection. Setting up the i3 department in February 2013 was one of the key initiatives StarHub embarked on to diversify from the traditional telco space and move toward providing enterprise digital solutions. The i3 unit was a fast-reaction innovation team responsible for moving (within the charter of three to five years) into new revenue streams of service consumption and growth markets that would react to disruptive entrants into the market. The i3 team’s main purpose was to identify potential start-ups that were related to the realms of digital life, advertising technology, mobile and electronic commerce, and Big Data. The team’s goal was to feed this information to corporate management for consideration. The disruptive start-ups were usually in the early stages of funding from venture capital. Because i3 did not receive any dedicated investment funding, the start-ups were funded in an ad hoc, project-by-project manner, contingent on the decisions of corporate management.

Once the start-ups were identified, i3 would incubate them by granting access to connectivity services, business mentorship, and go-to-market activities. The start-ups could potentially tap into StarHub’s existing pool of resources, including sales channels, networks, market information, and technological knowledge.

Initially, i3 was viewed as part of a cost centre that was expected to justify its resource allocation among the start-up projects, by generating a clear return on investment (ROI) over a short time horizon. Achieving this return was challenging, as the short-term goals conflicted with those of start-up projects that would require a longer payback period. Providing hard data to demonstrate an ROI was difficult as the new ventures often navigated in uncharted business environments⎯markets yet to be identified and established. Michael Sim, lead futurist with the i3 team since its formation, recalled:

Internally, we found it was difficult to work under these conditions as you’re often worrying about limiting your cost, which means you don’t really want to spend too aggressively. . . . Any kind of big innovation projects will tend to be discouraged because you need to justify your ROI.

The i3 team found an interesting pipeline of external start-ups and internal projects to be incubated. One example was an internally developed application named Goru Travel (Goru), an all-in-one digital concierge smartphone application for travellers in Singapore. Goru offered travel tips, could compare and book hotels, and could make dining and event reservations at the best prices. StarHub partnered with mobile strategy consultancy and enterprise-application development service provider Rainmaker Labs to develop the application.[[23]](#endnote-23) The travel app was launched in 2015 after a trial with over 700 users with the Singapore Tourism Board and content provider City Nomads. While the travel app initially received positive reviews from representatives of both pilot partners, it was eventually discontinued.

Nonetheless, StarHub had gained invaluable insights from the trial. First, it found that relying on third parties for application development hindered its ability to make changes quickly in response to user feedback. Second, the underlying technology was not as mature as expected, which affected the user experience. Third, as a travel app, Goru thrived on a transient consumer base. Even if the team had demonstrated the required internal technical expertise and the technology had been mature, StarHub’s existing direct and channel sales teams were not set up to reach out to international tourists. While the existing sales teams were very effective in marketing traditional telco services, they were not experts in marketing travel services to international consumers, who would arrive and leave the country in a few days. Nevertheless, these learning insights served to inform StarHub in its future application developments.

Transitioning From i3 to the Emerging Business (EB) Unit

In June 2017, the i3 team was subsumed under the emerging business (EB) unit. The unit comprised 20 staff members tasked to work with the stakeholders of various industries to co-develop innovative solutions in three growth areas: connected buildings, connected vehicles, and connected living. According to Sim:

Connected building is where all the smart meters and smart lighting comes in—solutions that make the building come alive. [A] [c]onnected vehicle [comprises] all the vehicle parts . . . the driver’s behaviour, fleet tracking, [and] urban logistics. Connected living . . . is actually your consumer space . . . smart homes and all the services around consumers.

Top management’s rationale for merging both divisions was that the i3 and EB units shared a similar focus with regard to consumer and enterprise innovation within IoT⎯devices or objects that were able to connect to the Internet to collect or exchange data through embedded sensors.

Sim mused:

We noticed that potentially there’s a gap between incubating a start-up and bringing it to fruition through productization and commercialization without our company infrastructure. That’s where StarHub set up the Emerging Business department—to complete the whole value chain. After i3 has scanned the market, looked at emerging technology and determined that this is something with potential, Emerging Business would then take the ideas and try to make them become reality.

Both units were complementary in nature: the i3 team would scan the market for new consumer- and enterprise-related technologies and solutions that would take three to five years for market adoption, while the EB unit team would develop new products before marketing them in one to two years. Essentially, the EB unit was StarHub’s commercialization department, bridging the gap between the process of product conceptualization and product sales. The EB unit also conducted due diligence with regard to product market research, evaluation of product viability, and investment in product development and marketing. This new approach allowed the i3 team greater flexibility to achieve its opportunity identification and endorsement objectives without having to meet short-term ROI goals.

To enable the EB unit to monitor the different stages of the innovation value chain, it developed an internal process of “Explore, Refine, Pilot, and Scale” (ERPS). Before restructuring, the i3 team would engage start-ups in their early stages of development, when their concepts and value had yet to be validated with the target market, which made investments in them inherently risky. After merging, the EB and i3 units would focus on exploring, refining, and piloting companies that were not only aligned with StarHub’s businesses but also could commercialize their new products or services within one to two years, effectively promising quick returns. These candidate companies had already established themselves within the industry and were looking for a partnership with StarHub to scale forward. The ERPS process provided the EB and i3 teams with a structured approach to discover, evaluate, and invest in innovations that would allow StarHub to create and capture value.

THE MANDATE FOR INNOVATION

In 2016, the IMDA launched the Infocomm Media Industry Transformation Map (ITM), which StarHub participated in. The ITM aimed to provide stronger support for innovation and the development of disruptive technologies such as cyber security, the IoT, artificial intelligence, and data analytics. It also supported immersive media across 23 industries, including info-communication technology (ICT) in media, healthcare, retail, hotels, and electronics.[[24]](#endnote-24) StarHub also participated as a technology solution provider in the IMDA’s SME Go Digital program, launched in April 2017 to support SMEs in retail, food services, and logistics in their early phases of adopting digital technologies. The program aimed to boost the SME’s productivity through the digitalization of processes. The SME Go Digital program involved “partnering influential companies to pilot sector-specific solutions that have the potential to scale.”[[25]](#endnote-25) In particular, Singapore’s telcos would provide the SMEs with a one-stop service through digital technology-bundled solutions, which included broadband or Wi-Fi connectivity and cyber-security and data-analytics tools.[[26]](#endnote-26) StarHub now had a greater mandate to venture into the growth domains.

To leverage new growth domains, StarHub simultaneously adopted an acquisition strategy. StarHub announced investment in content producer mm2 Asia Ltd. (mm2 Asia) in March 2016 for a 9.05 per cent stake at $18.04 million. Taking a stake in mm2 Asia expanded StarHub’s pay-TV offerings and the reach of localized content through distribution beyond Singapore’s shores. In 2017, StarHub acquired cyber-security system integrator Accel Systems and Technologies Pte. Ltd. (Accel) on May 26, and cryptographic firm D’Crypt Pte. Ltd. (D’Crypt) on December 15. These investments gave StarHub a 51 per cent stake of Accel for a total consideration of $19.38 million and a 65 per cent stake of D’Crypt for a total consideration of $122 million. By the fourth quarter of 2017, Accel was already contributing 6 per cent to the revenue growth of StarHub’s enterprise fixed business, which comprised data, Internet, and voice services. D’Crypt provided the in-house expertise for StarHub to become an end-to-end provider of cyber-security solutions because D’Crypt had the proven technology and research and development capabilities. Its cryptographic expertise complemented StarHub’s Cyber Security CoE in delivering mission-critical ICT and digital solutions. “Without the D’Crypt impact, you would be looking at 2 per cent to 4 per cent decline in service revenue,” StarHub’s chief financial officer, Dennis Chia, stated.[[27]](#endnote-27) Both investments presented an opportunity for StarHub to strengthen and diversify its portfolio, thereby differentiating itself from the cluttered competition field. StarHub planned to use internal cash resources to acquire the remaining stakes of both Accel and D’Crypt, intending to turn them into wholly owned subsidiaries by 2021.

DESIGN THINKING AND CO-CREATION

As a telco operating in a mature market, StarHub had relied on past industry data to guide, finance, and forecast its business trends. However, in an increasingly volatile business environment fraught with socio-cultural changes, technological disruptions, and economic uncertainties, the traditional method of making projections based on historical data became untenable. The EB unit team was tasked to find a business methodology that would adhere to StarHub’s corporate governance structure, while allowing it to innovate effectively. The team eventually adopted the “Discovery-Driven Planning” (DDP) business model, a methodology that emphasized experimentation instead of reliance on deterministic concepts such as projected economic value added. In the DDP model, important assumptions and metrics would be raised that supported the business plan; the plan would be tested and evaluated at stipulated checkpoints; and the decision to stop, redirect, or try something different would be made at each checkpoint. This approach allowed executives to test their assumptions and validate their product concepts with minimal upfront costs. They would make substantial investments to scale up production only when more evidence confirmed the commercial viability and technical feasibility of the product ideas.

The DDP business model complemented the design-thinking approach that, since its formation, had been the cornerstone of the i3 innovation processes. Design thinking promoted the integration of design with the core business strategy to create outcomes that met the customers’ needs (see Exhibit 6). It was a user-centric approach that aimed to strengthen the relationship between the business and its customers by discovering what created meaning for end-users. Sim explained:

Design thinking [provides] a mindset shift. The shift has to be embedded into how we look at things, how we empathize and feel what the customer is feeling . . . the mandate from the CEO is [that] everyone in the organization has to go through it. It’s a very strong mandate, where we then have to drive through a program to ensure that we have a common set of terminology.

EB was the first unit in StarHub to adopt design thinking. StarHub’s Human Resources (HR) department then became design thinking’s strong advocate, championing the inclusion of such thinking in the professional development of the company’s employees. The strong alignment between HR’s emphasis on design-thinking skills as part of talent management, and the corporate focus on innovation processes inspired by design thinking would in turn foster an organizational climate conducive for innovation. The change in organizational structure was to facilitate innovation processes; the next step for StarHub was to discover new business opportunities using the approach of design-thinking to co-create possible solutions for its target customers.

Smart F&B Retail Solutions

Given the slow economic growth in Singapore, it was no surprise that StarHub’s growth in the retail sector had been dropping by 3.1 per cent annually since 2016. To understand the issues within the retail business, the EB unit conducted design-thinking workshops with StarHub customers, particularly its F&B operators. Through customer focus group discussions, StarHub sought an in-depth understanding of the challenges that F&B operators faced. The issues raised ranged from insufficient customer information to the labour crunch. It seemed that StarHub’s integrated solutions based on customer analytics would be good tools for resolving these challenges. By granting Wi-Fi access to the F&B patrons, StarHub’s Wi-Fi Solutions initiative would allow the F&B operators to collect their patrons’ profiles and activity data. Capturing and analyzing video images of people who walked past the stores instead of entering would enable retail operators to better understand the profiles and behaviours of patrons and non-patrons, and hence to formulate effective marketing strategies to reach their target patrons.

Eager to empathize with the customer, the EB unit staff walked the customer journey with F&B operators to discover the “pain points” in their daily operations. After spending a few days at the F&B outlets to observe the operators’ workflows and interactions with their patrons, the EB unit staff realized that the initial integrated solutions were too complex and onerous for the F&B operators, especially those who had only a single establishment. Sim reflected:

Through working with these café owners, we know some of these nice, sexy solutions that don’t work for SMEs. [They were] either too expensive or complex, and they didn’t know what to do with it. So we watered [the solutions] down to something that is actionable and makes sense to them in their day job.

Walking the customer journey enabled the EB unit staff to discover that in Singapore, a segment of F&B owner–operators had to single-handedly juggle the multiple tasks of procurement, operation, and marketing. These operators would have no time to decipher large video analytics files offered by the telco. Observing these customers enabled the EB unit staff to critically evaluate the feasibility of their solutions and adjust their offerings more cost-effective solutions with simpler user interfaces.

To create greater value in the sector, StarHub launched its new Smart Retail Solutions initiative in 2016. Supported by the IMDA under the SMEs’ Go Digital program, Smart Retail Solutions offered bundled broadband services with the IMDA’s pre-approved digital solutions to 1,000 SMEs from the retail and F&B sectors. Some of these solutions included retail analytics, digital ordering and payment, and video and Wi-Fi analytics that would allow the operators to improve both product sales and customer experience.[[28]](#endnote-28)

Automation in the Hospitality Industry

Visitor arrivals to Singapore increased 7.7 per cent from 2015 to 2016, and StarHub considered that automation technology would help free up hotel staff from simple basic tasks and give them more time to focus on interacting with the guests.[[29]](#endnote-29) One robot could do the work of two to three people, and took only three minutes to make a room delivery, compared to five minutes of delivery by a human. With an array of available technology solutions to rapidly meet the demands of increasing visitors to Singapore, telcos such as StarHub would be well positioned to provide automation solutions to the hospitality industry to address the problem of productivity and the staffing crunch within the sector. In October 2016, StarHub partnered with Republic Polytechnic and U.S.-based robotics firm Savioke, Inc. to introduce an autonomous room-service delivery robot to enhance the operational efficiency of a local hotel, M Social Singapore, by automating the simple task of delivering items to guests’ rooms upon request.[[30]](#endnote-30)

Designing the robot for hotels was complicated. By physically following the housekeeping staff to observe their work routines at the hotel, the EB unit staff gained first-hand experience of housekeeping tasks⎯refreshing hotel rooms, replenishing inventory, and responding to hotel guests’ requests in a timely manner. A great deal of imagination was required to envisage the journey of such a robot. These “service robots” would be very different from their predecessors, industrial robots that were programmed to perform tasks in a highly controlled factory environment with access granted only to staff who had been trained to handle the robots. Unlike industrial robots, service robots would need to be more sensitive, as they handled more complex tasks such as interacting with consumers.

Sim described the considerations that went into StarHub’s design of service robots:

It’s a seemingly simple journey, but there is a lot of thinking through. The robot has no hands, how does it press the lift? How does it know which floor to exit? And can the robot coexist in the lift with humans? Also whether the hotel is suitable—the robot cannot take stairs. All these are considerations that our people actually have to discover by going down and walking the floor.

To address the complexity issues, robotics solutions needed to be integrated with the hotel’s existing technology infrastructure⎯such as elevator controls and phone communication systems⎯to coordinate the smooth mobility and functioning of the autonomous room-service delivery robots. This integration would enable the robots to ride existing rather than specially-designed elevators with hotel guests, navigate to the guests’ rooms and, upon arrival, notify the guests to open their doors.

THE ROAD AHEAD

StarHub hoped to create greater value by venturing into a range of solution offerings. Witnessing the positive responses of the F&B and hotel operators to their smart retail and robotic solutions, management was upbeat about the potential of these two industry sectors as future growth engines for the company. Because scaling of new operations would require extensive staff training and capability development, and would involve a steep learning curve to gain industry experience, StarHub needed to prioritize its efforts. On which of the two industry sectors should StarHub focus?

In Singapore, the F&B industry had more than doubled the number of its establishments, from 3,356 in 2000 to 7,260 in 2015, contributing more than $3 billion in value-added and 0.8 per cent of the nation’s gross domestic product.[[31]](#endnote-31) The growing population of F&B operators appeared to be a booming market for StarHub’s Smart Retail solutions, but the intense competition and long payback period on initial capital invested posed challenges for the establishments to stay afloat. On average, a typical F&B establishment operated at an annual loss of 8 per cent with a payback period of two and a half years. These challenges had led to an exceptionally high annual churn rate of between 20 and 30 per cent since the late 1990s. Rising staff salaries and space rentals further plagued the establishments. The Smart Retail Solutions initiative StarHub launched as part of the SMEs Go Digital Program to digitize 1,000 SMEs from retail and F&B seemed promising. It would transform the industry and enable the F&B operators to increase their competitiveness but StarHub would need to make significant investments to develop its staff and build facilities to reach out to the F&B operators, and to provide them with awareness training and re-training in an industry with a high churn rate.

With regard to the hospitality industry, the recent growth results were interesting. In 2016, the supply of hotel rooms surged to 63,850 across 413 hotels, a 4.8 per cent increase compared with the previous year. International visitor arrivals and tourism receipts grew at 7.7 per cent and 13.9 per cent from 2015 to 2016, to 16.4 million and $24.8 billion, respectively. Of the tourism receipts, about one-quarter⎯$4.4 billion⎯was spent on accommodation. However, despite the increase in tourist arrivals and tourism receipts, hotel-room revenue had declined by 1.7 per cent from $1.58 billion in the first half of 2016 to $1.55 billion in the first half of 2017. Hotels actually sold 0.6 per cent fewer room nights in the first half of 2017 compared with the same period in 2016. From 2016 to 2017, the revenue per available room fell nearly 5 per cent to $199, and the average occupancy rate dropped by 0.9 per cent to 84.2 per cent.[[32]](#endnote-32) Some market analysts attributed the decline to an oversupply of hotel rooms, which was softened by the increased tourist arrivals. As the growth in the number of hotel rooms was expected to exceed the growth in the hotel workforce, the hospitality industry would be pressured to adopt a labour-light business model by automating its operations. With its initial success in piloting robotic solutions with a local hotel, StarHub would be well positioned to use its expertise to reach out to other hotels. However, scaling these automation solutions to more hotels would require time and resources, not only in building internal capability but also in developing and customizing complex and intelligent service robots to cater to hotels with vastly different operational routines, building styles, and floor layouts.

Given both the opportunities and risks in entering either sector, StarHub’s senior management needed to consider the company’s options as it entered the new year.

EXHIBIT 1: MOBILE PHONE PENETRATION RATE (2006–2016)

Source: Infocomm Media Development Authority (IMDA), “Telecommunications,” accessed January 10, 2018, www.imda.gov.sg/industry-development/facts-and-figures/telecommunications#6x.

EXHIBIT 2: SINGAPORE MONTHLY BLENDED Average Revenue Per User (2014–2016)

Note: ARPU = average revenue per user; SGD = SG$ = Singapore dollar; SG$1 = US$0.74 on February 14, 2018

Source: Business Monitor International (BMI) Research, “Competitive Landscape – Singapore (Q4 2015, Q4 2016, Q4 2017),” accessed January 18, 2018.

EXHIBIT 3: SINGAPORE’s annual short message service (SMS) GROWTH (2012–2016)

Source: Government of Singapore, “Mobile Data Usage,” accessed January 18, 2018, https://data.gov.sg/dataset/mobile-data-usage?resource\_id=a807b7ab-6cad-4aa6-87d0-e283a7353a0f.

**EXHIBIT 4: SINGAPORE PAY TV SUBSCRIBERS, 2010**–**2015 (in thousands)**

Source: Business Monitor International (BMI) Research, “Market Overview – Singapore (Q4 2012–Q4 2016),” accessed January 18, 2018 via https://bmo.bmiresearch.com/home.

**EXHIBIT 5: STARHUB’S EBITDA FIGURES (2012**–**2016)**

Note: EBITDA = earnings before interest, taxes, depreciation, and amortization

Source: StarHub, “Full Year Financial Statement and Dividend Announcement (2012–2016),” accessed January 18, 2018, http://ir.starhub.com/investors/?page=Results.

EXHIBIT 6: STARHUB’S DESIGN-THINKING PROCESS

1. Identify the customers you want to work with.
2. Formulate problem statements encountered by the customers.
3. Walk the customer’s journey. Empathize with the customer’s perspective of the problem and know why they are frustrated.
4. Ideate and come up with a workable concept to build the prototype.
5. Test the prototype with the customers to gauge the suitability of the solution.

Source: Michael Sim, interview with case authors, October 20, 2017.

ENDNOTES

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