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The State of Play of Intelligent Automation in the Finance Function

CONTENTS

EXECUTIVE SUMMARY

Intelligent automation (IA) uses technologies such as artificial intelligence (AI) and robotic process automation (RPA) to streamline information and provide insights to support decision making. Automation improves operational efficiencies as vast amounts of data can be processed quickly and accurately. This not only improves the quality of the output, it frees resources from mundane and time-consuming work to take on higher-value tasks.

In this rapidly evolving era often referred to as Industrial Revolution (IR) 4.0, which builds on the digitalisation characterised by IR 3.0, there is real impetus among organisations to digitally transform work so that it is performed quicker, smarter and more efficiently while using fewer resources. IA, with its myriad applications, has the potential to do this.

This study aims to ascertain the role played by IA in the Finance function. It provides insights into which specific Finance function IA is typically implemented in, the challenges faced by companies which have adopted IA, and the reasons deterring others from adopting IA. It also explores the benefits of implementing IA solutions, the associated costs (both tangible and intangible), the importance of upskilling and training for Finance employees, particularly those who are directly affected by IA adoption, and what the *C-suite* (see Glossary of Terms) needs to consider before, during and after implementation.

In the quest to achieve their corporate goals through digitalisation, it is important for the management to consider the efficacy of the IA solutions at both the macro strategic level as well as the operational level. As the research findings show, there is a huge perception gap between the *C-suite* and *Working Level* (see Glossary of Terms) respondents regarding the *Efficiency and Compliance* of their IA solutions. Among the *C-suite* respondents whose companies have implemented IA, the majority (61.0%) believe it alleviates 26%–50% of the work but among the *Working Level*, an even higher majority (69.2%) say the relief is limited to 1%–25%. A key goal of automation is to improve productivity, and part of this involves easing the tedium through the reassignment of some tasks to IA. To address the perception gap and get the most out of their IA solutions to improve overall productive capacity, the technology experts, consultants and Chief Financial Officers interviewed as part of this study suggest that the *C-suite* can cultivate an environment which encourages honest, constructive feedback from all levels, especially from the users of the solutions, about their effectiveness.

When they consider how implementing an IA solution would impact their Finance employees, the *C-suite* respondents from both categories (companies which have adopted IA solutions and those which have not) are remarkably similar in their responses – by far the most significant consideration is the augmentation of the Finance employees' capabilities. Retraining for either horizontal or vertical movement within the organisation or department is also high on the list. Following the adoption and implementation of IA, changes should be made at all levels to properly reflect and capture the gains, such as modifying the key performance indicators of the *Working Level*, and also at the organisational level. However, the study shows that this does not appear to be a high priority among the respondents. This indicates a missed opportunity to better reflect the return on investment of IA adoption and implementation.

IA in the Finance function can produce data-driven insights which are relevant and can provide value to other departments. However, after Information Technology (66.7%), departments which might benefit most from the insights actually registered relatively low levels of usage of data captured by IA solutions – Operations (57.3%), Sales (46.2%) and Marketing/Communications (29.1%). The *C-suite* will need to think deeper about how to capitalise on the capabilities of their IA solutions and where synergies may lie in other areas of operation within the organisation.

Among the *C-suite* respondents whose companies have adopted IA, *Financial Cost* (28.5%) is the second highest priority (after *Efficiency and Compliance* at 45.5%) when they consider adopting their IA solution. The substantial 17% difference indicates that they have an appreciation of the intangible benefits arising from greater levels of *Efficiency and Compliance*, such as better use of the employees' skill sets after the more mundane tasks are assumed by IA, or achieving increased accuracy in performance. The intangible benefits of IA adoption are often long term and scalable. After companies have moved beyond the initial implementation problems, automation can provide employees with jobs that are secure (less likely to be displaced by automation) and advanced skill sets which enable them to do higher-value work while remaining relevant in the digital age. The organisation will benefit directly from the rising level of efficiency and productivity, and indirectly from intangible ways such as better resource allocation, talent retention and even raised employee morale.

When organisations navigate through the initial hurdles of IA adoption, it builds greater confidence in automation and intelligent systems in general, which in turn opens the gateway to further digitalisation. The findings show evidence of this – 25.7% of the *C-suite* respondents (from companies which have adopted IA) say they adopted IA before RPA or AI, and 36.3% say they adopted IA together with AI or RPA. Also noteworthy is that many of them are already using specific technologies including Computer Vision (65.0%), Speech Recognition (61.8%), Natural Language Processing (61.0%) and Text Mining (48.8%).

The decision to adopt IA starts with strategic leadership from the top, which involves the Board of Directors and the *C-suite*. As they bring their varied experiences to the table, the directors also help avert the prevalence of groupthink. The *C-suite* are charged with developing the long-term strategies of their organisations, as well as lead them to achieve their business objectives. Knowledge about IA, including the benefits, risks and challenges, even generically, will be an excellent foundation to start the conversation which sets the organisation on its digitalisation journey. However, the conversation also must include the *Working Level* – they know the business processes intimately and can provide on-the-ground feedback and suggestions throughout all the phases of implementation, training, calibration and process improvement.

CHAPTER 1: INTRODUCTION

The start of the Fourth Industrial Revolution (IR 4.0) broadly coincides with the turn of the century, and builds on the widespread availability of digital technologies which are the result of IR 3.0. Whereas IR 3.0 is closely associated with all things digital, IR 4.0 is characterised by the convergence of digital, biological and physical innovations including the use of new technologies and the Internet of Things. IR 4.0's technologies, such as artificial intelligence (AI), genome editing, augmented reality, robotics and 3D printing, are rapidly changing the way humans create, exchange, and distribute value (Schwab, 2021). While it is clear that new technologies can bring massive benefits in terms of efficiency and productivity, reasons such as the perceived prohibitive initial capital outlay, lack of clarity regarding the return on investment, and resistance to change may have hindered their widespread use, especially among the small and medium-sized enterprises (SMEs) whose lean resources are already committed to the daily operational concerns. Other reasons underlying the hesitation could be a lack of knowledge about which technologies to adopt, as well as how to work with them after installation.

Nonetheless, the march towards digitalisation is an ongoing one that shows no signs of abating. In the last two years, as COVID-19 upended traditional business models, organisations have been forced to hasten their digital transformation. In a study by cloud communications platform Twilio (Twilio, 2020), companies in Germany, Japan and Singapore say the pandemic sped up their digital communications strategies by over seven years. In a McKinsey Global Study of executives (McKinsey, 2020), companies believe the share of digital or digitally enabled products in their portfolio has accelerated by seven years. Significantly, most respondents in the McKinsey study recognise technology's strategic importance as a critical component of the business and not just as a source of cost efficiencies. The study shows that the rate of technology adoption is much faster in developed Asia than in other regions. And, at the organisations which experimented with new digital technologies during the crisis, executives are twice as likely to report outsize revenue growth compared to those at other companies. Findings from a recent UOB study (UOB, 2021)[1] also reflect a similar trend, that is, companies which had digitalised their entire business or multiple areas of it registered better revenue growth than those which digitalised just one area. Conversely, companies which did not adopt any digital tools saw a decline in their net revenue compared to a year ago.

"The digital domain is going to be the key to drive the growth of Singapore going forward," says Mr Lew Chuen Hong, Chief Executive of Infocomm Media Development Authority (IMDA). "It's like a parallel universe where people are increasingly living, working and playing." Mr Lew was discussing Singapore's digital journey with The Straits Times associate editor Vikram Khanna in a digital broadcast in July 2021.

More companies in Singapore are heeding the call to go digital. The IMDA figures show that around 75,000 SMEs have adopted digital solutions and among them, 12,000 came onboard last year. To help businesses tap on technology, the Singapore government has rolled out a slew of initiatives under its SMEs Go Digital (IMDA, July 2021) programme. From sector-specific Industry Digital Plans to pre-approved digital solutions which have been assessed to be cost-effective, relevant and supported by reliable vendors, as well as financial grants that can offset up to 80% of the costs of adopting digital solutions, it is now easier for SMEs to integrate technology into their business operations. For accountancy firms looking to go digital, the Accountancy Industry Digital Plan (IMDA, August 2019) is tailored to the sector, and aligns with the Professional Services Industry Transformation Map (Singapore Economic Development Board, 2018) and Accountancy Roadmap (Singapore Accountancy Commission, 2018).

[1] The survey was conducted from late November 2020 to early December 2020, among 782 local SMEs with revenue less than S$100 million, to understand the state of digital adoption among SMEs in Singapore and the support they desire for their digitalisation needs.

For companies which are at a total loss about how or where to begin, in the pipeline is a new IMDA initiative broadly styled as Chief Technology Officer (CTO)-as-a-service. This service paves the way for a small company to obtain the expertise of a CTO, on a part-time or project basis, without the burden of an additional headcount. The CTO would assess the company's digitalisation needs, create customised solutions which are not available off the shelf, and help the company to use technology to transform its business model.

Impetus for Change

As noted in a research study (Institute of Singapore Chartered Accountants et al., 2020), within the next three to five years, the economy-wide expansion in the use of technological enablers such as robotic process automation (RPA), AI, advanced analytics/big data and blockchain will have a pronounced impact on the Finance functions.

In addition, during the COVID-19 circuit breaker (Ministry of Health, 2020) and also in the subsequent months when safe management measures are put in place, companies which have been slow in their digitalisation transformation have found themselves pushed towards rapid technology adoption.

With the introduction of relatively low-cost intelligent solutions, it is opportune to uncover the state of play of intelligent automation (IA) in the Finance function. This would help the *C-suite* better understand the actual benefits of implementing IA solutions, the associated costs (both tangible and intangible), the upskilling and training of Finance employees, particularly those who are directly affected by IA adoption, and what the management needs to consider and do before, during and after implementation.

Intelligent Automation

In accountancy, AI technologies have been in use for several years now, either embedded or combined with other technologies like RPA, to automate mundane tasks. AI is not just a single technology, it is a broad and deep set of technologies, tools and methods that is helping organisations improve efficiency and drive insights to enable them to be more competitive in their customer and talent strategies (Wong, 2020).

AI and RPA are all part of IA. While RPA focuses on automating repetitive and rules-based tasks and processes, IA does the same job and more as it encompasses other AI technologies such as machine learning, natural language processing, structured data interaction, intelligent document processing and more (Jaura, June 2021). IA can thus be defined as an enhanced form of automation that combines elements of cognitive technologies, RPA and AI.

In accountancy, some of the more common IA solutions include reconciling failures to charge for services across billing systems by extracting information from multiple document types, "reading" legal and contractual documents to extract provisions using natural language processing, and using machine learning to code accounting entries and improve on the accuracy of rules-based approaches, to facilitate greater automation of processes.

For more clarity, in the survey questionnaire for this research project, AI refers to systems that use technologies such as text mining, computer vision, speech recognition, natural language generation, machine learning and deep learning to gather and/or use data to predict, recommend or decide, with varying levels of autonomy, the best action to achieve specific goals. RPA is defined as a tool that allows users to configure one or more scripts/bots to activate specific keystrokes to mimic selected tasks within a process.

Project Objectives

This research project seeks to achieve the following objectives:

a. Discover the risks and benefits for an organisation in implementing IA solutions;
b. Provide detailed insights into the prevalence of IA adoption;
c. Uncover the expectations of the *C-suite* when implementing IA in the Finance function; and
d. Provide recommendations for organisations considering the adoption of IA solutions.

Relevance to Accountancy and Finance Professionals

Implementing IA solutions in the Finance function has the potential to afford many benefits across different departments within organisations. More than a year after the pandemic wreaked havoc in Singapore and pushed companies to quickly adopt IA solutions, it is timely to study the impact and discover the risks and rewards of such implementation. As many members in the professional accountants in business (PAIB) segment would likely be involved in their respective company's technology adoption in the Finance function, such as in the IA solution selection process, budget approval, implementation and training, the study will be of relevance.

It is hoped that accountancy and Finance professionals will gain valuable insights into the challenges, costs and benefits of adopting IA solutions in the Finance functions and other potential application areas. They can bring the understandings back to their organisations for consideration, as they embark on or continue their digitalisation journeys.

According to the McKinsey study (2020), in leading companies, digital and corporate strategies are one and the same. For organisations which have yet to integrate IA solutions in their business operations, this may be food for thought.

CHAPTER 2: METHODOLOGY

The scope of this research is to uncover the expectations, risks, challenges and benefits of IA solutions in the Finance function among the target audience, comprising the senior management including *C-suite* (referred to as "*C-suite*"), and working-level accountancy and Finance professionals (referred to as "*Working Level*") (see Glossary of Terms).

The study was conducted in two phases:

Phase 1: Data collection from the target respondents via a survey questionnaire, and
Phase 2: Data collection from Chief Financial Officers, consultants and technology experts via in-depth interviews

Phase 1

The survey was carried out between 11 June and 2 July 2021.

In total, 277 people responded to the survey, consisting of 228 from the *C-suite*, and 49 from the *Working Level.*

The respondents were determined by a survey panel, in combination with invitations to a select portion of ISCA's membership base. The primary selection criterion was that they work within the Finance/ Accounting function.

As industry participation is not a key consideration in this research, the survey scope did not set this as one of the selection criteria for survey respondents. Thus, they can be working in any industry. The largest groups of respondents were from the Wholesale and Retail Trade (14.1%), Financial and Insurance Activities (13.7%) and Manufacturing (11.2%). Industries were classified according to the Singapore Standard Occupational Classification (SSOC) 2020.

The survey was focused on hearing from professionals in the following roles:

- Chief Executive Officers,
- Chief Financial Officers (CFOs)/Finance Directors,
- Chief Technology Officers/Heads of Information Technology (IT),
- Financial Controllers/Finance Managers/Accounts Managers, and
- Finance Executives/Accounts Executives.

The survey results were tabulated for analysis. Key questions were combined into charts to uncover gaps between different segments, and to garner important insights.

Phase 2

This phase, which spanned 9 July to 20 July 2021, involved in-depth interviews with four experts in AI/IA including two consultants whose work primarily centres on digital transformation, and two CFOs.

The interviewees identified as technology experts were:

- Professor Steven Miller, Professor Emeritus of Information Systems, School of Computing and Information Systems, Singapore Management University, and
- Mr Laurence Liew, Director for AI Innovation, AI Singapore.

The individuals identified as consultants were:

- Ms Doris Cheng, Partner, Singapore Accounting Operations, Assurance Leader, Deloitte, and
- Mr Ram Krishna, Director, Chief Data Officer & Digital Innovation Technology Lead, PwC Singapore.

The individuals identified as CFOs were:

- Mr Kenneth Leong, Chief Operating Officer and Chief Financial Officer, Axiom Asia Private Capital Pte Ltd, and
- Mr Liaw Chun Huan, Chief Financial Officer, KTC Group.

The interviews were conducted via email, with the exception of a video conference with Professor Miller. The responses were analysed to discern themes relevant to the project objectives.

CHAPTER 3: FINDINGS AND ANALYSES

This section examines the feedback from the two categories of survey respondents, comprising individuals whose companies have implemented IA solutions in Finance (IA adopters), and those which have not (IA non-adopters). For each category, the findings are analysed according to the four areas of Efficiency, Corporate Strategy, Upskilling and Training of Finance Employees, and IA as a Gateway to Digitalisation.

1) Respondents who have IA in Finance (IA adopters)

- **Efficiency**

In determining efficiency, the study considers not just work efficiency but also efficiency of the IA solution. One of the ways that IA raises efficiency is by relieving employees from routine and repetitive tasks so they can take on higher-value work. Among all the respondents who have implemented IA, slightly more than half (57.4%) share that IA relieves them of 26%–50% of work, 21.3% say it takes over 51%–75% of work, while 19.9% indicate it is only 1%–25% of work (Figure 1 and Figure 2). On closer inspection, there appears to be a glaring difference in perception between the *C-suite* and *Working Level*. While 61.0% of the *C-suite* believe IA takes over 26%–50% of work, 69.2% of *Working Level* say that in reality, the relief pertains to only 1%–25% of their work (Figure 2).

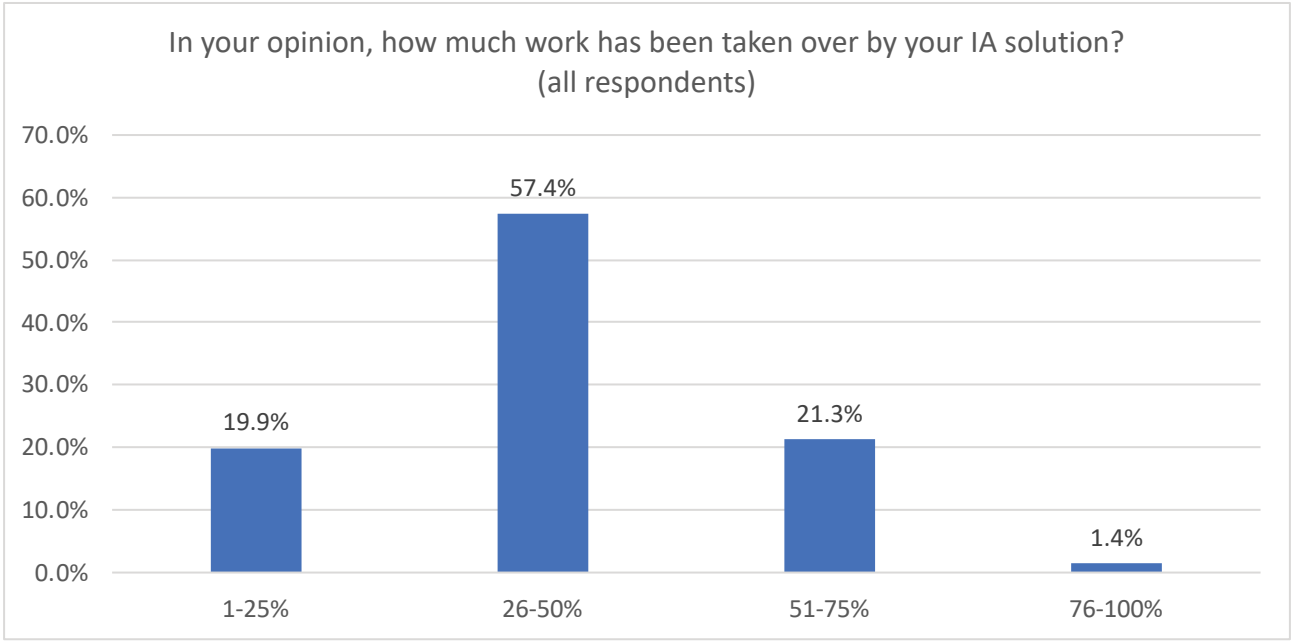

Figure 1

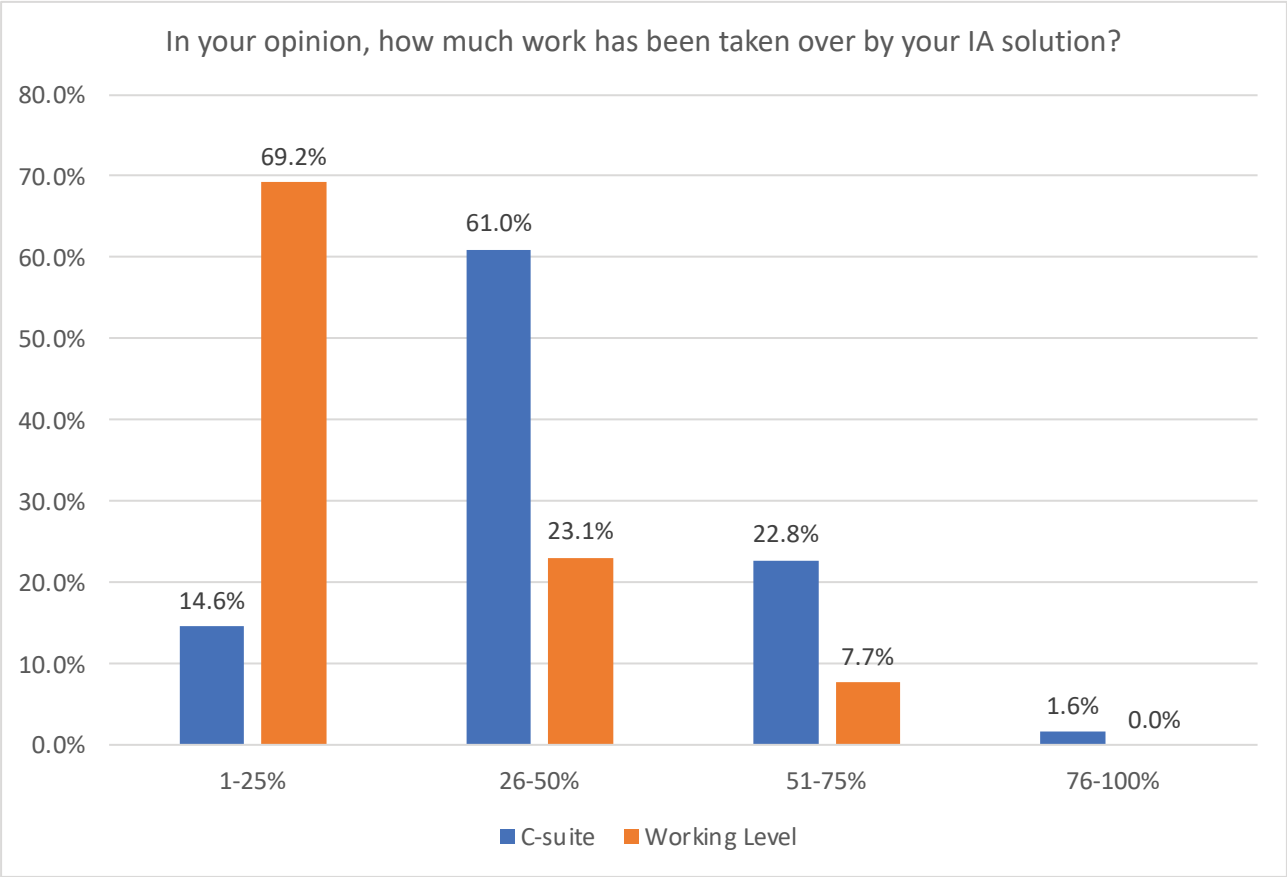

Figure 2

This discrepancy highlights an informational gap between the *C-suite* and *Working Level*. Cyert and March's seminal work on the foundational behavioural theory of the firm shows that knowledge often gets masked out at each level and thus, perception differences are a natural consequence of the division of work in organisations (Miner, 2005). As the top management such as the *C-suite* and Board of Directors are largely involved at a higher strategic level, they may be out of touch with what the employees are doing at the operational level.

Our interviewees suggest that the divergent views could sound a cautionary note for the management to foster the right corporate environment where honest feedback from the employees can not only be gathered but more importantly, also used to further improve the use of the company's IA capabilities. Communication between the *C-suite* and *Working Level* is essential as it creates a loop where the solution can be continuously improved upon while employees gain a deeper appreciation of the process and the solution, and develop confidence in the performance of their IA solution.

> IA is a labour multiplier in that it increases productivity and is key for Finance/Accounting staff. But for Finance/Accounting staff, this is particularly important as they provide justifications for critical parts of the business (budget setting, accounts receivable, accounts payable, etc). Automation should not be perceived as being another cog in the system but rather, it should be about enabling and assisting employees by removing tedium and refocusing efforts on higher-value tasks.

- **Corporate Strategy**

Almost half (49.1%) of the IA adopters use their solutions in Finance/Accounts. And within Finance/Accounts, the top three functions where IA is used are Accounts Payable (61.0%) Accounts Receivable (56.6%) and Budgeting/Financial Planning and Analysis (50.7%). IA is least used in Risk Management (23.5%), Tax (19.9%), and Treasury (14.0%) (Figure 3).

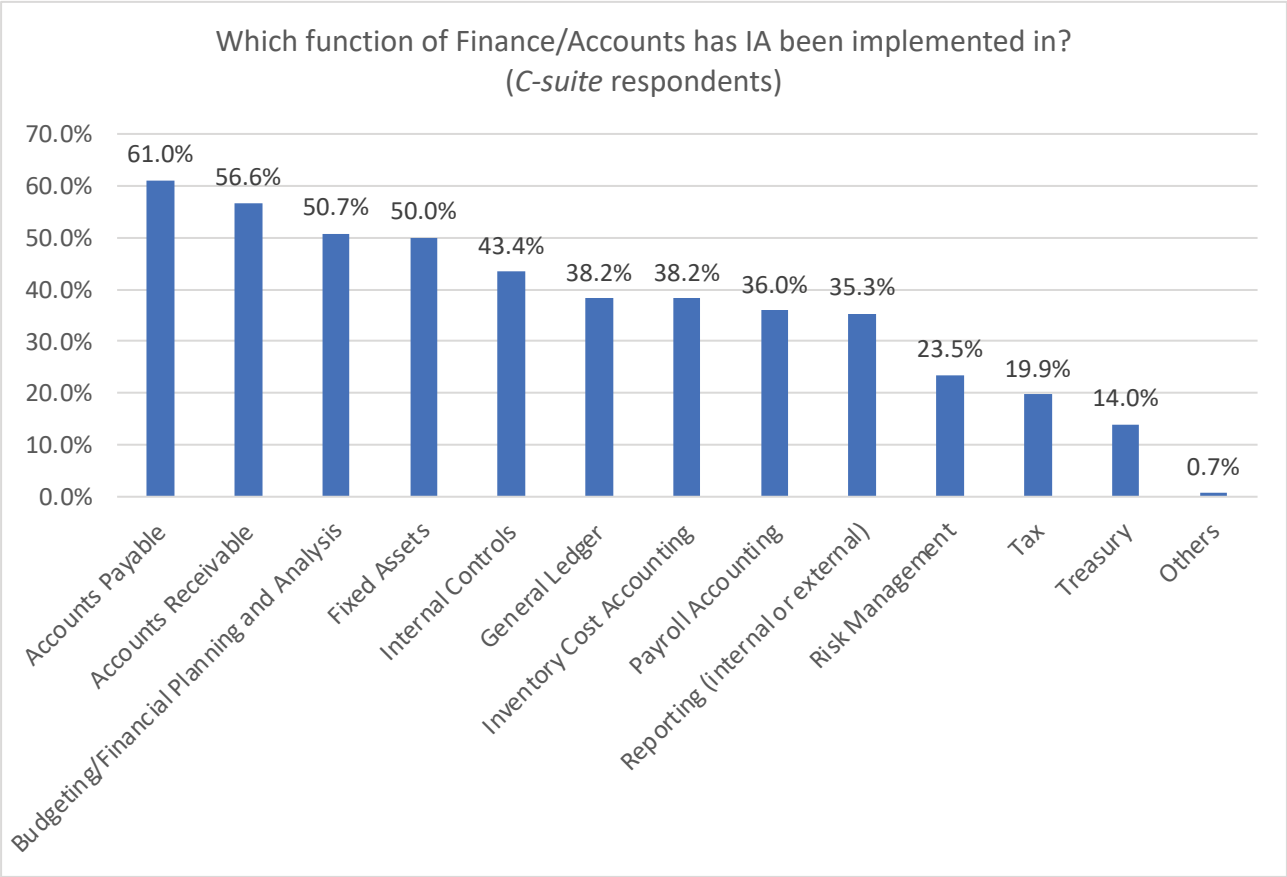

Figure 3

Accounts Payable and Accounts Receivable, with their established routines, are the ideal candidates for automation. It is relatively simple to set up the process and companies can either adopt domain-specific accounting automation solutions or adopt RPA to build automation for their work (Hajjar, 2021). Those looking to adopt IA for the first time can begin by automating the accounting cycle (accounts payable and receivable, journal entry, account reconciliations, and financial close). The experience will build familiarity and confidence in IA, paving the way for more complex solutions to be implemented in Finance/Accounts or other functions of companies.

> Start small, and do not overreach. It is critical to start the automation journey with baby steps. This allows all stakeholders to acquire experience and build confidence in implementing automation. Consider starting your journey with "attended robots": intelligent automated systems that are manually triggered by the employee to speed up a process.

As for Financial Planning and Analysis, once the accepted financial models have been put in place, the algorithms can work on large, multidimensional data sets and generate results with speed and accuracy, providing valuable insights much more efficiently than humans. For Budgeting, it is likely that this is simply a situation of having the right flags in place to detect anything approaching a warning alert threshold. In the case of the fourth-ranked Fixed Assets, as these are likely to be one of the larger components of a company's total assets, it is not surprising that it ranks high for IA implementation. Most accounting systems have a Fixed Assets management component which, when combined with scanning/tracking technologies, is able to manage and track a company's fixed assets more effectively. Once the fixed assets are recorded in the accounting system and the appropriate procedures put in place, the tracking and maintenance of such records can become a fairly automated process.

Although IA has the capacity to identify, in real time, the key material risks facing a company, the findings reflect that IA solutions are not extensively used for Risk Management. There could be a sector bias in the finding: unless a company is in the Financial and Insurance Activities sector, generally, this function would be of a lower priority compared to other functions such as Accounts Receivable, Accounts Payable and General Ledger. The findings corroborate this as respondents who select Risk Management also select other higher-ranked functions, especially Budgeting/Financial Planning and Analysis. The "trickle effect" may be such that Risk Management will be picked for automation only after the company is familiar with IA through its experience with the other functions.

Similar to Risk Management, IA implementation is not as commonly used in Tax and Treasury. Some 81% of those who select Tax also select Inventory Cost Accounting. This suggests that respondents could belong to industries which hold significant amounts of inventory, where Tax is not a standalone but subsumed under a broader/bigger function. This likely explains their low ranking.

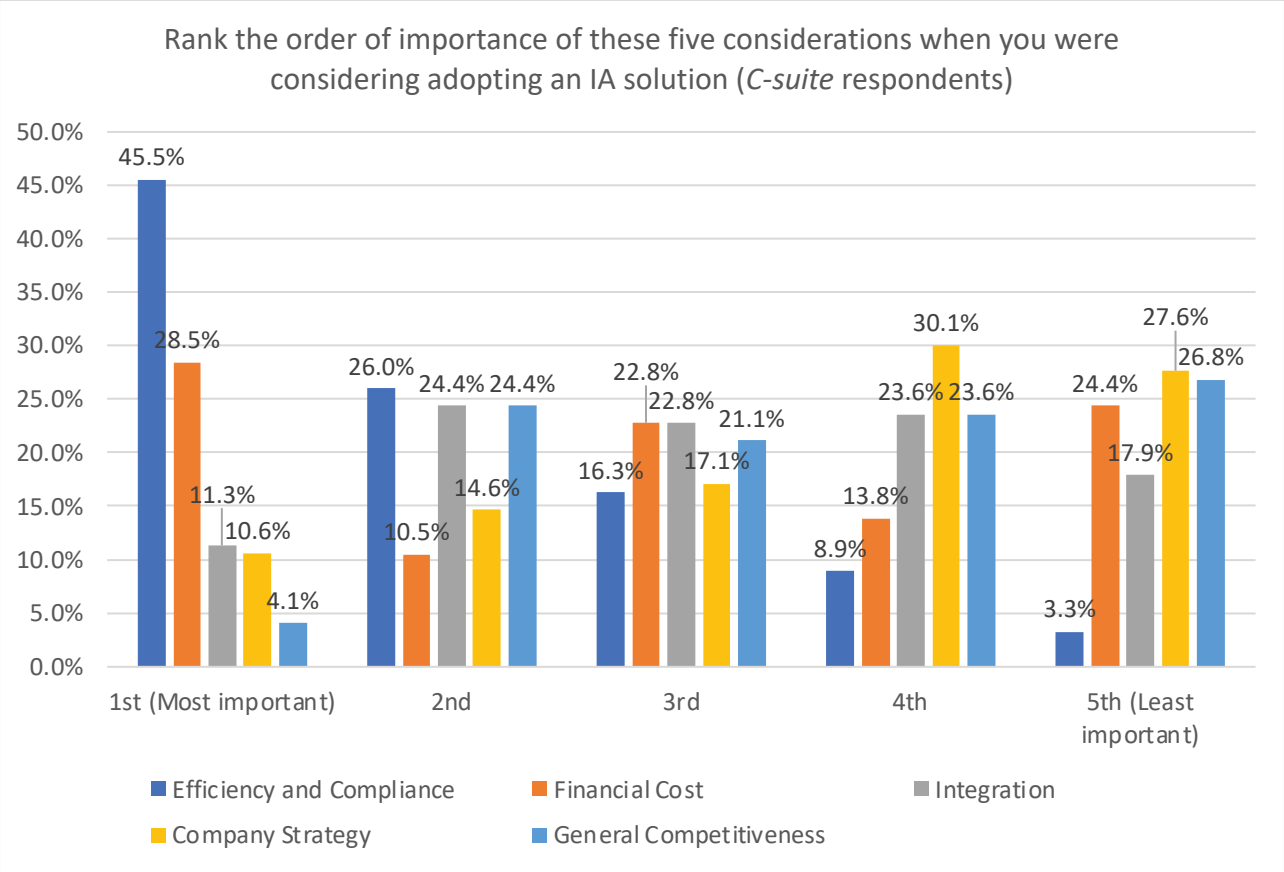

Figure 4

When companies contemplate the adoption of an IA solution or module, *Efficiency and Compliance* is by far the topmost consideration (45.5%), which is to be expected (Figure 4). The high priority accorded to it also suggests that companies are recognising the intangible benefits arising from greater levels of *Efficiency and Compliance*, such as more efficient use of the time and skill sets of Finance staff or achieving higher standards of compliance. *Financial Cost*, which is a necessary and practical consideration for any project, follows in second place at 28.5%. Although there is a sizeable 17.0% difference between the top two considerations, *Financial Cost* scores a relatively high second compared to the third and fourth factors (*Integration*: 11.3%; *Company Strategy*: 10.6%).

The majority of respondents (74.9%) expect to spend between $50,001 and $200,000 (22.0% expect to spend $50,001–$75,000, 30.1% expect $75,001–$100,00, and 22.8% expect $100,001–$200,00) while 13.8% expect to spend more than $200,001 for their IA solution; 2.3% set aside Less than $10,000 (Figure 5).

About 18.0% of the *C-suite* respondents report having spent more/less on their IA solution than what was budgeted for. This implies that the majority of companies kept within their expected budgets. As shown in Figure 5, 64.2% paid between $50,001 and $200,000 for their IA solution (25.2% paid $50,001–$75,000, 20.3% paid $75,001–$100,000 and 18.7% paid $100,001–$200,000). Of note, the average final cost of an IA solution is a little over $98,200 across all revenue bands[2].

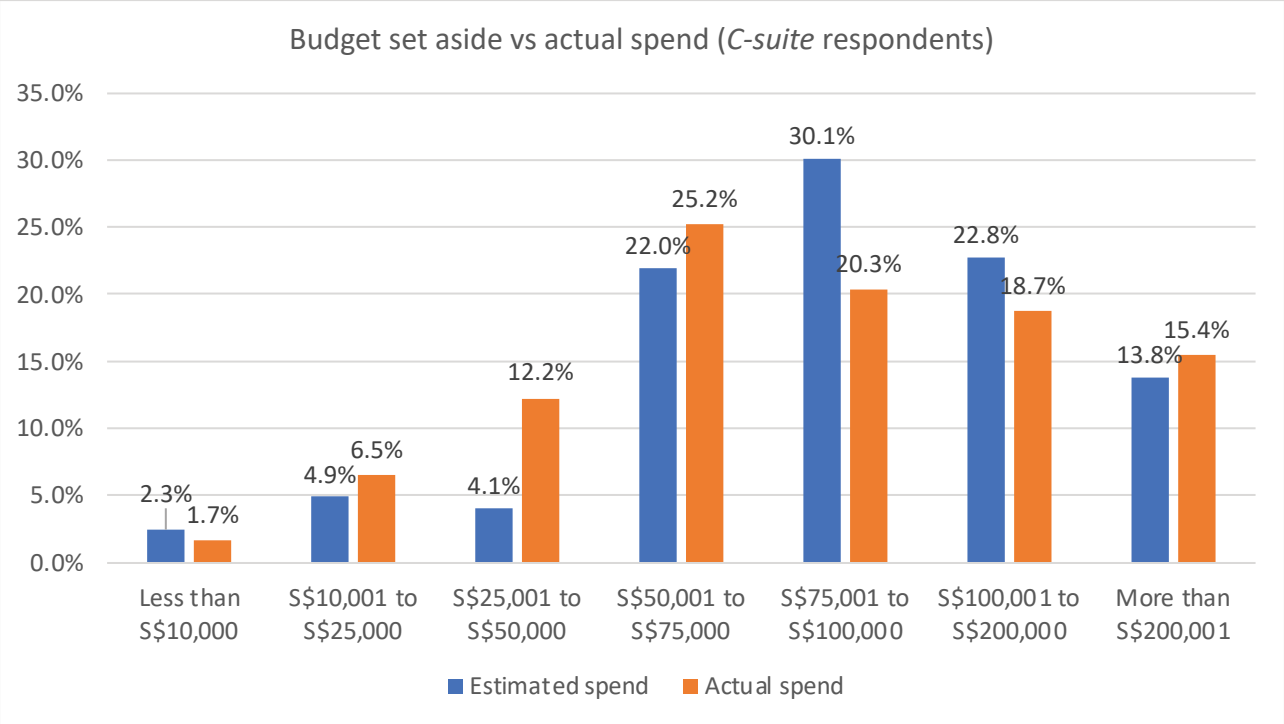

Figure 5

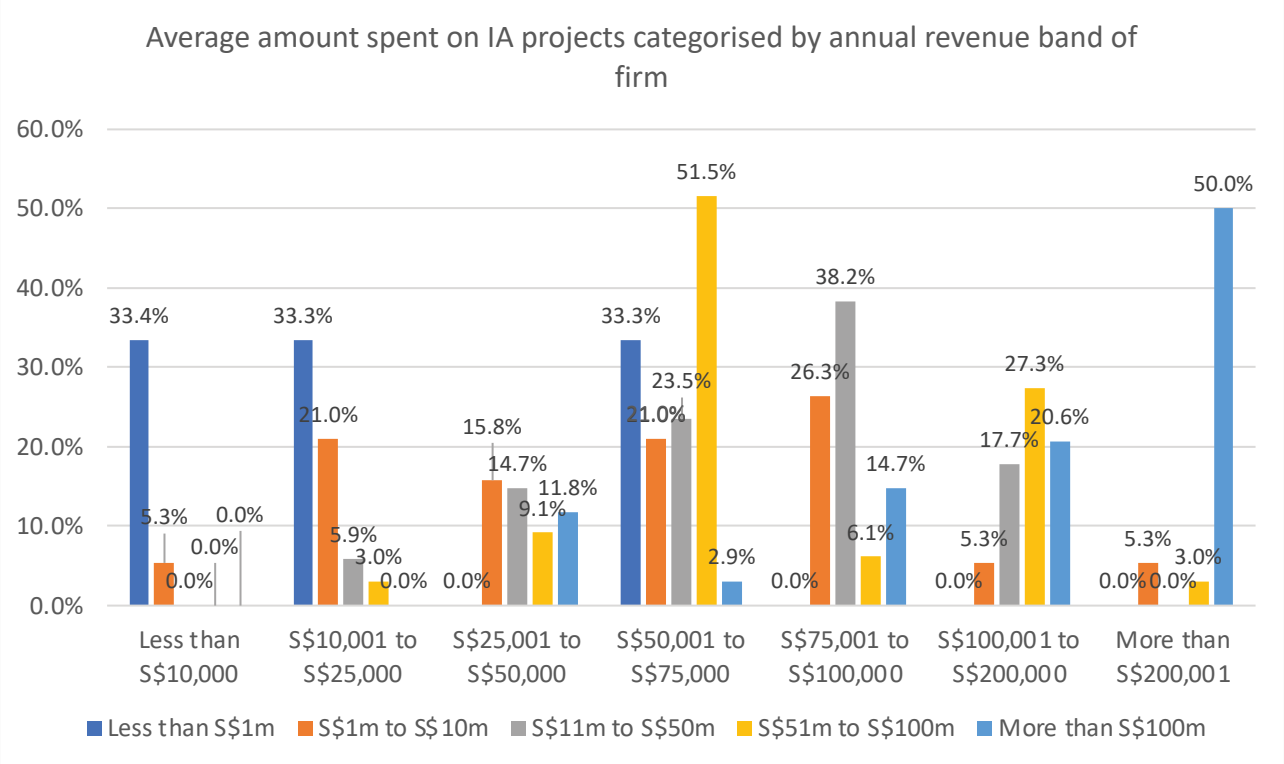

Figure 6

[2] The average cost of an IA solution is obtained by taking the average of each budget band and multiplying it by the number of respondents in each band, then averaging the total across all relevant *C-suite* respondents. The actual figure is S$98,272.36.

Companies which have bigger budgets for their IA solutions are likely to be organisations with larger revenues (Figure 6), which may require more complex solutions; they are also likely to have adequate financial resources. The final budget would probably include some allowances for contingencies and unexpected costs and, as is the common practice, the higher the project cost, the bigger the contingency amount. This could explain why the companies were generally able to keep within their allocated budgets.

Implementing an IA solution is not an end in itself. Instead, it marks the start of a journey towards higher productivity where the strategic goals of adopting and implementing IA in the Finance function must constantly remain top of mind. Automation can free up existing resources from manually intensive processes to focus on higher-value tasks such as business partnering. Furthermore, the solution would provide consistency, scalability and predictability to the process which in turn ensures that the outputs and deliverables are of a desired quality. Therefore, while implementation is a strategic consideration, it ultimately evolves into an operational day-to-day procedure for the *Working Level* staff.

After implementing their IA solution, 31.7% of the *C-suite* respondents say that Training is their top priority (Figure 7). This is followed by *Maximising Utilisation of Solution* at 26.8%. Although more than a third (35.8%) think *Capabilities of Solution* is the least important aspect, it should not be cause for worry as the efficacy of the solution would already have been assessed prior to implementation. After implementation, the focus should rightly turn to training users to harness the system's capabilities to realise its maximum potential.

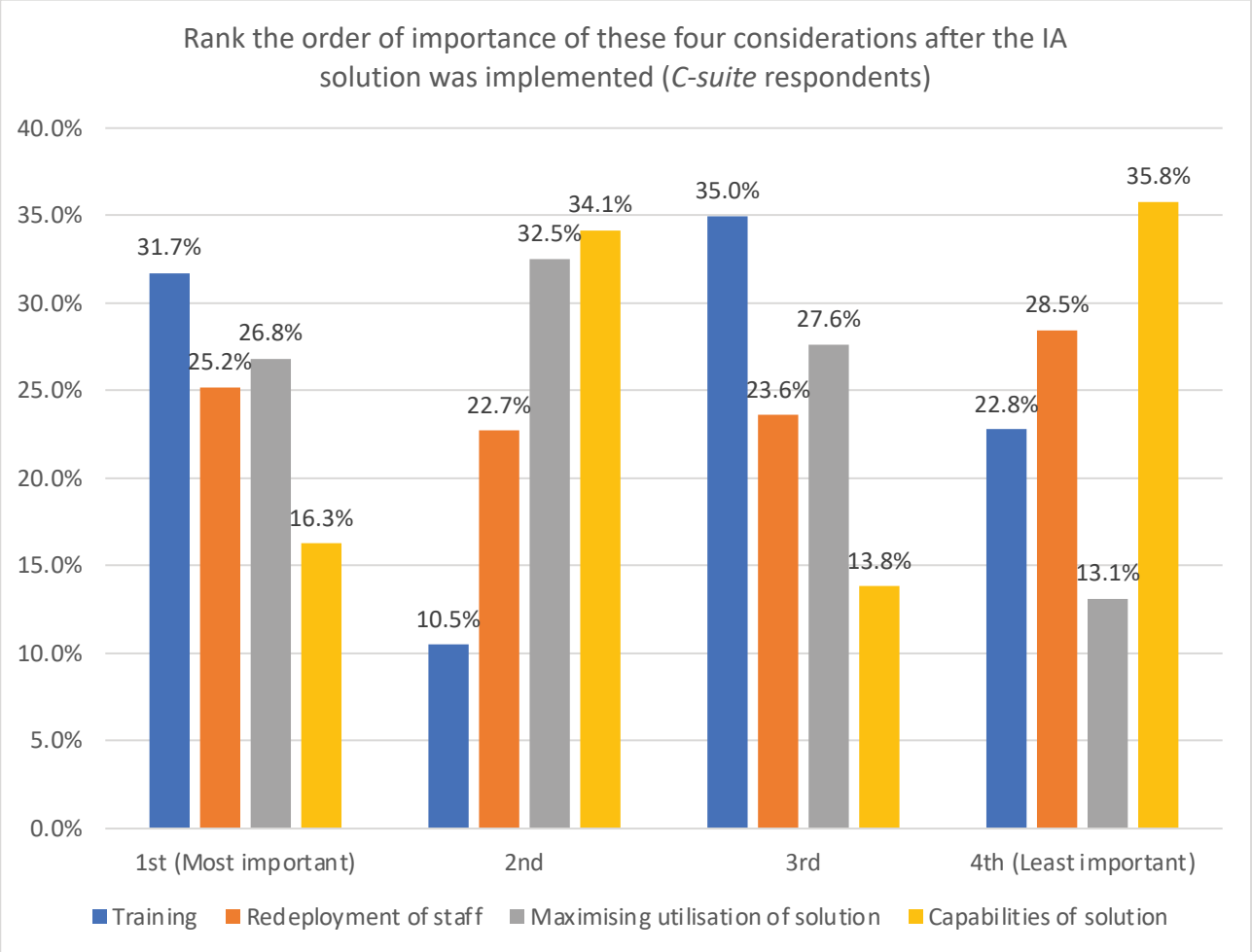

Figure 7

Solutions are almost always underutilised – just think of the number of shortcuts in Microsoft Word and Excel that are unused. In automation however, what is important is that there is always complementary work involved in adopting, implementing and using an IA solution. There is a need to constantly review, recalibrate and retrain the IA solution after the implementation stage to ensure that the system is performing to par.

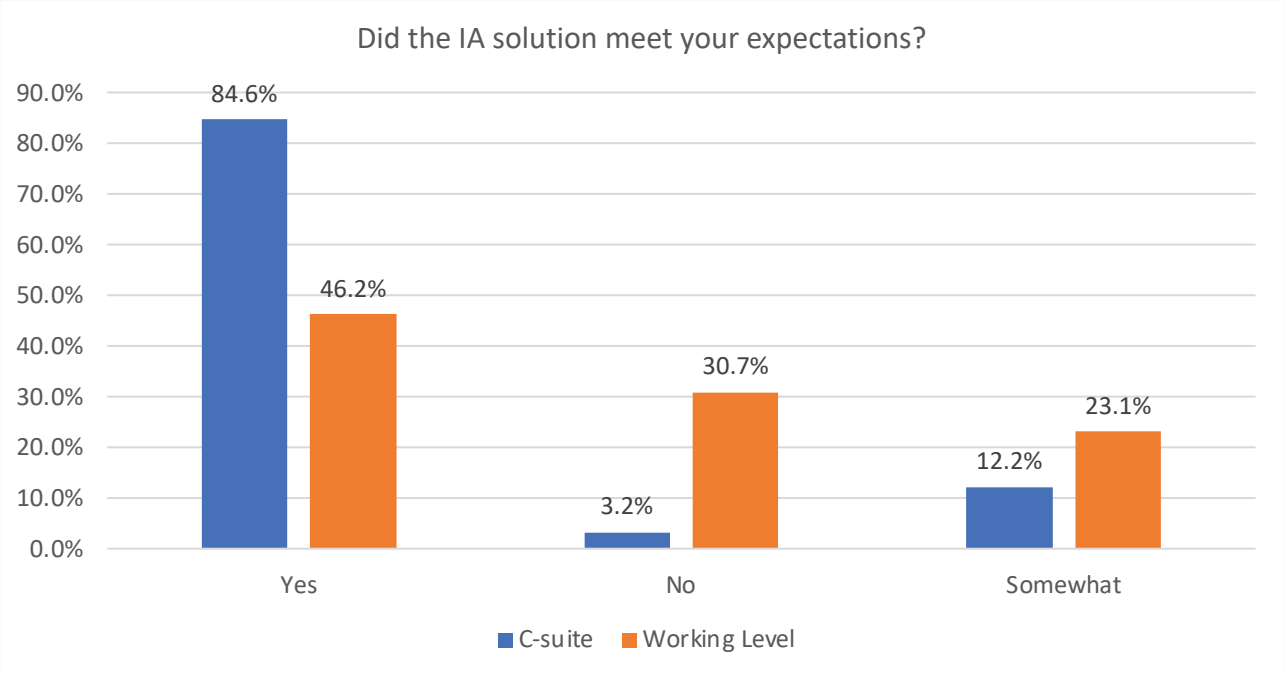

Figure 8

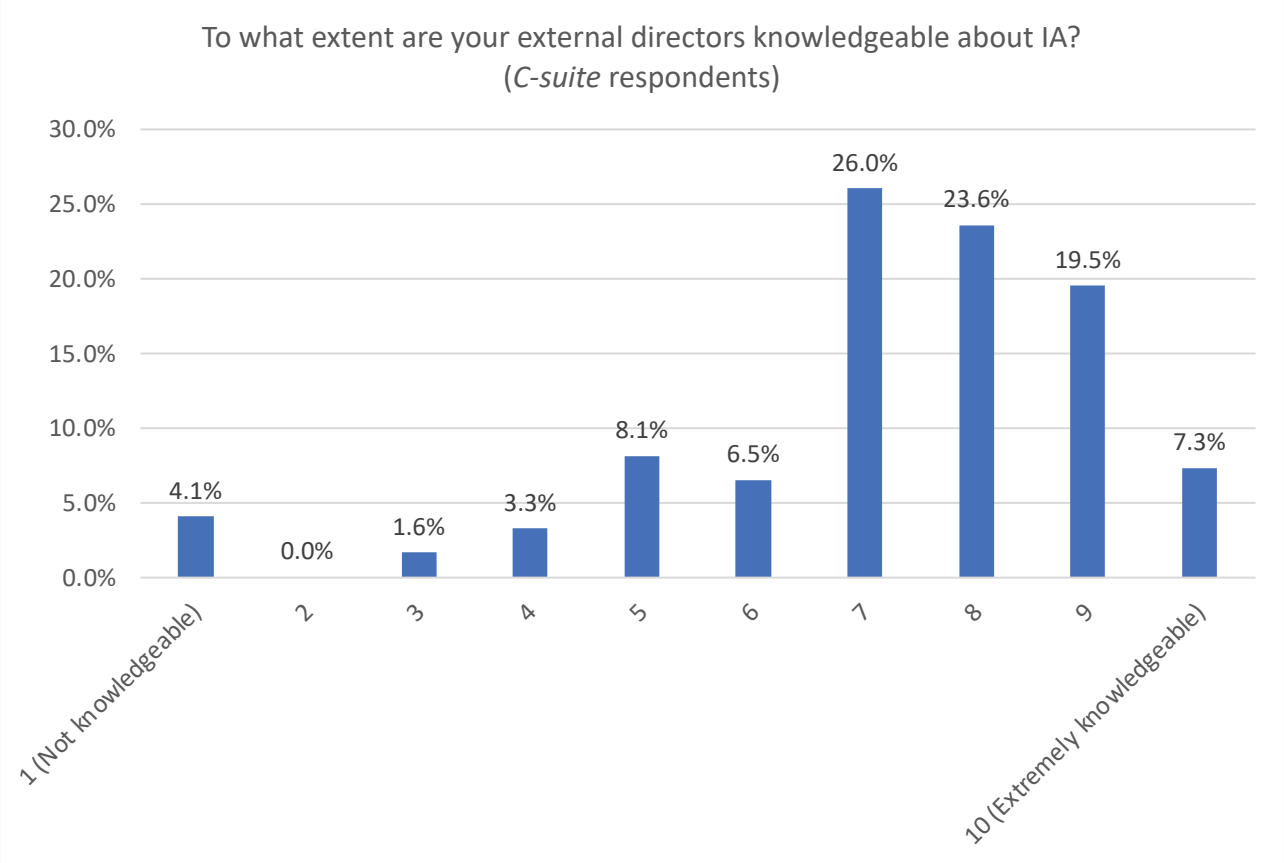

Figure 9

Despite the investment and training with regard to the IA solution, there remains a wide perception gap between the *C-suite* and *Working Level* on its performance. The majority (84.6%) of *C-suite* believe that the solution has fulfilled its expectations. However, among the *Working Level*, the figure is almost halved at 46.2% (compared to the *C-suite*'s 84.6%) (Figure 8). The disparity could be explained by the different roles each plays in the organisational structure. The *C-suite*'s role is largely strategic while employees on the ground are more involved in the day-to-day operational aspects of work. The discrepancy reiterates a point made earlier in the section on Efficiency – that there is a perception gap in the reality of everyday work between the *C-suite* and *Working Level*. The difference is also apparent when the *C-suite* rate their non-executive directors on their IA knowledgeability – most of them (76.4%) give their directors a high score of seven out of 10 or higher, even though the directors are even further removed from the daily operational aspects of work (Figure 9).

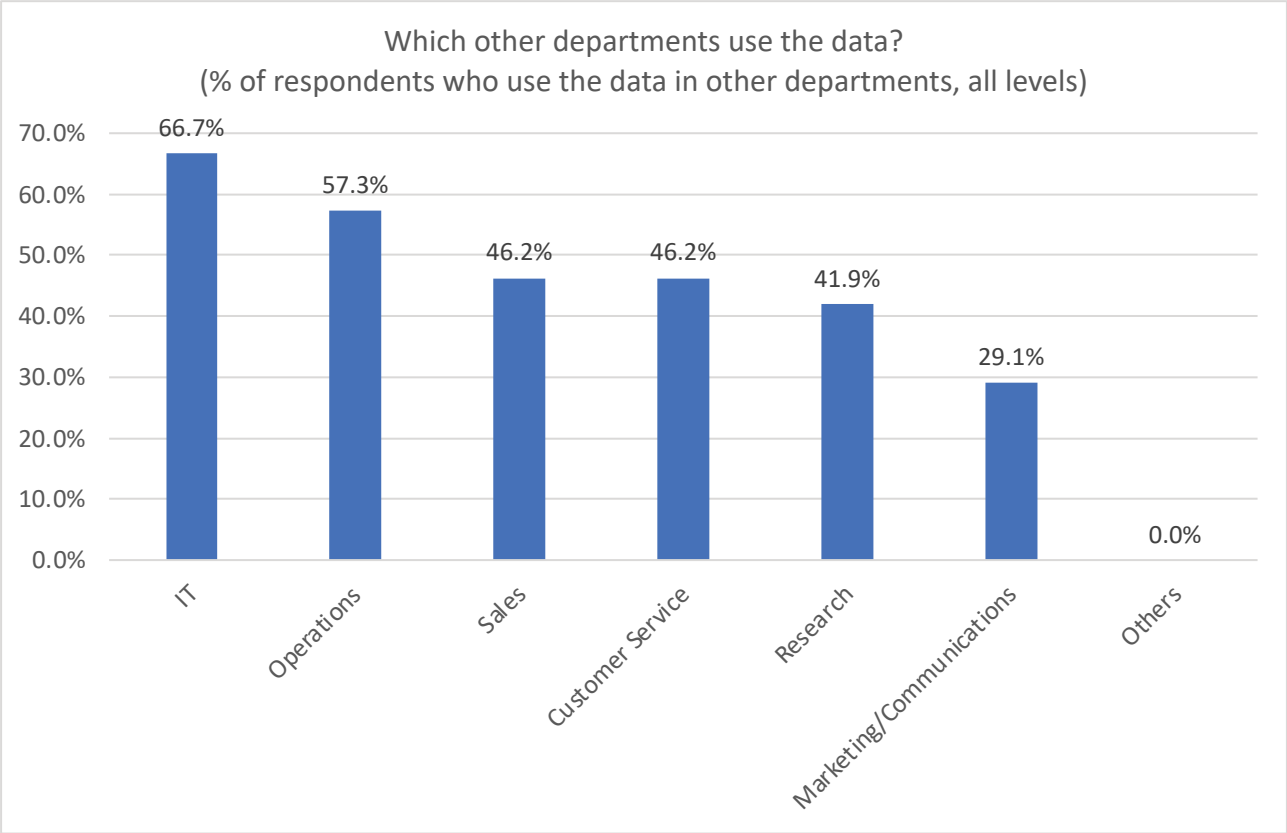

Figure 10

One of the many capabilities of IA is its ability to provide useful insights from the vast quantity of data captured. According to the majority (86.0%) of respondents across all levels, this data is also used by other departments/functions. IT leads the way at 66.7%, but what is interesting is that departments which might benefit directly from the insights record relatively low percentages, such as Operations (57.3%), Sales (46.2%) and Marketing/Communications (29.1%) (Figure 10). Organisations should think more strategically about how to optimise the use of data from their IA solutions across departments, in order to harness the benefits to support business growth.

Leadership from the top and buy-in from all levels are critical for any automation to succeed. While the CFO, and in general the *C-suite*, sets the direction for how existing processes and Finance talent should evolve in response to the solution being implemented, it is important that everyone in the work process is part of quality control and continuous process improvement.

- **Upskilling and Training of Finance Employees**

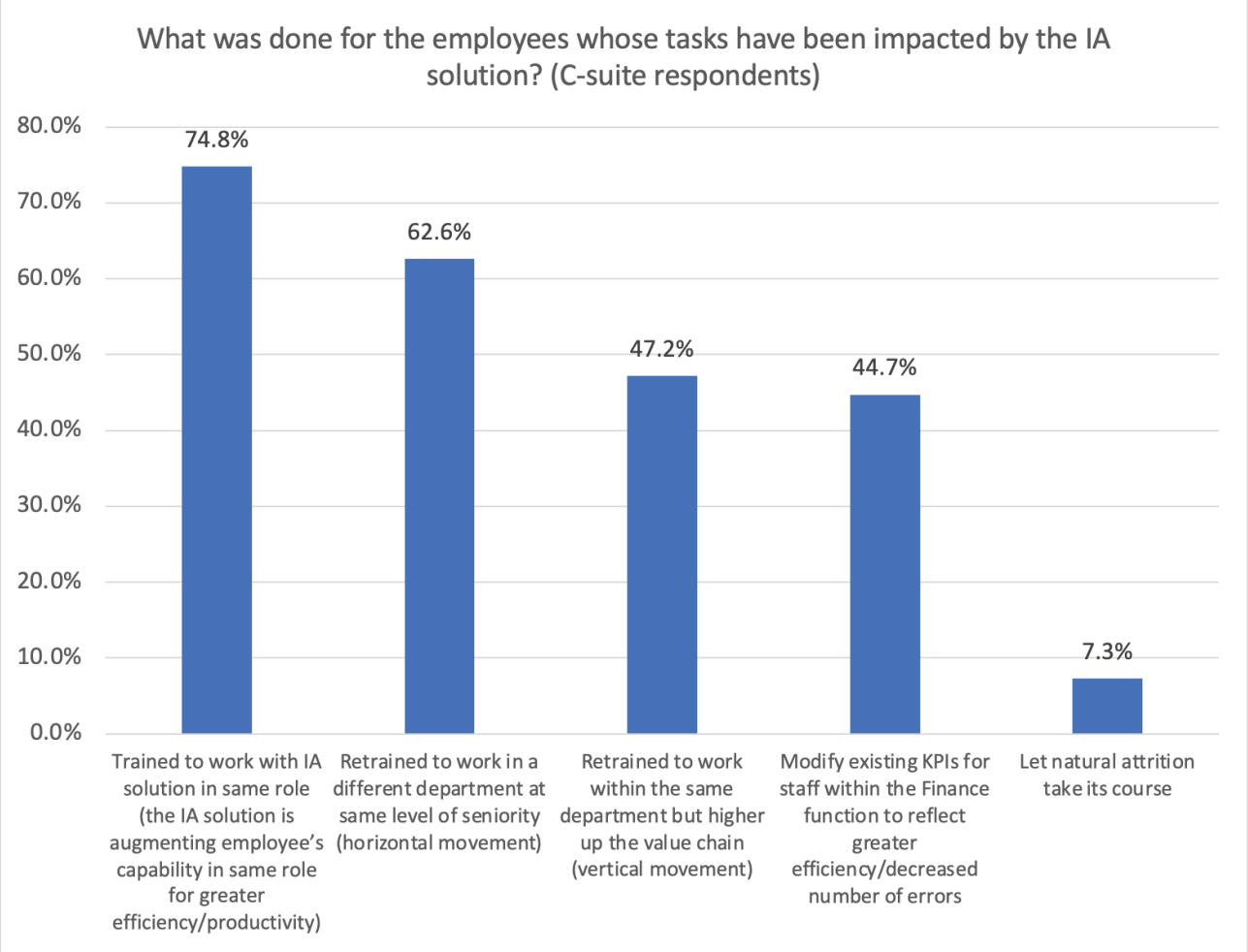

Figure 11

As *Efficiency and Compliance* is the main reason for IA adoption, it is be expected that the majority of the *C-suite* (74.8%) use the IA solution to augment employees' capabilities (Figure 11). It should be noted, however, that 62.6% and 47.2% respectively also retrained their staff for horizontal and vertical movements within the organisation.

As discussed in the earlier section on Efficiency, IA implementation has succeeded in shifting some tasks away from employees. The majority (69.2%) of *Working Level* respondents agree that the IA solution has taken over 1%–25% of their work, 23.1% say it is around 26%–50%, while 7.7% say it is more (51%–75%) (Figure 2). Among those whose job roles have been impacted, most of them have received "new" training – the majority (74.8%) of the *C-suite* use the IA solution to augment employees' capabilities, 62.6% retrained them to work in a different department at the same level of seniority (horizontal movement), and 47.2% retrained them to work within the same department but in jobs higher up the value chain (vertical movement). About 44.7% also modified existing key performance indicators (KPIs) within the Finance function to reflect greater/decreased number of errors (Figure 11).

Figure 12

The cost for employee training ranges from Less than $1,000 to More than $5,000 per person. About a third (37.4%) of the *C-suite* point to $2,001–$5,000 as the amount spent on training their staff. This is followed closely by another one third (33.3%), who peg the amount at $1,001–$2,000 (Figure 12). It is noteworthy that the investment in training has equipped employees with new skills which enable them to move to different roles, including higher up the value chain. As more companies turn to IA solutions as part of their digitalisation strategy, and also in light of the accelerated technology adoption as a response to the pandemic, it is important for employees to upgrade their knowledge of Finance-related technologies so that they can remain relevant and employable. These employees would also be able to serve as subject matter experts as they understand the process intimately. Additionally, they can serve as part of the troubleshooting team and as advisors during the process improvement phases. Rather than being replaced, employees can evolve into more diverse roles via horizontal or vertical movement while enjoying enhanced job security as they are trained to take on different job tasks. The transition to automation must be managed carefully and sensitively. Automation may sometimes be perceived as a threat to job security. Thus, employees whose job tasks have been impacted by automation should be offered opportunities and resources to upskill themselves. With the appropriate feedback and supervisory cycles, employees can improve the performance of the IA solution through iterative process improvement phases while learning to be adaptable.

- **IA as a Gateway to Digitalisation**

To recap, AI refers to systems that use technologies such as text mining, computer vision, speech recognition, natural language generation, machine learning and deep learning to gather and/or use data to predict, recommend or decide, with varying levels of autonomy, the best action to achieve specific goals. RPA is a tool that allows users to configure one or more scripts/bots to activate specific keystrokes to mimic selected tasks within a process. Both AI and RPA are part of IA, which is defined as an enhanced form of automation that combines elements of cognitive technologies, RPA and AI.

It is encouraging to know that the majority (93.5%) of individuals surveyed have a digitalisation strategy and among them, 97.4% have adopted the IA solution as part of their digitalisation plan. In all likelihood, these companies are currently enjoying the efficiencies offered by automation in such areas as Accounts Payable, Accounts Receivable, and Budgeting/Financial Planning and Analysis, which have been identified as the top three functions in Finance/Accounts where IA has been implemented.

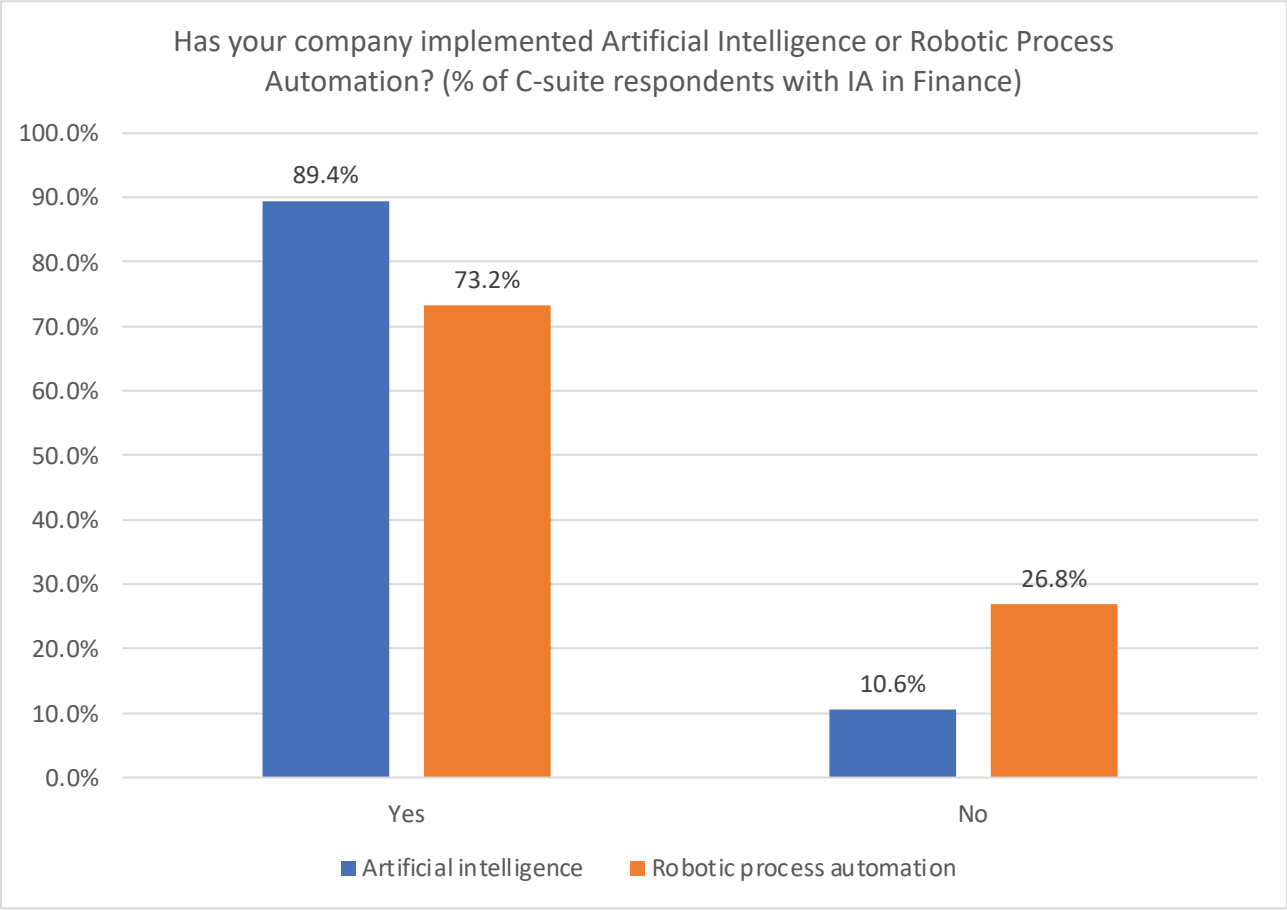

Figure 13

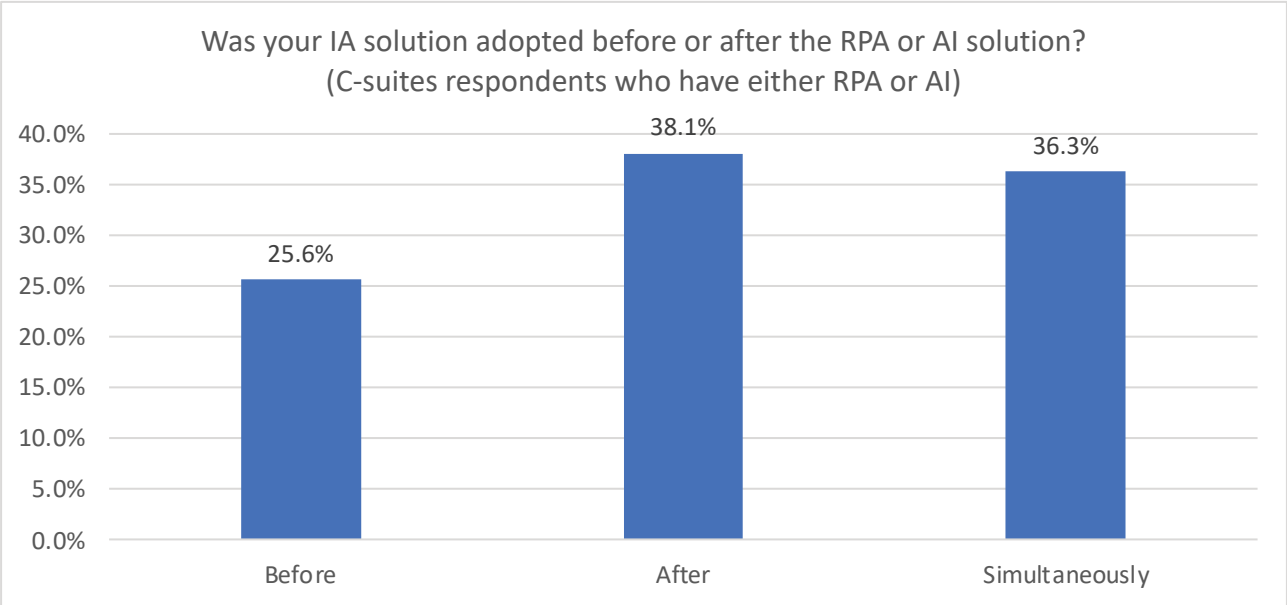

Figure 14

There appears to be a correlation between the adoption of IA, AI and RPA (Figure 13). According to the *C-suite* respondents, 25.6% say they adopted IA before RPA or AI, and 36.3% say they adopted IA together with AI or RPA (Figure 14). The numbers provide credence that adopting IA – or any intelligent/digital solution such as RPA or AI – could potentially be the precursor to adopting other related technologies. Of interest is that the IA adopters are also using Computer Vision (65.0%), Speech Recognition (61.8%), Natural Language Processing (61.0%) and Text Mining (48.8%) (Figure 15).

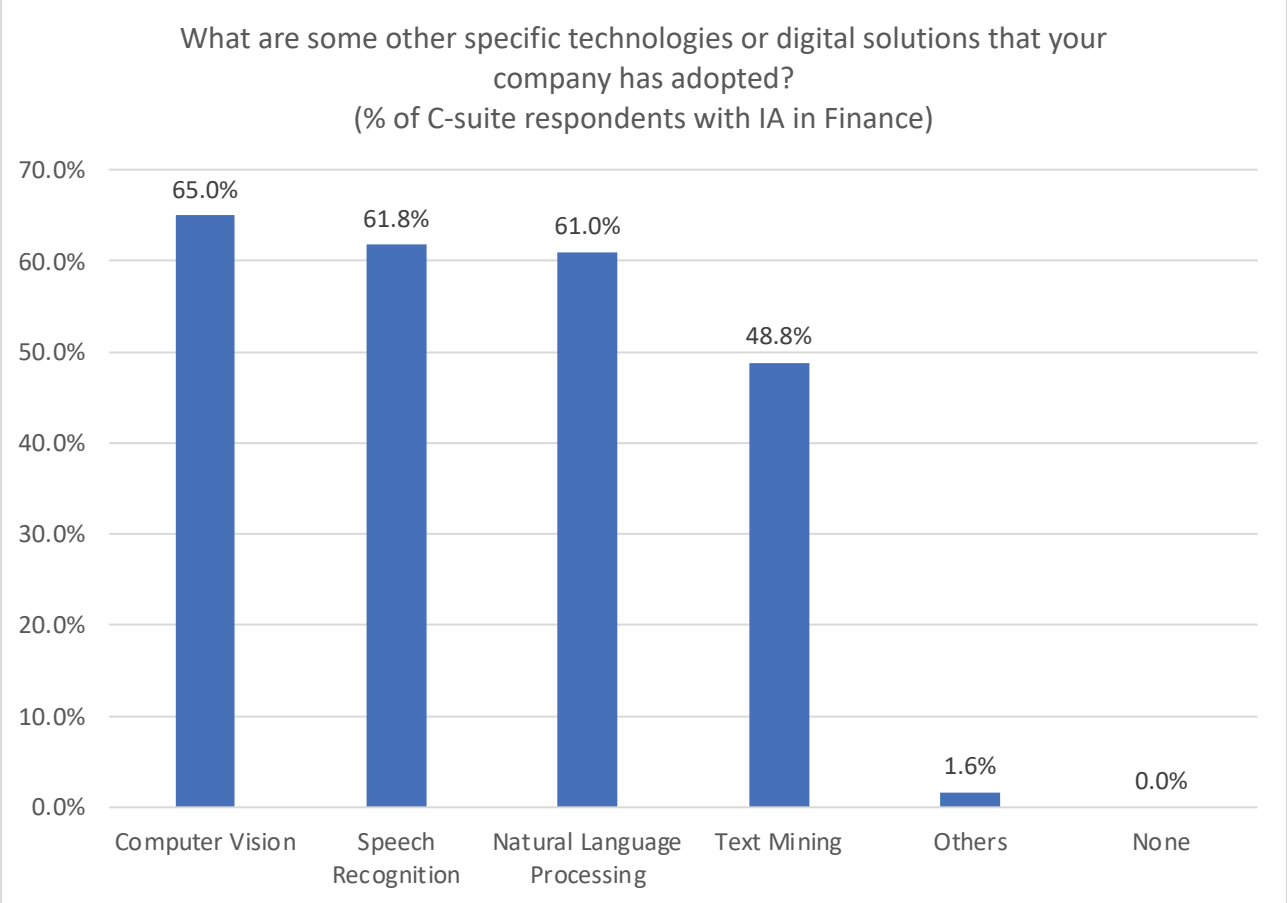

Figure 15

2) Respondents who do not have IA in Finance (IA non-adopters)

- **Efficiency**

Although the many benefits of IA in Finance are well documented, more than half (55.3%) of the *C-suite* respondents in the IA non-adopters category reveal that they have no intention of adopting an IA solution in the Finance function, while 44.7% indicate "yes" or "maybe" (Figure 16). Among companies which intend to implement an IA solution, 77.8% say they will do so within the next one to three years.

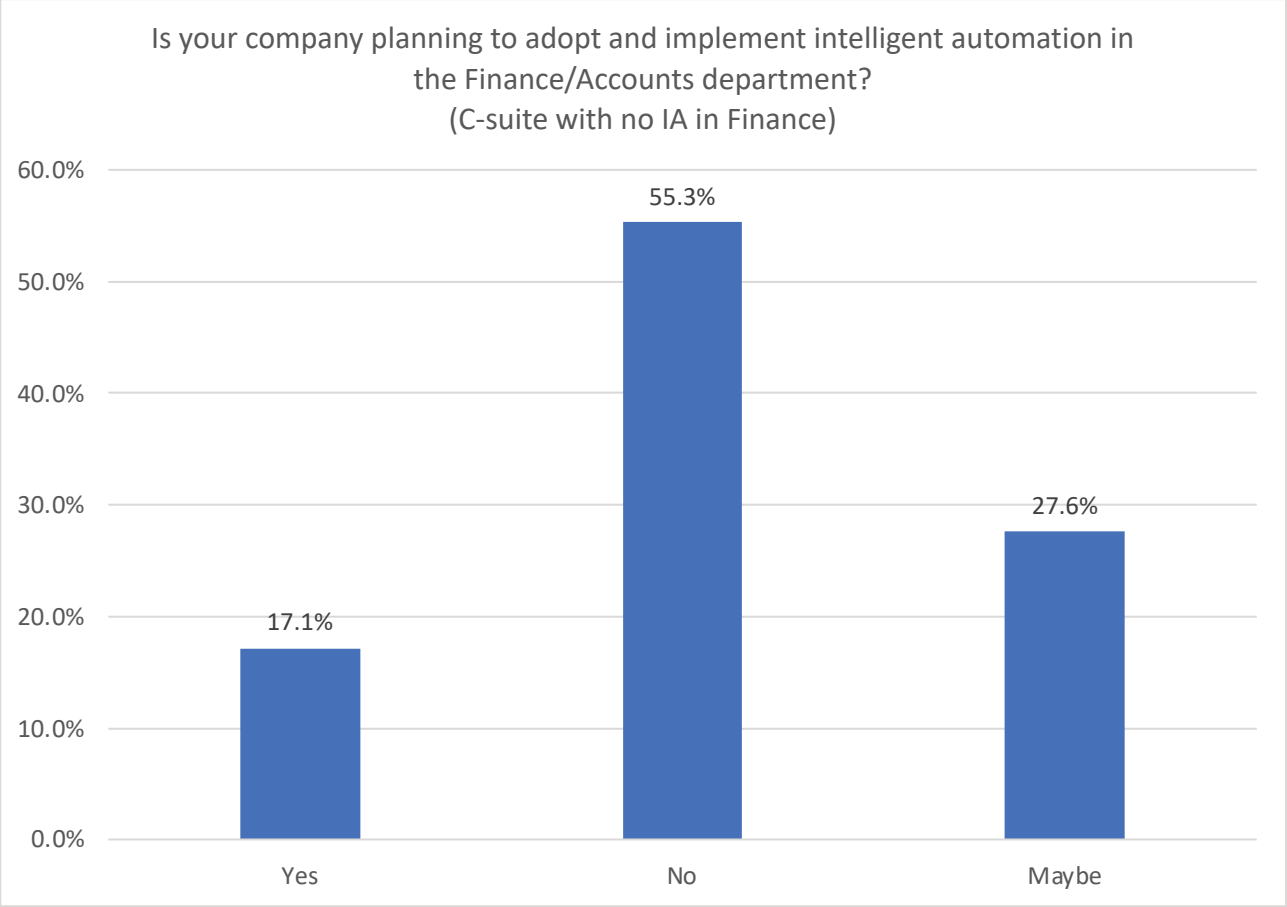

Figure 16

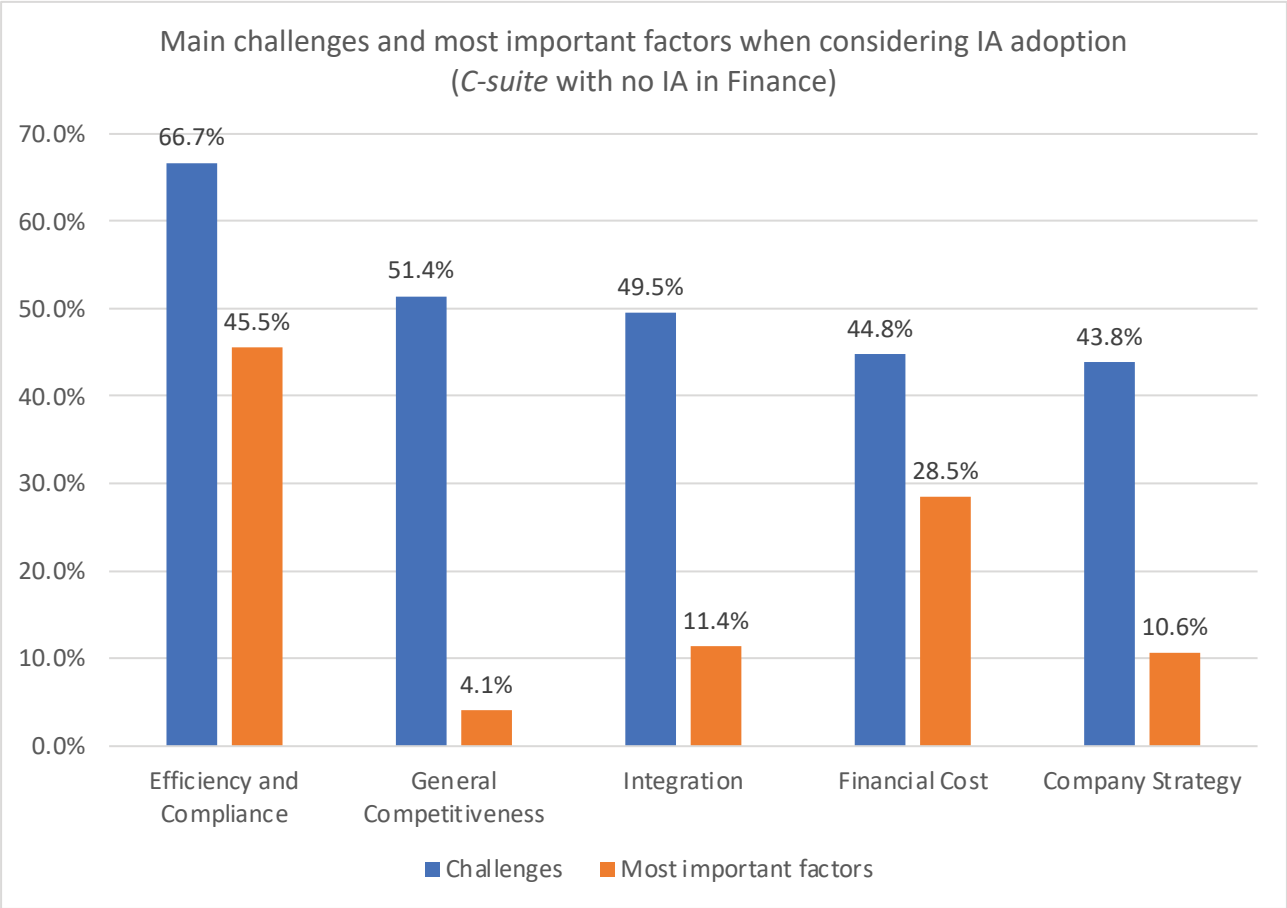

Figure 17

That the majority of those in the IA non-adopters category (55.3%) have no intention of adopting an IA solution in the Finance function is unusual, especially as such solutions have proven to enhance the overall efficiency of the organisation. But as shared by the *C-suite*, there are several hurdles to adoption, and chief among them are *Efficiency and Compliance* (66.7%), *General Competitiveness* (51.4%) and *Integration* (49.5%). *Financial Cost* (44.8%), and *Company Strategy* (43.8%) rank fourth and fifth. The top two findings stand in sharp contrast to those of the IA adopters. As seen in Figure 17, among the IA adopters and IA non-adopters, *Efficiency and Compliance* has been marked as both the topmost priority (45.5% by IA adopters) as well as the greatest challenge (66.7% by IA non-adopters). And, while the IA adopters regard *General Competitiveness* as a relatively unimportant factor for adoption (4.1%), among the IA non-adopters, this ranks second highest (51.4%). The responses of the IA non-adopters seem to suggest that they may be unclear about some of the benefits of adopting automated solutions. One such benefit would be the long-term sustainability of the organisation's operations. Adopting these solutions allows companies to grow their teams' capabilities which in turn will enable employees to move up the value chain as automation takes over the mundane and routine tasks.

- **Corporate Strategy**

Among the IA non-adopters, organisations which feel that *Integration* (49.5%) and *Company Strategy* (43.8%) (Figure 17) are challenges also stand in stark contrast to the IA adopters (*Company Strategy*: 27.6%, *Integration*: 17.9%) (Figure 4). The discrepancies possibly stem from a lack of understanding of how IA solutions can be integrated into the company's processes both strategically and within a department.

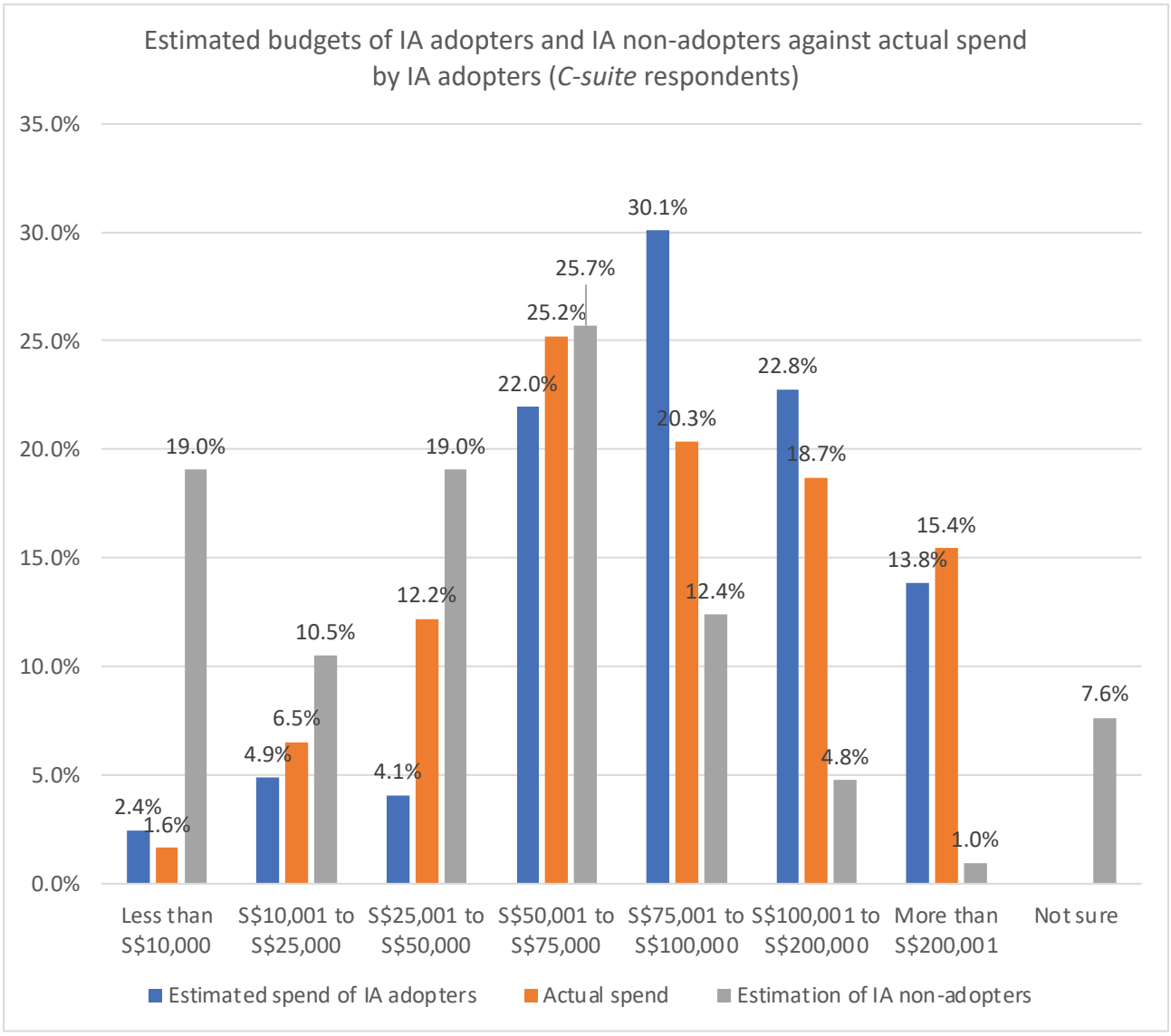

Figure 18

Of significance is the agreement between the IA adopters and IA non-adopters that the two most important factors when considering IA adoption are *Efficiency and Compliance*, and *Financial Cost*. Among the IA non-adopters (Figure 18), 25.7% estimate that an IA solution fitting their needs would cost $50,001–$75,000. Their estimation is closest to the actual expenditure of the majority of the IA adopters (25.2%). However, at the other end of the spectrum, 19.0% have picked an estimated cost of Less than $10,000 – a figure which wildly differs from the IA adopters' estimated budgets (2.4%) and actual expenditures (1.6%). About 7.6% of IA non-adopters are unsure how much a suitable IA solution would cost them. The findings suggest that among the IA non-adopters *C-suite*, there might be some understanding of the actual cost of implementing IA in the Finance function and, within the category, there are varying perspectives about IA, such as the benefits they bring, difficulty/ease of adoption, and cost of implementation.

- **Upskilling and Training of Finance Employees**

Both the IA adopters and IA non-adopters are remarkably similar in their perspective of how the IA solution would impact their employees in the Finance function. The one differing point is that 35.2% of the IA non-adopters expect natural attrition to occur within the department, compared to just 7.3% of the IA adopters (Figure 19).

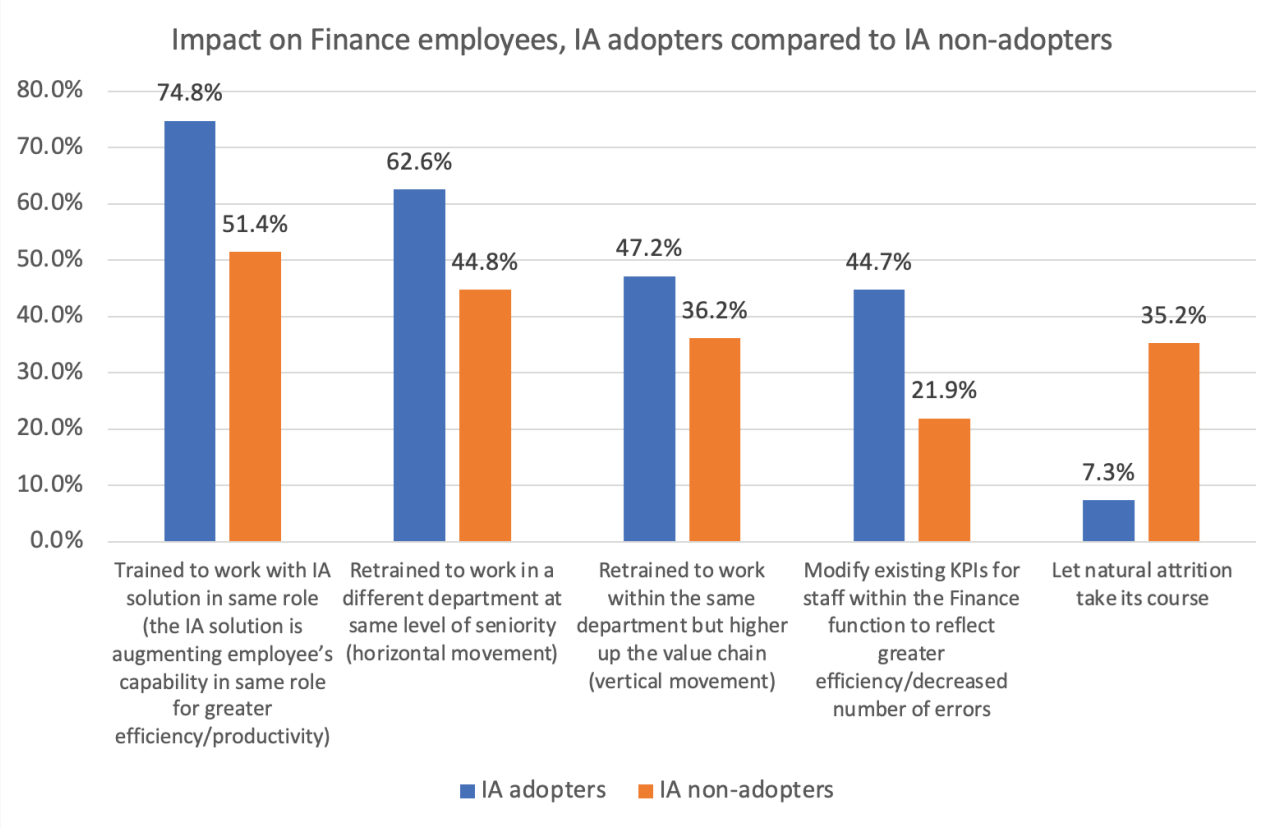

Figure 19

Among the IA non-adopters (Figure 19), augmentation of the employees' capabilities in the Finance function (51.4%) is by far the most significant impact on the employees, according to the *C-suite*. Retraining for either horizontal or vertical movement within the organisation or department is also prevalent, at 44.8% and 36.2% respectively. It should be noted that vertical movement, where employees would be moved higher up the value chain within the Finance department, is almost as popular a choice as natural attrition (35.2%).

Modifying KPIs to reflect greater efficiency or fewer errors is the least popular among the IA non-adopters. This might suggest that greater efficiency, while a great concern at the strategic level, is somehow diluted at the operations/department level.

- **IA as a Gateway to Digitalisation**

It is not surprising that the IA non-adopters have not adopted related technologies or digital solutions in a big way – only 3.8% have implemented AI and 1.9% have implemented RPA (Figure 20). The specific technologies or digital solutions adopted span Computer Vision (7.6%), Speech Recognition (6.7%), Text Mining (4.8%) and Natural Language Processing (3.8%) (Figure 21). To get the majority (84.8%) which have not adopted any such solutions to embark on their digitalisation journey, starting with one IA solution could be the key.

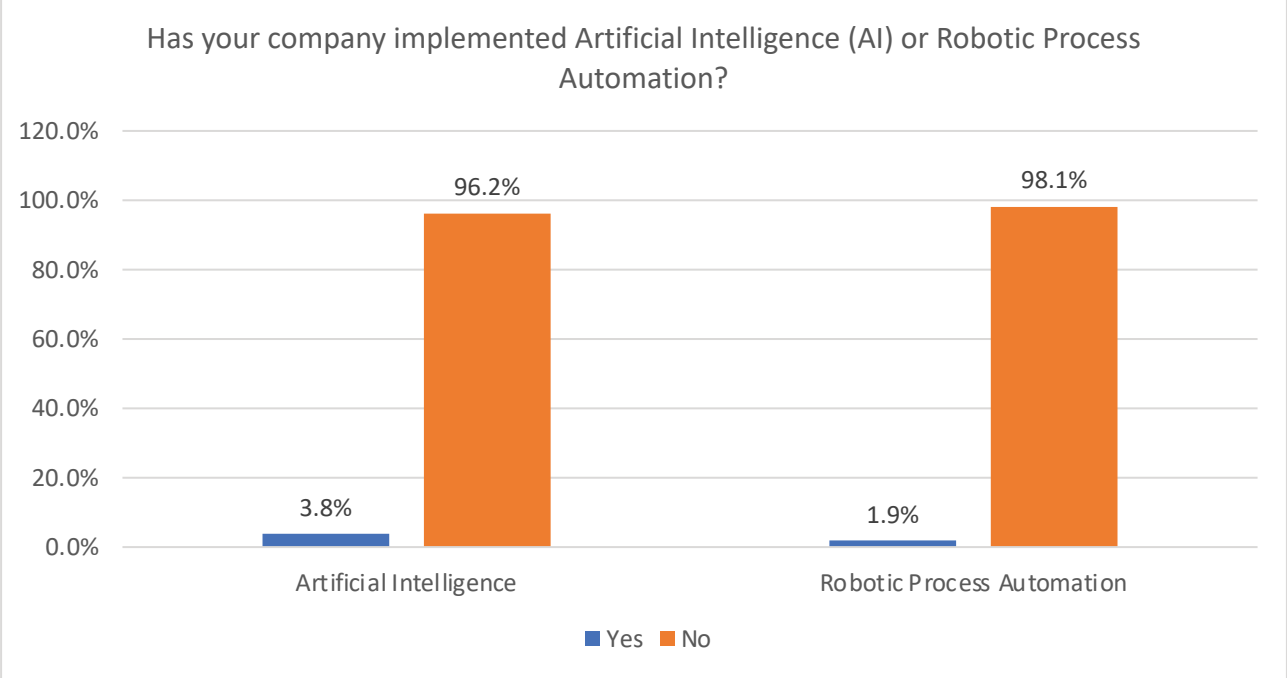

Figure 20

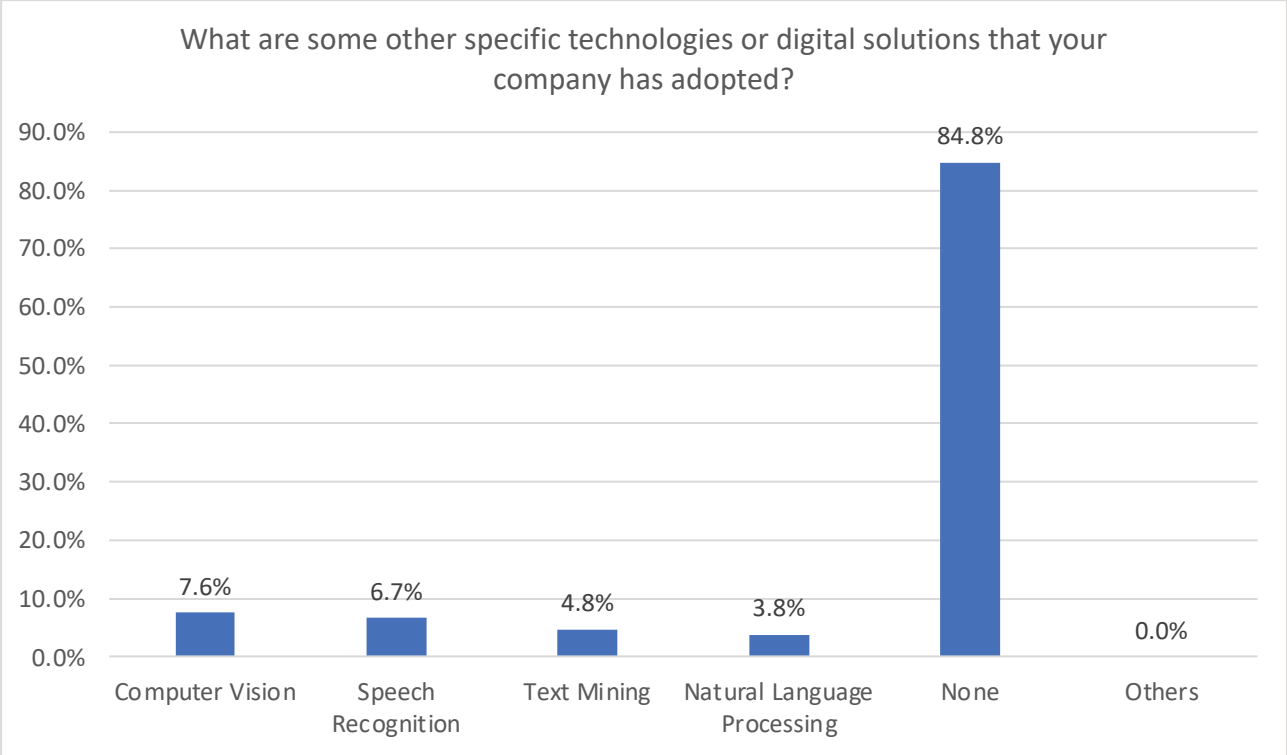

Figure 21

As can be seen in Figure 20 and Figure 21, a small number of companies are already using technology solutions in their business processes. As they become more familiar with such technologies and continue to experience the benefits that technology brings, they might be ready to explore other/more complex solutions. Those looking to go digital or adopt IA for the first time can begin by automating the accounting cycle (accounts payable and receivable, journal entry, account reconciliations, and financial close) as it is a basic application which yields immediate efficiencies. The many initiatives offered by the Singapore government, industry, and business and professional bodies, which range from pre-approved digital solutions and consultancy services to financial assistance and technical training including how to use IA solutions, would help smooth the way for companies to go digital.

CHAPTER 4: RECOMMENDATIONS TO CONSIDER BEFORE ADOPTING IA IN THE FINANCE FUNCTION

> Even if we increase the level of automation… it's not just the efficiency that people want – it's the combination of efficiency and adaptability. […] The trick is how to be flexible with an increasing degree of efficiency. And the only way you're going to get that combination of efficiency at scale with adaptability – adaptability for both the current moment as well as changing structurally for new circumstances – is with the combination of people and machines. Even as we make increasing usage of intelligent automation in accounting and Finance-related knowledge and administrative work, I am not worried about net job loss as there is no shortage of work for people to do, especially as we move forward with digital transformation and other types of restructuring." – **Professor Steven Miller, Professor Emeritus of Information Systems, Singapore Management University**

The preceding chapter provides an in-depth examination of the data to uncover meaningful insights into the state of play of IA in the Finance function. The information was analysed according to the four areas of Efficiency, Corporate Strategy, Upskilling and Training of Finance Employees, and IA as a Gateway to Digitalisation. This chapter continues the discussion with some recommendations which organisations may want to consider before they adopt IA in their Finance functions. The recommendations have been compiled from a series of interviews with technology experts, consultants and CFOs (see Chapter 2: Methodology for list of names).

1. Start small.

Do not overreach, and start by automating simple processes.

a. It is important to take baby steps to acquire experience and, more critically, confidence, when adopting IA. If early projects do not demonstrate any return on investment, or if users do not see the benefits, the project is likely to be unsuccessful.
b. Ad hoc workflows provide the opportunity to take those baby steps.
c. Identify the processes which occupy the bulk of the employees' time – these would be the top candidates for automation. These would often be the mundane and routine tasks.
d. Build up the confidence of users via sufficient and targeted training to extract the maximum value from the IA solution's capabilities and functionalities.
e. Consider starting the journey towards automation with "attended robots". These are intelligent automated systems which are manually triggered by the employee to speed up a process. These tend to be easier to troubleshoot. An example of an "attended robot" may be an application that gets customer information from one database and types it into a separate form, thereby freeing the employee from having to search for the information, then typing it in (IBM, 2018).

> Real-life example: A logistics company automated the processing of its shipment waybills. Before automation, a staff member would manually retrieve the customer order, transfer the details to the company's own waybill template and send it for print. After using RPA to automate the process, customer orders emailed to the company would be detected, data from the relevant fields would be extracted and transferred to the company's waybill template, and the waybill would be sent for print – all automatically. Thereafter, all the staff had to do was collect the printed waybill from the printer.

2. Leadership from the top is critical.

The role of the CFO, and in general the *C-suite*, is to set the direction and provide the input for how the existing processes and Finance talent should change and evolve with the technology being contemplated. The top management also decides on the pace of automation. Therefore, any IA adoption must receive the endorsement and support from the very top.

3. Buy-in from all levels is essential.

Once endorsement from the top is achieved, the *C-suite* needs to convince the remaining levels to come onboard the IA adoption. Since the Finance function employees are the end users of the intelligent solution, they are the people intimately aware of what the process entails. With their hands-on knowledge, they can be tapped on to:

a. Provide a basic blueprint of the process as well as the list of requirements which the IA solution should fulfil;
b. Assess the user-friendliness and ease of use from a day-to-day perspective by asking themselves questions such as:

    i. Is the technology sufficiently user-friendly for existing Finance employees?
    ii. Does the technology resolve or minimise the current pain points?

At the same time, the IT department should be involved as well. They will need to:

a. Understand the expected level of IT involvement should changes or tweaks need to be made regarding how the solution has been set up. Questions which the IT department should ask are:

    i. Does the solution allow for the Finance function to be independent, where the solution is "low code"? (Low code is a software development approach which requires little to no coding to build applications and processes.)
    ii. Is the IT department able to provide a basic level of troubleshooting?

b. Designate a dedicated employee who is able to articulate the business case while bridging the technical aspects.

Real-life example: An accounting company started a company-wide process to automate its workflows. One workflow involved logging into the Inland Revenue Authority of Singapore (IRAS) website with the organisation's credentials, look over incoming letters (PDF files) from IRAS to its clients, use TagUI's built-in on-prem OCR to detect predefined keywords, and route the letters to the right staff based on predefined keyword-staff definitions. The staff can then manually follow up on the letters which require attention/action. For cases where there was no match, the system would flag them out for manual review.

4. Manage the transition to automation carefully.

Automation has sometimes been perceived as a threat to job security. The *C-suite* will need to manage perceptions and allay fears when transitioning to automation.

a. Employees whose job tasks have been assumed by automation may worry about their job security. Organisations should offer reskilling and/or upskilling opportunities as well as relevant resources to employees to address their concerns.
b. Ensuring support for employees whose job tasks have been enhanced by automation will create a beneficial cycle of improvement. With the appropriate feedback and supervisory cycles, the users can help the intelligent solution to keep learning and become more "intelligent". They can also assist their colleagues to better understand the process. This addresses the threat to job security.

5. Communication must be a two-way channel, and taken seriously.

Automation can be both a boon and a threat. Communication in both directions is key to ensure that everyone's voice is heard at all stages of the IA adoption journey.

a. The *C-suite* has to foster an environment where the *Working Level* staff are able and encouraged to provide honest and constructive feedback about the solution, updated processes, outputs and whether the pain points have been resolved.
b. To garner buy-in, the company needs to continuously emphasise, explain and promote the strategic vision and objectives of the solution to all levels after implementation. This is especially beneficial for staff who are deeply involved operationally, to be able to occasionally take a step back and assimilate the strategic vision of the company.

6. Consider the opinions of *Working Level* staff, particularly during process improvement phases.

As *Working Level* employees are familiar with the processes, their feedback about operational concerns are often critical sources of information.

a. Once a two-way communication channel is established, companies should actively seek feedback about pain points and other operational issues from the *Working Level* staff in order to prevent deterioration of the IA solution. Such feedback should also be seriously considered by the top management.
b. Recalibration and retraining of the solution are essential in ensuring that its performance is maintained, to keep up with changes in data quality.

7. Ensure that expectations across all levels are realistic and specific.

The following (non-exhaustive) list shows some of the common expectations when considering IA adoption:

a. Investment cost should commensurate with expected return/value.
b. The solution can address a specific pain point/problem that it is intended to address.
c. The extent and type of post-implementation support offered to users should be comprehensive (for example, training, troubleshooting, maintenance, etc).
d. The solution is easy to implement and integrate into existing systems.
e. The experience and capabilities of implementation consultants are appropriate and specific.

Expectations may vary across different strategic and operational levels. To minimise the gaps in perception, the *C-suite* should also set realistic expectations that is informed by the *Working Level*.

8. Seek to continuously improve on the process and the solution.

Implementing an IA solution is not an end in itself. Companies should adopt an IA solution with the understanding that it is a continuous and ongoing process that needs constant improvements, and that the solution will grow with the organisation. As such, companies should aim to promote a growth mindset as a core element of its corporate culture.

a. A growth mindset exposes all staff to new strategic visions, encourages adaptability and alleviates fears relating to job security.
b. This mindset may encourage staff to work on improving processes; it also helps to maintain the performance of the IA solution and grow its capabilities.
c. Such a mindset creates confidence in automation in general, which leads right back to the start of your next automation project, thus continuing the virtuous cycle of improvement and benefits!

ACKNOWLEDGEMENTS

Interviewees:

- Ms Doris Cheng, Partner, Singapore Accounting Operations Assurance Leader, Deloitte
- Mr Ram Krishna, Director, Chief Data Officer & Digital Innovation Technology Lead, PwC Singapore
- Mr Kenneth Leong, Chief Operating Officer & Chief Financial Officer, Axiom Asia Private Capital Pte Ltd
- Mr Liaw Chun Huan, Chief Financial Officer, KTC Group
- Mr Laurence Liew, Director, AI Innovation, AI Singapore
- Professor Steven Miller, Professor Emeritus of Information Systems, Singapore Management University

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GLOSSARY OF TERMS

- *C-suite*
  - Chief Executive Officers
  - Chief Financial Officers
  - Finance Directors
  - Chief Technology Officers/Heads of Information Technology

- *Capabilities of Solution*
  - What the solution can do, such as taking over mundane and routine tasks, analysing data sets, generating actionable insights, etc

- *Company Strategy*
  - Pertains to a company's digitalisation or general strategy

- *Efficiency and Compliance*
  - Increasing efficiency of Finance staff/procedures, raising levels of compliance, lowering rates of errors, etc

- *Financial Cost*
  - Upfront and future/associated costs including cost of purchase, future upgrades, maintenance, etc

- *General Competitiveness*
  - Refers to a company's competitiveness

- *Integration*
  - Includes training staff/adapting processes to use IA solution, time/effort required to incorporate into current software systems, etc

- *Maximising Utilisation of Solution*
  - Ensuring that as many aspects as possible of the IA solution is utilised across the whole of the organisation (for example, sending the data captured from Finance/Accounting processes for use in Sales, Marketing/Communications, etc)

- *Training*
  - Training Finance/Accounts staff to work with the IA solution, or to take on higher-value tasks in the same department (vertical movement), or redeployment to other departments (horizontal movement)

- *Working Level*
  - Financial Controllers
  - Financial Managers
  - Accounts Managers
  - Finance Executives/Accounts Executives

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AI Singapore is a national AI programme launched by the National Research Foundation (NRF), Singapore to anchor deep national capabilities in AI in order to create social and economic impacts through AI, grow the local talent, build an AI ecosystem, and put Singapore on the world map.

AI Singapore brings together Singapore-based research institutions and the vibrant ecosystem of AI startups and companies developing AI products to perform applications-inspired research, grow the knowledge, create the tools, and develop the talent to power Singapore's AI efforts.

AI Singapore is driven by a government-wide partnership comprising NRF, the Smart Nation and Digital Government Office, EDB, IMDA, SGInnovate, and the Integrated Health Information Systems.

For more information on AISG and its programmes, please visit https://aisingapore.org/.

About NUS Business School

The National University of Singapore (NUS) Business School is known for providing management thought leadership from an Asian perspective, enabling its students and corporate partners to leverage global knowledge and Asian insights.

The school has consistently received top rankings in the Asia-Pacific region by independent publications and agencies including The Financial Times, Economist Intelligence Unit, and QS Top MBA list, in recognition of the quality of its programmes, faculty research and graduates.

The school is accredited by AACSB International (Association to Advance Collegiate Schools of Business) and EQUIS (European Quality Improvement System) – endorsements that the school has met the highest standards for business education. The school is also a member of the GMA (Graduate Management Admission) Council, Executive MBA Council, Partnership in Management (PIM) and CEMS (Community of European Management Schools).

For more information, please visit https://bschool.nus.edu.sg/, or go to the BIZBeat portal (https://bizbeat.nus.edu.sg/) which showcases the school's research.

INSTITUTE OF
SINGAPORE
CHARTERED
ACCOUNTANTS

60 Cecil Street, ISCA House,
Singapore 049709
TEL +65 6749 8060 **FAX** +65 6749 8061
www.isca.org.sg