SURF

Solutions for Urbanised Future

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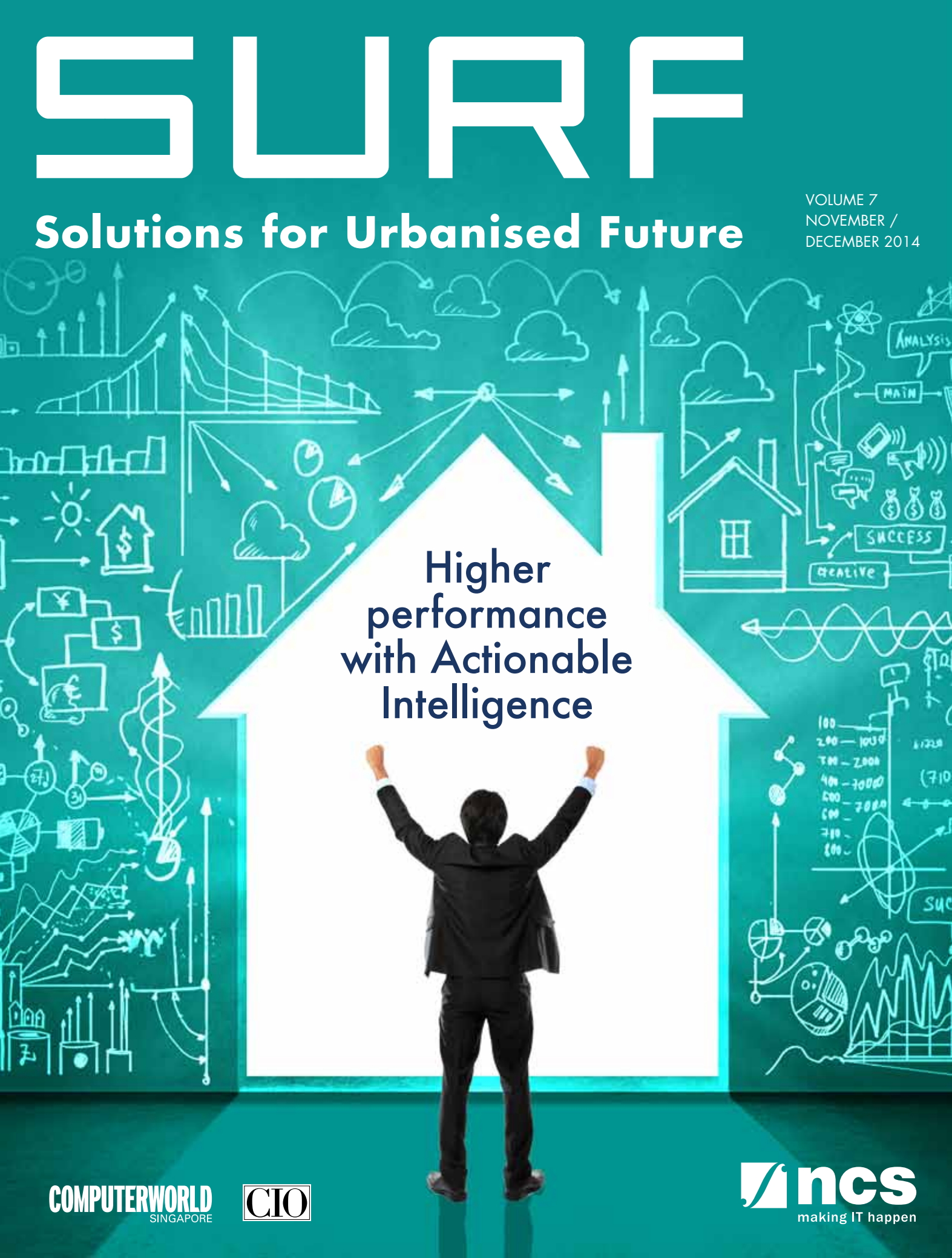

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SURF Maturity Index 2014: S'pore Firms Tapping on Multiple Technologies

What different verticals are focusing on to make their organisations future–ready.

Even more Singapore enterprises now tap on multiple technologies instead of focusing on any one technology, according to findings by NCS' SURF Emerging Technologies Maturity Index 2014.

This annual study is commissioned by NCS and conducted by IDC, and is part of NCS' efforts to track the maturity levels of companies to enable Solutions for an Urbanised Future (SURF). SURF is NCS's vision of empowering a smart, sustainable city through emerging technologies.

The SURF index found that approximately 20% of businesses interviewed have invested in multiple technology assets (cloud, mobility, Big Data, machine-to-machine [M2M], social) over the past 12-24 months. Looking ahead, between 2014-2016, these investments will rise substantially as approximately 80% of businesses will invest across all technology domains.

The survey found that the various industries have differing levels of adoption rates for the emerging technologies. For instance, the government, retail & wholesale sectors have the highest adoption rates for cloud technologies, while the healthcare and retail sectors showed high adoption rates for situational awareness technologies. The financial services sector has a strong appetite for emerging technologies, with the highest adoption rates for big data analytics and social media technologies.

Interestingly, cloud adoption is the lead intiative for the majority of the sectors – media and communications, healthcare, government & education, process & discrete manufacturing, resources & utilities, and logistics. (Figure 1).

The findings showed that the drivers for adopting emerging technologies by the various sectors differ. These range from responding to new regulations, reacting to the cost of operations, changing customer needs, maintaining market leadership or facing increased competition.

Financial Services

The finance sector is embracing technology innovation, with the greatest focus on big data analytics, followed by cloud and mobility technologies.

According to survey findings, the sector's Line of Business (LOB) and CXO (C-level executives) do not view technology as an extra expense, and their innovation plans involve technology, while two in five said that their business strategy is empowered by technology innovation investments.

This sector also turns to external sources to help with emerging technology adoption, as three in 10

Figure 1 Lead Initiatives across Verticals

of the respondents from financial services said innovation involves third parties together with internal stakeholders. The majority of them said their IT department is involved in innovation decisions and is fully integrated within innovation management.

Government

In the public sector, cloud technology adoption is the key focus, followed by big data analytics. Technology is viewed as an integral part of their organisations, as the survey found that none of the government respondents view technology as an extra expense, though this vertical scored the least when it comes to having qualified internal resources.

Top three drivers for the government sector are new regulations, the need to drive new innovations and the cost of operations. Three in 10 said technology-led transformation is an essential part of their strategy, and two in five said that the IT department is an agent for innovation.

Over 60% of respondents in this sector also view the use of video surveillance as highly important to gain situational awareness. More than 70% also aim to use situational awareness technologies for business continuity and disaster recovery.

Media and Communications

The media and communications sector has been dramatically affected by the digital transformation trends, as the way content is produced and shared has profoundly changed with the digital age. This is reflected in the way the media and communication industry is embracing emerging technologies like social media.

Close to 65% of the respondents said their IT department is fully integrated within innovation management, the highest compared to any other vertical, while the majority said they had clear internal stakeholders for technology innovation.

The focus is on cloud technologies, followed by mobility, then big data analytics. Three in 10 had set up a specific group to make decisions for technology-led transformation, and half of the respondents said their business strategy is empowered by technology innovation investment.

Discrete Manufacturing

The discrete manufacturing industry is facing globalisation challenges with shorter product life cycles, and global supply chains. As a result, many are turning to information technology (IT) solutions to help manage their global operations.

The survey found that cloud and mobility technologies are the priorities among Singapore discrete manufacturers, followed by big data analytics, then social media.

The majority said they have clear internal stakeholders for technology innovation and that innovation involves third parties together with internal stakeholders.

There are still organisations in this industry that hold the more traditional perspective, where 15% said LOB and the CXOs see technology as an extra expense. However, the technology-led initiatives are top-down, where 35% said senior management promotes technology-led transformation at all levels.

Process Manufacturing

Cloud adoption is a priority for those in the process manufacturing industry. The survey found that 35% said innovation involves third parties together with internal stakeholders.

The manufacturing industry has less of a focus on technology, where one in 10 said they have no stakeholders for technology innovation, and 35% said that a specific group makes decisions for technology-led transformation.

In terms of technology adoption, this sector has equipped staff, where 20% said they have qualified staff internally, and two in five said staffing is designed to support the innovation agenda involving both external and internal resources in a single team.

Retail & Wholesale

As consumers embrace new technologies, retailers may find it difficult to keep up with the latest technological trend. While the retail industry has been at the forefront of technology adoption, there is a mix of attitudes to emerging technologies. Unsurprisingly, they view social technologies as the priority, followed by cloud, mobility and big data analytics. Contrary to the perceptions of most industries, 10% in the retail & wholesale industry said LOB and the CXO see technology as an extra expense.

In terms of implementation, they involve third parties together with internal stakeholders, for two out of five respondents, and a similar figure said they have innovation plans which involve technology but they are limited.

Resources & Utilities

In today's competitive business world, operational efficiency is critical for resources & utilities organisations. Embracing digital transformation enables them to deliver services more efficiently and provide better customer services.

To this end, cloud technologies are a priority for this industry, followed

by social technologies, then mobility.

However, there are still those with more traditional perceptions, as 15% said their LOB and the CXO see technology as an extra expense.

Nonetheless, a good number embrace technological innovation, with two in five saying there are clear internal stakeholders for technology innovation, and a similar number said that the IT department is involved in innovation decisions.

Logistics

Technology has the power to optimise transportation and logistics systems, and in this industry, cloud is the priority, followed by social technologies.

There is support for technology adoption, as two in five said there are some internal stakeholders for technology innovation, and a similar number said senior management provides some support to technology for business transformation. Three in 10 said IT department is involved in innovation decisions, while 37% said external and internal resources are in virtual teams. Interestingly, 7% said there is no evaluation on results accomplished for defining ROI from digital transformation initiatives.

Education

Digital transformation technologies can help create more engaged students, enabling personalised learning, and help teachers teach more effectively and efficiently.

The survey findings reveal that cloud and mobility are the top focus for the education sector, followed by social technologies.

Half of the education respondents said there are clear internal stakeholders for technology innovation in their organisation, while three in 10 said a specific group makes decisions for technology-led transformation. However, 3% said LOB and the CXO see technology as an extra expense. There is a variance in the approach and perception of technology, where 2 in 5 said their innovation and technology plans are integrated, but 3% said there are no plans for innovation.

In terms of their technology resources, one in 10 said they had qualified staff internally, and two in five said their external and internal resources are well planned and integrated.

Healthcare

In the healthcare industry, cloud technologies are the priorities.

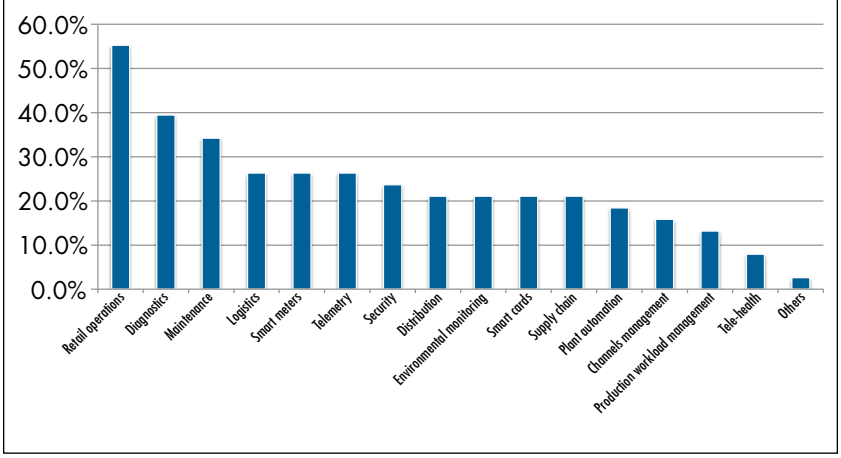
Two in five said there are clear internal stakeholders for technology innovation. However, 3% said the LOB and the CXO see technology as an extra expense, and only 7% identified technology-led transformation as an essential part of their strategy.

While half said IT department is involved in innovation decisions, none said their organisation's staffing is designed to support the innovation agenda. And one in 10 said they have no evaluation on results accomplished for defining ROI from digital transformation initiatives.

Agile Decision-Making

An area that will see increased spending and growth is situational awareness technologies, where 39% of respondents have a clearly defined business case that they would like to achieve. Retail operations, diagnostics and maintenance are three top business areas where situational technologies will be deployed (Figure 2).

Figure 2 Business Areas where Situational Technologies would be deployed



Such technologies can provide organisations with a 360-degree view of relevant business information from different categories of intelligence and not just isolated data, to derive timely and intriguing insights to changing business situations. However, price and complexity are major inhibitors (Figure 3).

The situation appears to be that situational awareness technologies are being adopted under the radar, with several projects being outside

the remit of IT, though this is not expected to be for too long.

Different verticals can utilise situational awareness to enhance enterprise responsiveness by making more informed decisions, to effectively manage changing business situations, mitigate risks, exploit opportunities, and attain the best outcomes.

rapidly. Situational awareness can provide insights that influence strategies and directions, for instance, whether and how product offerings, distribution and sales channels need to be changed.

The use of real-time data from sensors, mobile devices and social media can have an impact on the operational

also pave the way to better customer engagement.

Situational awareness technologies can empower the **resources & utilities** industry with the ability to monitor and make real-time decisions to manage utility flow, metering data and enable increased safety, reduced costs, and better responses.

In the **logistics** industry, situational awareness capabilities can help to protect, enhance and ensure the efficient movement of people and goods, and the supply chain in general.

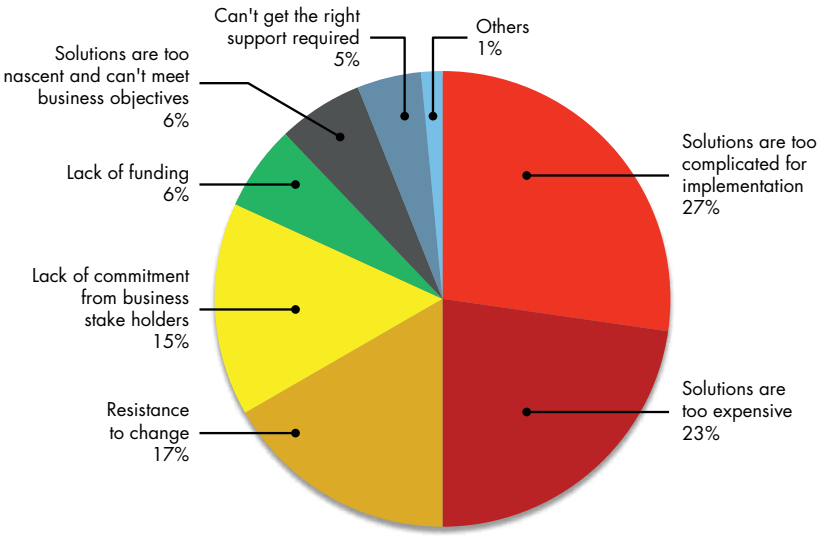
Educational institutions have the challenge of building a safe environment that promotes learning. Situational awareness systems can help to increase awareness of all situations, such as emergencies, to enable a safer place to grow, learn and live.

For the **healthcare industry**, situational awareness can improve patient safety, administration, healthcare quality issues, and even be applied to critical care environments. In the situations of epidemics and outbreaks, situational awareness can help in policy decisions.

Essentially, organisations are faced with a whole new set of challenges in an era that IDC identifies as Digital Transformation 3.0, which is characterised by the use of 3rd Platform technologies, and is built on a foundation of cloud, mobile, social, and Big Data technologies.

Even as these technologies disrupt the way business is conducted across the verticals, business strategists, IT leaders, and solution developers need to use these emerging technologies to conceive, build and reinvent their industries.

Figure 3 Price and Complexity are Major Inhibitors



The **financial industry** can use situational awareness technologies to enhance its surveillance and visibility into operations, hence mitigating any reputational and regulatory risks, and reduce their operational costs.

While in the **public sector**, government agencies with effective situational awareness strategies can aggregate and filter information from multiple sources to better respond to crises and emergencies like natural disasters and criminal activities.

In the **media and communications** space, the trend of digitisation has compelled organisations to evolve

decisions in the **manufacturing industry**. In a manufacturing process, unexpected things happen, making it useful to have the ability to make decisions and respond in real-time to these changes.

The complex **retail and wholesale** environment of today requires the retailer to move towards knowledge-driven decisions that are based on analysing the data accumulated from situational awareness to better manage store operations. These include insights into customer traffic, footfall and even their demographics. Insights into shoppers' online shopping profiles and habits can

Promising Peace of Mind to Citizens

Meet the team that harnesses emerging technologies for tomorrow's safe and secure city.

When night falls over the city-state of Singapore, its citizens may wind down to rest after a hard day's work, but the public safety agencies are testing technologies that allow its officers to stay even more alert and vigilant.

Under the cover of night, this vigilance for situational awareness could be heightened thanks to innovative sensor and analytics technologies tested at Singapore's first Safe City Test Bed initiative.

The Singapore government fully appreciates that building a Safe City requires the integration of technology, infrastructure and processes to ensure security and safety in today's complex urban environments.

The key? Access to optimal information that is critical for the relevant authorities to perform situational assessments, and respond effectively to keep today's urbanised environments safe.

Already, public safety agencies have experienced the capabilities of the Test Bed technologies deployed in the pilot project spearheaded by the Safety and Security Industry Programme Office (SSIPO). The SSIPO is jointly established by the Ministry of Home Affairs (MHA) and the Singapore Economic Development Board (SEDB) to develop a Safety and Security industry with innovation capabilities.

A key element of the project was an integrated safe city platform developed jointly by NCS & Airbus Defence and Space to acquire multiple live city data feeds through physical and electronic sensors. Data collected was processed and analysed through advanced analytics and predictive modelling; intelligence reports were then auto-triggered to alert the on-ground operations team and the command and control room.

One key highlight of the Test Bed technologies is the "visual signature" capability, which allows a vehicle's trajectory to be traced. For instance, this can be used to trace a suspicious vehicle that breaches security at an immigration checkpoint.

Embarking on a robust framework and approach

If you imagine that a technology Test Bed is a straightforward and smooth-sailing experience, think again. Being a pioneer is not easy – having to break new ground and going where others have not gone before.

The challenges can range from defining the architecture, to getting approvals for the sensor deployment and layers of communications with multiple agencies. NCS SSIPO team and Airbus rose to the challenge and tackled the issues one by one.

"Participating in the SSIPO CFC [call for collaboration] provided us with the opportunity to create our very own NCS Safe & Smart Cities Platform reference architecture that could meet the objectives of all the stakeholders," said **Tok Wu Chuan, Director, Customer Solutions, Communications Engineering at NCS**.

Behind the successful partnership of NCS and Airbus, is a story of dealing with deadlines, challenges, standards and approvals.

As one of four consortia who were selected to participate in this Safe City Test Bed, NCS and Airbus knew they had their work cut out for them. They had to use video content, e-sensing and smart city sensors to integrate information and sensors in an automated manner, and derive analytical insights.

Faced with a shared objective, NCS and Airbus started by aligning their processes, systems and deliverables, through an iterative approach. In pursuit of developing a robust solution, real-life alerts, prediction of over-crowdedness and a suite of possible scenarios were mapped out at the identified precinct.

What is the Safe City Test Bed all about?

It is all about being leading edge. The Safe City Test Bed was an innovation platform for Singapore's government agencies to collaborate with industry consortia to build and test solutions for urban management and safety and security.

The Test Bed fused existing data from different government sensors and applied new analytical capabilities to give government agencies an improved and combined operating picture, enhancing situational awareness and decision making. These solutions can also find correlations and emerging trends from the data to ensure effective planning and preparedness against future threats.

For instance, the Test Bed developed a crowd simulation model for indoor environments such as MRT stations. Using real-time crowd counting techniques, this solution, when applied to emergency and evacuation scenarios, can help officers predict crowd behaviour and movement if an incident or crisis occurs, and to plan for evacuation routes by emergency and rescue teams.

Another feature developed was video analytics solutions that are capable of detecting abnormal scenarios like traffic congestion, abandoned objects, and rubbish build-up. With a combination of rule-based algorithms and machine-learning, these technologies can allow agencies to distil vast amounts of data to provide meaningful insights and help improve response times.

Going forward, the government aims to create a plug-and-play analytics platform where companies can test analytics modules with ready access to operational data. These solutions, if successful, can be eventually adopted by participating government agencies. To realise this vision, SSIPO will be conducting a technical feasibility study toward the end of this year.

Fusing data from multiple government agencies was a crucial enabler to maximise the situational awareness capabilities and enhance the response capacity for a wide spectrum of safety and security concerns. The system architecture is designed to ensure minimal disruption to the existing city infrastructure and work processes. Sensors are integrated incrementally to enhance efficiency and city safety management.

Integration itself presented technically complex issues due to a vast range of existing and new sensor specifications, different operational processes and large ammount of data fed from the different sources. In order to ensure interoperability, creative and innovative problem solving techniques were deployed. Such collaboration gives rise to a sophisticated public safety technological solution to aggregate and analyse data streams from and across multiple systems.

"To create the reference architecture, we carried out extensive research to search bleeding edge concepts and ideas, met up with potential vendors, exchanged ideas with the Economic Development Board (EDB), and

SSIPO. There were multiple drafts of the reference architecture before we arrived at a version that is good enough to be the NCS Safe & Smart Cities reference architecture for SSIPO in end September/early October 2012," said Tok.

Theory always looks good, but there is nothing like putting the technology to work. This Test Bed has allowed the live testing of advanced analytics on video content, e-sensing and smart city sensors.

"The use of technologies in a "live, practical" environment is better than a "lab" environment. The lab environment will not be able to duplicate the weather, physical site conditions, lighting, dust, noise, people movement and density, that is provided by a live environment. It was invaluable," said **Ching Yin Sing, Director, Strategic Business Development, NCS Communications Engineering**.

"The project is relevant as it proves that some of the technologies can be implemented with real impact to operations, if the system is tuned properly. For example, the fire incident in Little India," said Ching. The monitoring of tweets and camera footage had allowed the detection of a construction site fire at Little India on March 26 within six minutes.

In the end, the NCS – Airbus SSIPO project resulted in real-time, value-added insights that had never been collected before. Important pieces of the project puzzle include the following:

- Physical sensors: Empowering situational awareness and detection of potential events in the precinct with sensors that cover places of interest and hot spots.
- E-sensors: The social analytics engine collects relevant information and notifications that help predict or detect potential threats.
- Secure communications: The backbone empowering seamless data streams from and across the systems.
- 4G wireless connections: 4G wireless connections help optimise digital engagement across all communication devices.

DO YOU KNOW?
AROUND 15 000 EVENTS ARE DETECTED BY SENSORS A DAY AT LITTLE INDIA (10 000 BY E-SENSING AND 5 000 BY PHYSICAL SENSING)

Success Factors

So what made the NCS–Airbus partnership a success? Sheer determination and the dedication of the team members were key factors.

"The key difficulty was in the implementation. One issue is the co-ordination required, as the project involved many parties. I think we have to acknowledge the extremely good work done by the team members **Liu Zujiang**, **NCS Project Manager** and **Manminder Singh Takhar**, **NCS Solutions Architect**. The resolution of issues that involved many parties were done via negotiation, cajoling and much patience," said Ching.

Given the scale of the integration of data, the project also provided the opportunity to promote inter-agency collaboration for idea and information sharing.

Through this Test Bed, NCS has walked away with invaluable experience. In the area of mobile video surveillance, they have learnt that it is useful for the operator at the command centre to have an awareness of the ground situation, and that having a separate network/bandwidth is key to real-time mobile video surveillance.

Another lesson is that besides using video sensors, deploying a variety of sensors such as sound sensors, cyber monitoring (e-sensing) sensors can bring about a different form of intelligence to the analysis of the situation.

Even as the Safe City Test Bed project has been completed, it is just the beginning of more exciting developments to come, as new ground is broken. Now, public safety agencies can better understand the capabilities of the Test Bed technologies, like the ability to detect and reduce any overcrowding situation in buildings before it reaches to a dangerous level. Crowd management can be an easier task with the right video analytics. These findings can enable better understanding of situational awareness for improved resource deployment, and allow officers to send high quality mobile video to the control centres for decision support.

The tireless work of this team may have well paved the way to future cities where public safety officers are armed with the latest data and technologies to make fast and right decisions, leading to a safe and secure environment where citizens live, work and play.

Passion to Shape Future Generation of Learners

Lee Chueng Andros, Lead Consultant, Education, Business Application Services, NCS

Working with the aviation, education and government sectors may seem to be completely different and unrelated industries, but to Lee Chueng Andros, this diversity is part and parcel of his work at NCS.

Having talked to Andros, 35, to find out what drives him, we found out that it is his passion to positively impact how students learn – something that also keeps him awake at night.

What is your area of focus in NCS? What are your skillsets or training in?

I work in the Chief Architect's Office, and deal specifically with pre-sales consultancy for solutions that make use of NCS's in-house products such as eNGage™, CustomerConnect, ExchangeConnect etc. I also focus a fair bit on the education industry and the various government agencies.

What are some of the highlights of your career at NCS?

One of the most memorable events was a short overseas stint to complete a project for an application that handles the maintenance of the Bruneian sultan's fleet of aircraft.

In recent years, it has been the opportunity to work with educators from both the K-12 and IHL [Institutes of Higher Learning] sectors. The work we do in these sectors has given me the chance to help in a small way to shape the future of education.

What are your aspirations for a Smart City?

A Smart City should better the lives of its inhabitants in all aspects, with the technology remaining unobtrusive. I hope the advent of new technologies will ensure that quality education,

healthcare, and transportation be made accessible to all, to give everyone an equal footing in terms of acquiring basic skills and accessing basic amenities.

How do you think your skills can contribute to a Smart City?

My experience and insight into the minds of educators can help in small part to contribute to the future development of education applications and technologies. I hope that this will in turn become a pivotal part of a smart city.

What would you say are the key attributes of a successful IT professional?

I think that patience and an insatiable thirst to learn are two very important attributes for success.

What technologies are you most excited about now?

I find biometrics and augmented reality intriguing for current and future applications. These two pieces of technology are key to allowing technology to becoming an integral part of everyday life.

The trends and technologies in the IT industry change so quickly, what do you do to stay on top of the game?

Read, read, and read – any and every piece on new technologies that I can find.

Any tips on how to survive in the IT trade?

Aside from IT expertise, I find that relying on patience and sincerity will get you through tough situations and ultimately lead to breakthroughs in both business opportunities and building better relationships and partnerships.

What are your career goals and vision?

I hope to continue working in the education industry and gain even more insights and experience into this unique landscape.

Hopefully, in time to come, I can truly be called a consultant in technology-enabled teaching and be able to affect the lives of future generations of learners.

Check out how eNGage™ has been deployed in a school. Scan this QR code with your smart phone to watch the video.

Deep–diving into Analytics for a Smart City

Ron Liu, Senior Presales Consultant, Business Application Services, NCS

Having a clear and single-minded focus on what he does has enabled Ron Liu, 27, to experience academic as well as career success. SURF caught up with him to find out his thoughts on the future smart city, and life in the fast-paced IT industry.

What is your area of focus in NCS? What are your skillsets or training in?

As a presales consultant from BAS Enterprise Business Analytics, my area of focus is to promote the adoption of NCS analytics solutions among our customers. Prior to joining NCS two years ago, I graduated from Nanyang Technological University (NTU) with two first-class honours bachelor's degrees in Business and Computer Science.

What are some of your career highlights at NCS?

During my course of work, I have had the privilege of interacting with CIOs and senior managers of many organisations to understand their unique business challenges and propose tailored analytics solutions to meet their business objectives. Industry verticals I have worked on include transport, education, healthcare and government services.

What are your aspirations for a Smart City?

A Smart City should be like a smart super-human, that can assimilate all the information available in the environment to help residents make smart decisions – be it about personal travelling decisions, city-wide street light energy-consumption optimisation, or even where to find good food!

How do you think your skills can contribute to a Smart City?

I believe that the complementary skills of business and IT that I picked up at NTU would put me in good stead at my age to serve as the communication bridge between the aspirations of Smart Cities business leaders and technology providers, so as to craft out creative but practical win-win solutions for both parties.

What would you say are the key attributes of a successful IT professional?

There are many different categories of IT professionals, each requiring different attributes, but common to them, and in fact likewise for any other profession, you have to be passionate about what you do. Many people treat their work literally as work to earn a living, but the most successful people in the world see it as a lifestyle. Success, in whichever shape and form, is a natural consequence for such people.

What technologies are you most excited about now?

Unsurprisingly, analytics is of great interest to me now. In recent years, analytics has picked up much interest among customers. Right now, many of them are still in the exploratory stage, which means that there is a huge growth potential in this area, be it revenue streams for the company or my personal career growth. It also exposes me to an interesting mix of domain knowledge in the IT, statistics and non-IT areas.

The trends and technologies in the IT industry change so quickly, what do you do to stay on top of the game?

I always start my day by going to news web sites to keep myself updated about latest happenings and technology developments. I've also attended a Data Science course to bring myself up to speed in the area of analytics.

Any tips on how to survive in the IT trade?

Always keep an open mind about newer technologies or risk becoming obsolete.

What are your career goals and vision?

In the mid-term, I have an inclination to be a presales team leader in analytics or other technology areas. In the long-term, if I have a good business idea, I might consider entrepreneurship. Regardless, I hope that whatever I do would have a positive impact on the lives of the general public rather than simply for personal wealth accumulation.

Situational Awareness: The Key to New Insights

How organisations can get actionable insights by developing a better awareness of their surroundings.

Organisations need to have situational awareness, and achieving this can be through a variety of ways, said the participants at a lunch discussion on the topic of "Situational Awareness for Improved Business Outcomes" hosted by CIO Asia and sponsored by NCS. This took place at DB Bistro at Singapore's Marina Bay Sands on 16 September.

Having situational awareness does contribute to better quality decisions, said Elizabeth Lim, VP & CIO, Enterprise Information Management & IT Security at STATS ChipPAC, a provider of advanced semiconductor packaging and test services.

"I find that more and more management decisions really don't have a zero and one [binary numbers used in computers]. It is really about situational awareness. Finding out more about situational insights helps to make better quality decisions and better business outcomes," she said.

The term situational awareness has become such a buzzword that it is helpful to look at its definition and what it involves, said Ching Yin Sing, Director, Strategic Business Development, Communications Engineering at NCS.

The first step to achieving situational awareness is perception, where data is collected. The second is comprehension, where there is understanding about what is happening, and finally, projection, where the decisions taken on what to do is based on the findings.

"This concept can be applied to manufacturing, end-to-end tax processing, distribution, capital markets in sourcing. How it applies would depend on the context, because the sensors, data and processes are different, but the underlying concepts and some of the technology can be used across the board," said Ching.

STATS ChipPAC has used situational awareness technologies to maintain high yield levels in its manufacturing process. IT investments in this area have paid off, as machine downtime has been reduced by half.

"We use in-line analytics to tell us when something goes wrong with the operations. Our equipment is expensive, and downtime of the testers means money to us. Whenever the testers run into low yield, it stops, and all the data related to that lot is displayed on a dashboard. This test on the low yield environment analysis gives us immediate insights and helps us be proactive," said Lim.

Waleed A. Hanafi, VP - Technology Adviser to CEO at Global Blue, a tourism shopping tax refund company, countered that it is easy to be seduced by the promises that technology makes.

"I take issue with whole idea that using better tools and technology to analyse the whole big data set will reveal the insights that are lurking. I can tell from a lifetime of dealing with banks that it's not true. They make assumptions just by looking at some data sets and still send me offers for trips on yachts and to play golf, neither of which I do."

Ching agreed that many do become "seduced" by technology due to some well-publicised, successful instance of analytics. "When one person gets it right for that one customer, others think that it must be right for everyone else."

Lim pointed out that not all types of situational analytics are the same. She said that analytics can be divided into two types: business-to-consumer (B2C), and business-to-business (B2B). In B2B situations involving machines, the insights tend to be straightforward, whereas B2C analytics involving marketing, sales, and dealing with customers may be more complicated and may need the expertise of data scientists.

Hanafi said that for marketing strategies, instead of spending millions on analytics, it might be better to just ask the customers what they want. He cited an example where GlobalBlue wanted to find out how long users are prepared to wait in a queue, something that would have an impact on counter staffing requirements. One approach is to hire summer students to watch the behaviours and ask people how long

Left to Right:
Mr Teng Fang Yih, Mr Waleed A. Hanafi, Mr Jason Tan, Mr Alan Liew, Mr Aw Yong Sai Khoon, Ms Joyce Tan, Ms Elizabeth Lim, Ms Soraya Phillips, Mr Ching Yin Sing, Mr Eddy He, Ms Janet Foo, Mr Zhang Jianxin and Mr Raymond Teo (not in photo)

they are prepared to wait, instead of investing in a situational awareness system. He said that how long someone is prepared to wait in a queue is not data that will come out in data crunched, unless the sensors are individualised.

Evolution of Situational Analytics

Situational awareness and analytics have evolved to be more targeted, from focusing on the eligibility to buy to those with the propensity to buy, said Eddy He, Assistant VP, Technology Architecture, Group Operations & Technology at OCBC. He noted that a typical marketing approach adopted by banks today is a carpet bombing marketing strategy, where they target customers with the likelihood of buying.

Hanafi warned that insights without context can drive inaccurate assumptions. He said that data from automated analysis based on world population and size of country has seen Singapore emerge as the densest and most populated country. Whereas in reality, Hong Kong is more dense, as its usable space is a small strip at the bottom of the mountain.

"That data is still used. Once you have data, it's hard to ignore it. It is just like pilots who crashed their planes – even though they knew their instrument is broken, they were still looking at it and flew the plane into the ground. Situational awareness is not just about adding sensors, but you also need to know what to ignore and you need to know the context," said Hanafi.

Raymond Teo, Assistant Head, IT Application Services at A*Star Science and Engineering Research Council, a statutory board that fosters scientific research and talent for Singapore, said that IT is a comprehensive and sophisticated tool, but it is still a tool. He pointed out that many users do not fully appreciate the full capabilities of business intelligence tools (BI). They often just use BI to generate reports, and don't know how to use BI to dig down to the truth.

Vertical Interest

Many industries would benefit from situational awareness, as knowing what is happening in their operations is a definite advantage, said Ching.

Based on NCS's experience, there is

now a lot of interest from the security and safety industry. And in the manufacturing industry, it is helpful to know if there is a glitch in the manufacturing operations, and to sort out the problem quickly so that operations can resume with as little downtime as possible. However, certain countries like Hong Kong are not keen on installing video cameras in public.

"I think all industries and everyone in this room is, practicing and doing situational awareness without necessarily using the buzzwords," said Ching.

Jason Tan, Deputy Director, Technology Adoption Programme (TAP), A*Star Science and Engineering Research Council, noted that situational awareness is more relevant in some sectors, such as security, transportation, and retail industries, where there is more personalisation than other sectors.

Tan also pointed out that logistics companies are searching for end-to-end, real-time tracking capability, using situational awareness devices. "The challenge is to be able to track all the way to last mile. Right now, they can't connect the entire stream," he said.

Zhang Jian Xin, MIS Director at Dou Yee International, a provider of industrial solutions, noted that in his organisation, the role of IT has changed from being a service to support the organisation. Its focus is now on enabling the business, supporting end users and the management team to have an overall view of the business environment.

Safety and Security Testbed

Given that some situational awareness technologies are still relatively new, Singapore conducted a pilot project with four consortia who built and tested solutions for urban management, safety and security in four different parts of Singapore. (see page 7 for details on the testbed)

NCS had participated in this testbed, and used physical and electronic sensors to acquire multiple live city data feeds in the Little India area. The data collected was processed and analysed through advanced analytics and predictive modelling; intelligence reports were then auto-triggered to alert the on-ground operations team, and the command and control room.

For Joyce Tan, Senior Manager for Group IT, United Engineers, whose businesses include construction, engineering and property services, their organisation is certainly trying to have a high level of situational awareness regarding security. They have hired a consultant to do ethical hacking, and do not want the safety of their corporate website to be compromised.

For Janet Foo, Assistant VP, IT - OSPL, Group Operations & Technology at OCBC Security, an issue is ensuring that they keep up with MAS guidelines especially in the areas of system security and app control.

"This is very challenging for us, as guidelines are very stringent, making it hard to follow exactly. This means that some of the apps that we talked about outsourcing may have to be done in-house to comply with the security data regulations, as outsourcing would mean the data is handled by a third party," said Foo.

Soraya Phillips, Assistant VP, Sourcing at Barclays Capital Services, said that there is a lot of focus on risk and security. A challenge is to mitigate risk with changing situations, and look at

Delegates at the roundtable

Ms Joyce Tan, Senior Manager, Group IT, United Engineers Limited

Ms Elizabeth Lim, Vice President & Chief Information Officer, Enterprise Information Management & IT Security, STATS ChipPAC Ltd.

Mr Alan Liew, Director, Corporate, Enterprise Information Management & IT Security, STATS ChipPAC Ltd.

Mr Jason Tan, Deputy Director, Technology Adoption Programme (TAP), A*Star Science and Engineering Research Council

Ms Soraya Phillips, Assistant Vice President, Sourcing, Barclays Capital Services Limited

Mr Zhang Jianxin, MIS Director, Dou Yee International Pte Ltd

Mr Waleed A. Hanafi, SVP - Technology Adviser to CEO, Global Blue

Mr Eddy He, Assistant Vice President, Technology Architecture, Group Operations & Technology, Overseas-Chinese Banking Corporation Limited

Ms Janet Foo, Assistant Vice President, Information Technology - OSPL, Group Operations & Technology, OCBC Securities

Mr Raymond Foo, Assistant Head, IT Application Services, A*Star Science and Engineering Research Council

Mr Aw Yong Sai Khoon, General Manager, Information Systems Division, Corporate Management Group, Pioneer Electronics Asiacentre

Mr Ching Yin Sing, Director, Strategic Business Development, Communications Engineering, NCS

Moderator
Mr Teng Fang Yih, Editor, *Computerworld Singapore*

how risk can be minimised in the whole process.

Hanafi pointed out that a challenge to minimising risk is the burden of history. "What went wrong last time is added to a list to look out for, and the list keeps growing. That works for first couple of years till the burden of history is so large and the person exercising list has not had any of those experiences, then the whole exercise becomes rote."

"Agility, flexibility and actual knowledge win over history, checklists and rote. The danger is allowing the organisation to become complacent. The MAS guidelines are another attempt to legislate risk out of a system which inherently is risky. Sometimes, the burden of compliance exceeds the value of the business you are trying to do," said Hanafi.

A*Star's Teo agreed that the ideal scenario is when an organisation is ready to tackle change and challenges. "Ideally, we should respond to change, not react to change. The problem is that most of the time we are reacting, we should have a solution when the problem surfaces, and not have a kneejerk effect. We need to analyse the problem, and look at the function that address the problem – whether it is IT or software or a process issue."

Implementation Challenges

Cost is a real issue when it comes to adopting situational awareness technologies. Ching cited a customer who wanted to put space thermometers in rooms in three building blocks. The cost of each thermometer at S$80 is reasonable, but when the total cost of the set up, including cables, came to $300,000, the client decided to relook the project.

"You have to look at business justification. Do you really want to do that, and what are the returns? But if you don't do it and don't have awareness, then you might be worse off," said Ching.

Tan from United Engineers said that it is important to be mindful of balancing the adoption of technology for situational awareness with costs, strategy and operational efficiency. For instance, her company had installed Wi-Fi for its guests and chose not to have a password for access. Unfortunately non-guests took advantage of this, and it was misused. Now a password is needed to access Wi-Fi.

"With the Internet of Things, everything is connected to the Internet. There are a lot more opportunities to make use of information that can provide customers with a better experience," said Tan.

Ching agreed that many NCS customers want to improve on their existing system. For instance, situational awareness with licence plate recognition technology can be applied to car parks. In north Australia, a car park used that technology to note the cars coming in, and those that exceed a stay of three hours is charged with a parking fee. The system is capable of adding up the total amount of time spent in the car park, even though the car may have entered and exited the car park more than once within a day.

From the infrastructure perspective, the challenges would be more technical in nature.
Some technologies like licence plate recognition are mature, but others are still at a nascent state, and customers who are less familiar with technology can be seduced by television shows which use these advanced technologies, and have unrealistic expectations of these technologies, said Ching.

Teo noted that the human element is still critical. "While software, videos and cameras can collect whatever data we want, human intelligence is still needed to choose the right response. Technology can only be reactive, they can never replace us."

Aw Yong Sai Khoon, General Manager, Information Systems Division, Corporate Management Group at Pioneer Electronics Asiacentre, agreed that there still needs to be a knowledgeable person to interpret the analytic results. However, they need to be mindful that while the sales persons may not be the easiest customers, they are the ones who sponsor the project, and ultimately, they need to find value in the technology.

Another issue is the analytical approach taken by some data scientists. "There could be one valuable insight out of another 50 false insights, not out of causality, but correlation," said Hanafi.

"That's the problem with data scientists, they start with a hypothesis. They could be looking at data and searching for correlations and may be creating the hypotheses. You can always fit a good story to data," he explained.

Ultimately, given the challenges of implementing situational awareness technologies, organisations need to be mindful of which approach they should take to this ever-growing reservoir of information that can be transformative to their organisation. Undeniably, the successful use of situational awareness can help to improve enterprise responsiveness by providing the insights to make more informed decisions.

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