

Information Technology Trends 2000 - 2016

The Information Technology industry has transformed over the past 15 or so years, and it is hardly an exaggeration to say that the industry of today is almost unrecognizable compared with that at the turn of the new millennium. This paper explores the trends relating to IT projects, sales and profitability, outsourcing and near sourcing and staffing and recruitment, to examine some of the key drivers of change and how these have impacted the industry.

Projects

Information technology has advanced tremendously over the past 15 years, and projects have taken many shapes and sizes. Around the turn of the millennium one of the key projects being worked on by most firms was Y2K. This was a very high profile and well known concern, focused on the belief that computers would not be able to cope with the year 2000, due to a bug based on the way programming had been carried out¹. This turned out to be something of a false alarm. Meanwhile, many organizations were trying to get their ecommerce solutions up and running for the first time. Things have changed a great deal since then. Initiatives that have grown in importance over recent years have been security projects, cloud, mobile devices and data management. These areas will be discussed in turn.

Security projects

Many of the projects undertaken in the information technology industry today, and over the past several years, are related to security threats. This is with good reason as the number of threats have increased substantially in recent years. Indeed, Deloitte (2015)² reports that one billion records were compromised as a result of security breaches in 2014, and the cost per compromise is estimated at \$57-\$82 US dollars. Protection of data has become of paramount importance to organizations. High profile cases such as that of Sony, when information about 50,000 employees was revealed due to a hacking incident have raised awareness within organizations of the importance of prioritizing this serious threat. Deloitte states that:

¹ <http://time.com/3645828/y2k-look-back/>

² <https://www2.deloitte.com/content/dam/Deloitte/sg/Documents/risk/sea-risk-cyber-thought-leadership-noexp.pdf>

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“Since 2010 the world has seen a significant increase in cyber-attacks across the globe, as the level of sophistication of cybercriminals has progressed in tandem with that of Moore’s Law.”

When hackers do succeed with attacks the results can be devastating and manifold. For example, organizations can experience data loss, fraud or revenue loss, damage of reputation, IP threat, operational disruption and also even threats to life and safety. Projects that organizations are increasingly undertaking include putting in place security architecture, which even today some organizations do not have. Other projects include patching software and applications, and putting in place mitigation steps to help avoid issues. Training of staff to know what to do and to realize when there is a threat, such as the threat of phishing³ is also a task that many organizations have been working on to help protect themselves. These training projects have also worked with staff to understand the threat of weak passwords, and downloading risky attachments, among others.

Cloud Projects

Cloud projects were unheard of in 2000, but today they are commonplace. Cloud computing refers to storing and accessing data and software over the internet, rather than on the actual computer. This technological advancement has made a tremendous difference to organizations in being able to save money by paying for server space in the cloud, rather than making expensive capital expenditures on expensive servers in datacenters, and there have been a massive number of projects in this area. These projects have included moving data to the cloud and focusing on providing software as a service rather than on-premise and on specific computers. Growth in this area is set to continue.

Transition from Web to Mobile

Over the past 7 or 8 years, the evolution of smartphones has meant that many IT projects have been focused on mobile technology, including getting websites to work on mobile, but also the building of mobile applications. The graph below illustrates the growth in revenues in this area that has been achieved since 2011⁴, and gives an indication of the level

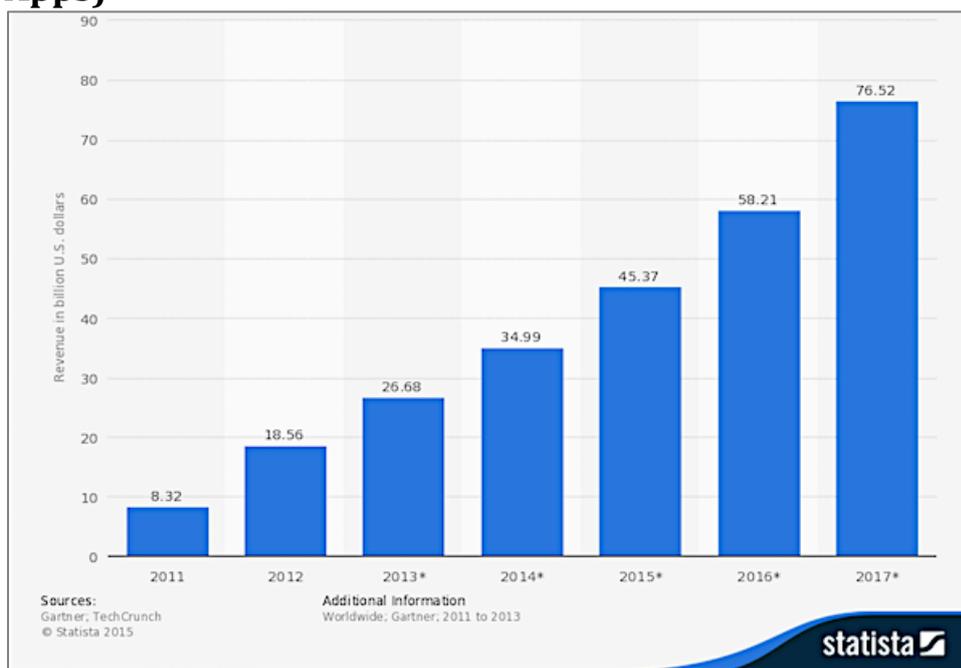
³ <http://ptac.ed.gov/sites/default/files/issue-brief-threats-to-your-data.pdf>

⁴ <http://www.businessofapps.com/app-revenue-statistics/>

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of focus of organizations on these types of projects. Particularly given the emphasis of Google's search engine preferences for mobile sites, and that smartphone sales worldwide are increasing, this focus is set to grow.

Figure: Worldwide Mobile App Revenues 2011-2017 (Business of Apps)



This is all in stark contrast to projects fifteen or so years ago, when the internet was a relatively new phenomenon. The first websites were launched in the mid 1990s, and between 2000 to approximately 2007, organizations were focused on ways of selling online. Web 2.0 was also a major interest, as it allowed people to interact with the web and post reviews and other content. This provided social networking opportunities, and the development of very successful review sites like TripAdvisor and Yelp, among others.

Data Management

The amount of data organizations have to manage now, compared with 15 years ago has grown exponentially and is likely to continue to do so. This has led to an increase in so-called "big data" projects over the past decade that allow organizations to make better use of their data through business

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intelligence and analytics. These types of projects have been accelerated due to the growth of Internet of Things projects. While the term the “Internet of Things” was coined by Kevin Ashton in 1999, it has only really started to become a reality over the past five or so years. According to McKinsey⁵, the Internet of Things is the “networking of physical objects through the use of embedded sensors, actuators and other devices that can collect or transmit information about the objects.” This feedback loop allows data to be used to optimize performance. For example, sensors in heating systems can tell when people are in the room and can heat or cool the room accordingly, increasing the efficiency of energy use. McKinsey estimates that by 2025 the Internet of Things could have an impact on the global economy of \$6.2 trillion. Today it is only in its infancy, but projects have nonetheless been underway for the last several years to deliver solutions in this area.

Sales, Revenues and Profits

The sales, revenues and profits of the IT industry today mirror the growth and changes in projects. Projects that have proven to become increasingly profitable in the past several years have largely been those focused on cloud-based technologies, as well as mobile technology and big data analytics. The sales of mobile applications graph presented earlier in this paper illustrates the tremendous growth in this area. While Internet of Things projects are growing in number, these are not yet bringing in the most sales, revenues and profits. One of the most fundamental changes in this area is that 15 years ago sales of software was by license per PC but this has become an increasingly less profitable approach following the implementation of cloud based solutions. Sales of expensive infrastructure to business are becoming increasingly obsolete.

Evidencing this, in terms of sales, revenues and profitability, cloud technology has really taken off in the past several years, and particularly since 2008. As can be seen from the graph below⁶, the growth has been phenomenal, particularly for software as a service, though platform as a

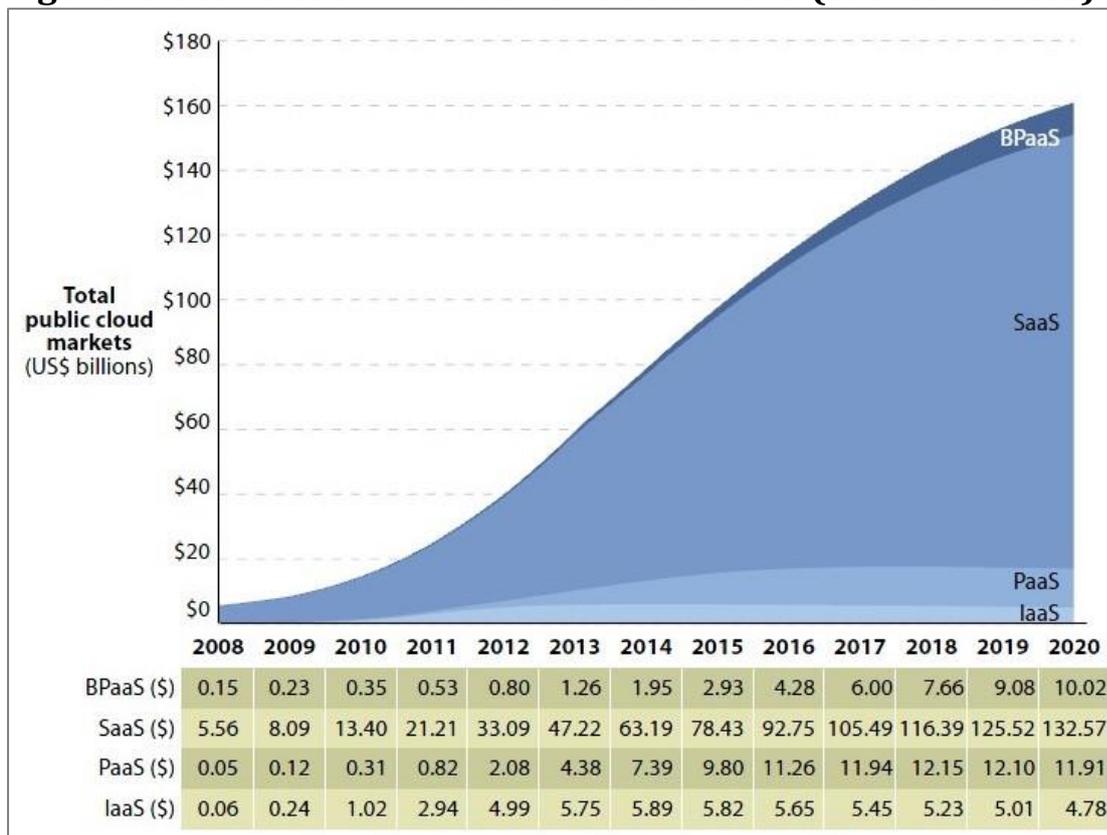
⁵ <http://www.mckinsey.com/industries/high-tech/our-insights/the-internet-of-things-sizing-up-the-opportunity>

⁶ <http://www.forbes.com/sites/louiscolumnbus/2015/01/24/roundup-of-cloud-computing-forecasts-and-market-estimates-2015/#3b8c6d740ce0>

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service and infrastructure as a service have also entered the market and gained some traction. These types of solutions were not even in existence at the turn of the millennium, but have grown tremendously in the past seven years, as organizations have become aware of the cost savings of opting for pay-as-you-use, and not having to pay for storage. Forbes reports that in 2016, the global software as service software revenues have been projected to reach \$106 billion, which is 21% higher than in 2015. The expected trend is that cloud computing use will continue to accelerate in organizations, making this area continue to be a profitable one.

Figure: Global Cloud Market Size 2008 to 2020 (Source: Forbes)



Big data IT is increasingly saleable and profitable. Analytics was relatively new in 2000, but over the timeframe to the current day this has changed, and IDC research predicts a compound annual growth rate in this area of

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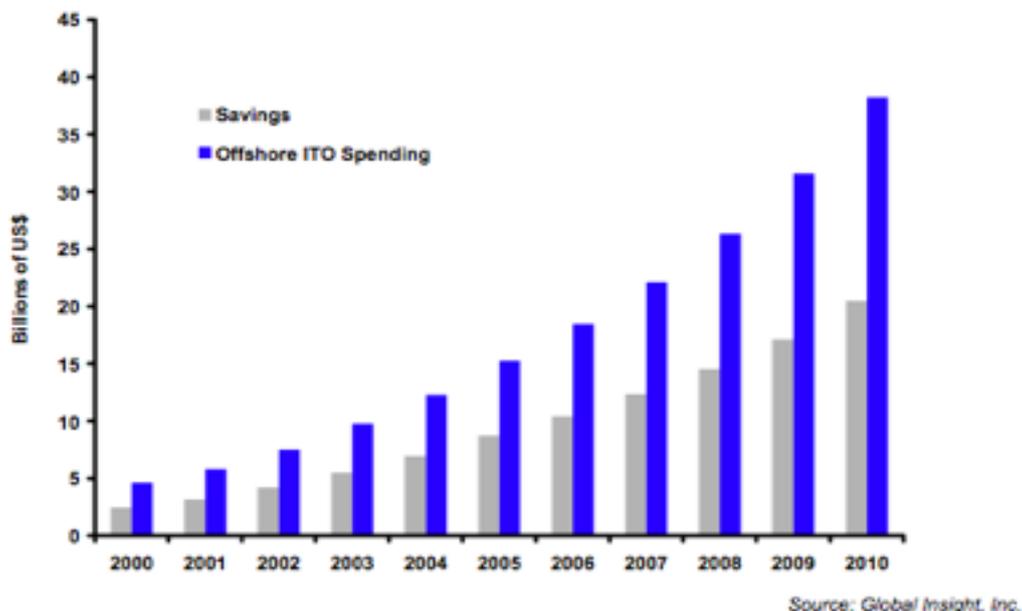
23.1% and a total market of \$48.6 billion by 2019, compared to a very minimal market in the year 2000⁷.

Security projects are also increasingly contributing to revenues for companies that offer them, given that high profile cases have been driving companies to spend more in this area – as demonstrated earlier in this paper.

Onsite, Offshore or Nearshore?

Over the past 15 years there have been ongoing changes in onsite working, offshore outsourcing and nearshoring. At the start of the period, there was considerable focus on outsourcing, and generally speaking spend on outsourcing in the IT sector has continued to increase each year, as demonstrated in the diagram below, which shows the extend of the growth in spend on outsourcing in the IT sector between 2000 and 2010:

Figure: Growth in Spend on Outsourcing IT (Source: Reid Douty, 2010⁸)



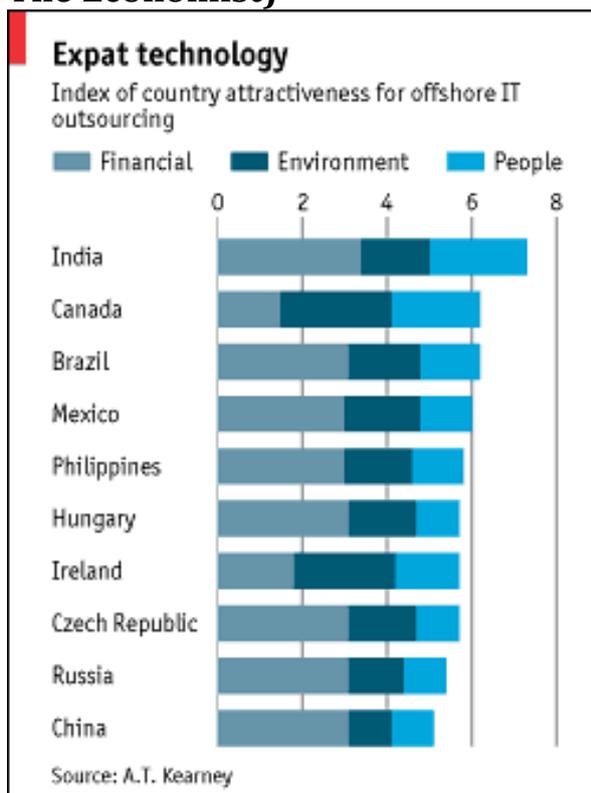
⁷ <https://yourstory.com/2016/06/fractal-analytics/>

⁸ <http://reiddouty.blogspot.co.uk/2010/11/outsourcing-detriment-to-economy.html>

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This was driven by a number of factors. As The Economist (2003) reports, not least of these was the fact that office space prices were increasing dramatically⁹. The advent of the Internet had also led to a situation where communications had improved massively and it was possible to outsource work. This led to a situation where work was being outsourced to a variety of countries, primarily India, but also China, Russia and Vietnam. As The Economist specifies, this can be compared to the outsourcing of manufacturing industry from richer countries to developing countries that happened in the 1970s and 1980s. The diagram below shows the popularity of different countries for outsourcing of IT work as of 2003.

Figure: Popularity of Different Countries for IT Outsourcing (Source: The Economist)



As can be seen from the diagram, at that time India was very popular, as was Canada, Brazil, Mexico and the Philippines, as well as the other aforementioned countries.

There were significant benefits of outsourcing that could be realized by organizations, mostly cost related. Paying people in India to do programming led to a significant cut in costs, compared to paying people in the United States or in other developed countries to do the same type of work. This was of course in addition to the massive savings in paying for office space. There were in some cases also time zone advantages of outsourcing –

programmers in countries like India could be coding overnight, managers in the USA could review the work done in the morning and send new requests that day and the programmers could work again overnight to complete the requested tasks. This led to greater efficiency.

⁹ <http://www.economist.com/node/1925828>

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While outsourcing has continued and is still popular, the focus is arguably not as heavily on India in some cases as it was. Some companies prefer to, and have taken steps towards nearshoring instead. In this case, the focus is on paying people that do not live in the same country but still leave somewhere cheaper, but nearby in a neighbouring area to do the work. Examples include nearshoring from the USA to Mexico, the UK or Germany to Eastern Europe/Russia.

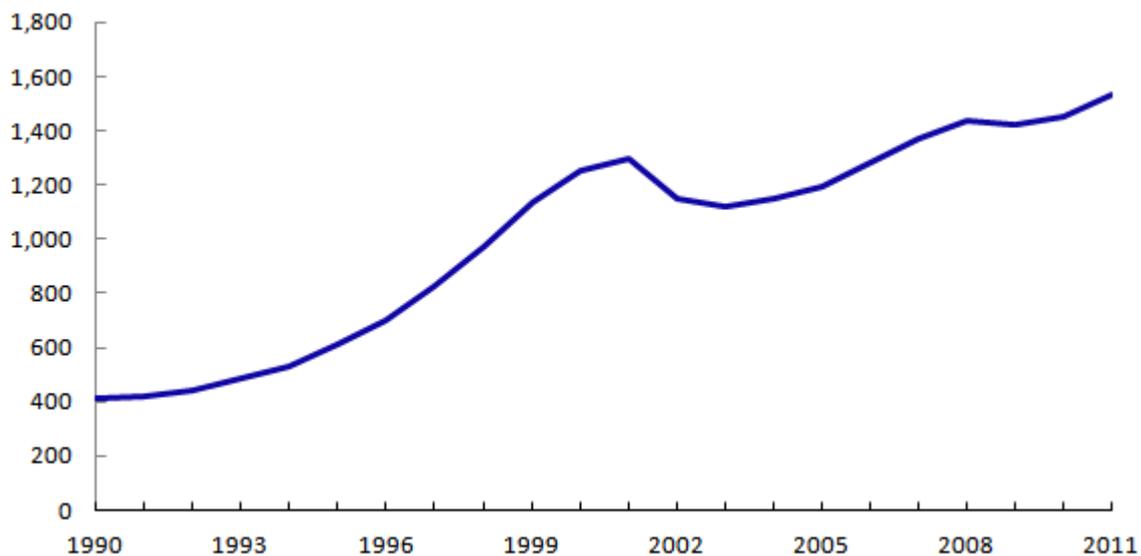
In recent years, another trend that has taken hold is the idea of people working from home. This means that even where people are hired by an organization in the same country or city, they may not necessarily work on the company's premises. The acceleration of communication technologies has enabled this approach, allowing many IT professionals to be able to do most, if not all of their work online, and communicate with the office via messaging apps and VOIP technologies such as Skype. Either way, the trend shows that there are less people working in the office in IT jobs than there were previously due to outsourcing, near shoring and the simple move to people working from home.

Recruitment and Staffing

Recruitment and staffing in the IT industry has been influenced to a fairly large degree by the debate between onsite, offshore or near shore. Who an organization hires and what for is clearly impacted by what is outsourced to third party companies and what is retained in house. That aside, there are an increasing number of people working in the IT sector as illustrated in the diagram below (the dip around 2001-2002 reflects the dot.com crash at that time):

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Figure: Employment in the Computer Systems and Design Related Services Industry in the Thousands, 1990-2011 (Source: BLS¹⁰)



Finding Staff

Generally speaking, aside from the continually changing ideas on outsourcing versus onsite, the biggest trend with regard to recruitment and staffing over the past 15 years, which appears to be increasing in intensity, is the challenge of finding sufficiently qualified staff to do the job. This has been highlighted by many industry experts, and Computer Weekly (2010) also brought attention to it with analysis of a survey carried out by industry body CompTIA¹¹. Indeed at that time, 59% of IT managers felt their IT department was understaffed, and had plans in place to increase recruitment in 2011. However, two thirds of respondents were worried about being able to find new employees, and a third had concerns about retaining staff.

In particular, skills that are highlighted to be most needed include project management, database administration, business intelligence, PC and technical support, software-as-a-service/cloud and virtualization and of

¹⁰ <http://www.bls.gov/opub/btn/volume-2/careers-in-growing-field-of-information-technology-services.htm>

¹¹ <http://www.computerweekly.com/news/1280094625/Lack-of-qualified-staff-hinders-IT-department-recruitment>

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course, security. Specifically, over the past 15 years, recruiting to deal with the issues created by cyber security threats has become increasingly challenging. This problem exists globally. As reported by CIO in 2016, 56% of organisations reported experiencing a security breach in the prior year, and 95% said that IT security issues had moved up the management agenda, with 73% in their survey having increased budget to cover the security threat¹². These hiring problems have continued, and in 2013¹³ it was reported that IT security was a top priority, for which organizations do not have the skills to address effectively. This problem is set to continue and get worse. It is estimated that by 2019, there will be a need for six million security professionals for companies and public sector organizations, but that only 4.5 million will be sufficiently qualified to help¹⁴. In fact, this has been termed by the Financial Times as the “largest human capital shortage in the world.” This is a far cry from 15 years ago, when while security was important it was not given the priority it has today, and nor was it as complex. However, in the past 15 years, hackers have evolved their skills tremendously, and organizations have to keep pace with this. This will be an ongoing problem moving into the future.

Skills Needed

Aside from the intense need for computer security skills that have already been heavily highlighted, skills related to mobility have become among the top five most desirable skills, and particularly skills related to mobile, tablets and video conferencing. Despite the fact that there has been a lower emphasis in IT departments on IT skills to manage infrastructure, and that these have been declining in need in the past 15 years, many companies are still seeking data storage and network management skills. The same report found that cloud skills were also increasingly in demand.

In terms of demand in general and not just related to cyber security issues, Computer Weekly (2013) identified that demand for new IT skills outstrips supply, which is perhaps unsurprising, given the fact that the industry undergoes continual change to keep up with new technologies.

¹² <http://www.cio.co.uk/it-security/cios-see-security-budget-increase-tackle-cyber-threat-3607644/>

¹³ <http://www.computerweekly.com/opinion/IT-skills-shortage-still-tops-the-technology-agenda>

¹⁴ <https://www.ft.com/content/4cabd0fe-8940-11e5-90de-f44762bf9896>

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Conclusion

The IT industry is complex and undergoing considerable change. This paper has illustrated some of the very significant trends that have occurred in the information technology industry over the past 16 years, back to the turn into the new millennium. Some of the biggest changes have been driven by the move to cloud technologies, mobile, big data and cyber security, and all of these have had an impact on what brings in the biggest revenues/sales and profitability, the actual projects that are worked on by IT departments and companies and the recruitment of staff. Going forward, it is likely that all of these areas are going to continue to be very impactful, as has been demonstrated in this report. However, cybersecurity is likely to continue to increase in importance at an even faster pace than some of the other areas, particularly given high profile attacks and the resultant damage that is done. Additionally, the increase in Internet of Things technologies and solutions is sure to have a bigger impact in the future, given the exponential growth that has been predicted in this area. These areas are likely to continue to impact on projects, sales and profitability, recruitment and other fundamental aspects of information technology activities.

The good news is that despite the continual change and uncertainty, Apex Informatics is at hand to help. Apex Informatics offers IT solutions in consulting, staffing and recruitment and outsourcing. These services are offered to clients of any size and in any industry. We can take on any IT challenge and help reduce the amount of time you spend on it, by doing what we do best – offering reliable IT solutions to your business.