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An investigation into the motivators and drivers of technological Innovation in accountancy firms based in the USA

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Abstract

Accountancy firms form an important element of a countries' economic value, however, whilst there is considerable research into the service sector as a whole, there is little research which focuses specifically on accountancy firms themselves and how they innovate. This study used semi structured interviews with five senior members of different accounting firms in the U.S. from which it was determined that the drivers of technological innovations were principally motivated by efficiency. Efficiency was important for a number of reasons. Firstly, aiding staff retention in terms of both providing feedback and allowing staff to perform less of

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the mundane tasks and focus on more analytical and strategic work and it was suggested younger staff members enjoyed using the new technology encouraging staff retention and job satisfaction. Secondly, staying competitive with pricing for customers was also a driver for using innovations to become more efficient, although increasing the profit margin was also suggested as savings made by innovations are not always passed on to customer (I.e. value pricing), reducing the time and manual activity to do tasks was a key driver to improving the profitability of work. Thirdly, security was mentioned as an important area for innovation – both to keep confidentiality of clients' data and to allow employees to work securely off site allowing staff flexibility in terms of working from home or at a clients' site. The results also suggest that accounting firms engage in direct communication and collaboration with their employees, clients, alliances, and suppliers as a source of technological innovations.

Introduction

Accounting plays an important economic role in the economy assisting and shaping the economy due to its economic value, with an increase in revenue and profitability within the industry reported recently (AICPA 2016). However, it seems to be a common mindset amongst accounting professionals that they do not

need to innovate or change (Glaveski, 2015) and are simply followers of compliance without risking new innovations (Russell 2014). Client expectations are now however evolving based on availability of new technology such as improved software and clients are able to do some of this work for themselves. This is being recognised within the industry with awards for innovation (Russell 2014). Accountancy firms now need to adapt to provide a unique service that clients cannot do for themselves more cheaply.

The importance of the service sector has long been known as a key factor to the growth and competitiveness of developed countries (Javalgi et al., 2011). A professional service firm as defined by von Nordenflycht (2010) has the characteristics of knowledge intensity, low capital intensity and a professionalised workforce. Innovation and the service sector are believed to be important to economic growth. Zieba and Zieba (2014) argued that the concept of knowledge management definitely correlates with innovation, and demonstrated that the issue is well covered in literature. As knowledge management in particular is a main concern amongst Knowledge-Intensive Businesses (KIBs), it is beneficial to study the technology innovations in KIBs – as this industry significantly affects the growth of the economy. KIBs are divided into t-KIBs and p-KIBs (Miles, 2012) with t-KIBs representing technology-based KIBs, such as computer service firms

and engineering service firms, and p-KIBs representing traditional professional KIBs, such as accountancy firms and legal service firms. T-KIBs can be services which rely heavily on the use of scientific and technological knowledge such as computer services, architectural and engineering services, data processing services, and R&D and testing services. T-KIBs are directly related to information and communication technologies, focusing on synthetic knowledge. On the contrary, P-KIBs are more conventional professional services, including legal services, accounting, bookkeeping and auditing services, tax consultancy, and business and management consultancy. It should be noted that p-KIBs are considered to be users of technological innovations rather than developers – while t-KIBs take a more active role in creating and framing them (Miles, 1995). The majority of the existing literature focuses primarily on developing theories and the exploration of t-KIBs, as they are believed to be more influential in developing and influencing technological innovations than p-KIBs, however, when discussing technological innovations in the knowledge-intensive businesses researchers often overlook the existence of the professional service (p-KIBs) and focus more on technical-based services (t-KIBs).

In 1995, Miles et al., defined KIBs as "services that involved economic activities which are intended to result in the creation, accumulation or dissemination of

knowledge". A more general definition of KIBs was given in 2006 by Tovoinen as specialist companies who cater to other companies or organizations. Furthermore, den Hertog (2000) proposed that KIBs are 'private' entities providing professional knowledge based services; professional knowledge can be specific or technical discipline proficiencies intended to deliver intermediate services which are knowledge based. KIBs offer services that combine their own knowledge with that of their customer. This shows that the service provided is part of the innovation system which helps to spread valuable knowledge to other sectors in the economy (Wong and He, 2005). Hauknes (1998) explained the different roles of KIBs (towards their clients) in the innovation process:

1. KIBs facilitate innovation by supporting their customers' innovation processes, but they do not develop innovation nor transfer innovation to the customer.
2. KIBs transmit innovation by transferring innovation between companies even though the innovation transferred was not developed by them.
3. KIBs act as a source of innovation by taking a lead role in establishing and evolving innovation for the benefits of the customer.

As a firm operates, it builds and expands its business network with other entities throughout its life cycle. Firms expand and strengthen their inter-organisational relationships, and as a result, they are more exposed to other surroundings and are able to lessen the figurative distance between themselves and other entities. This helps them gain access to information about new technologies, which can be a technological spill over from either their business rivals or firms outside of their industry (Pennings and Harianto, 1992).

In 2004, Greenhalgh et al., defined service innovation as "a novel set of behaviours, routines, and work methods that improve outcomes, administrative efficiency, cost effectiveness, or user experience implemented by planned and coordinated actions". A number of authors have discussed service innovation in more detail Toivonen and Tuominen (2009) gave a meaning to service innovation building on the Schumpeterian approach in a similar viewpoint; however, such as suggesting there is a separation between service outcome and the development process of service, innovations must be new to actors; however, they have to be new in a broader context not exclusively to their inventor and innovations must be beneficial to actors (Witell et al., 2016). Another view suggested by Menor and Roth (2007) is that service innovation can be an extension to existing services or a delivery process modification. It requires changes in the service provider and

customer application. This view of service innovation being involved in a dimension shift in an existing service adheres to the Lancasterian view that the service provider's characteristics, client proficiencies, technical characteristics, and end users' service characteristics form a service (Gallouj and Weinstein, 1997; Saviotti and Metcalfe, 1984). Gallouj and Savona (2008) argued that the service industry is focusing more on technology and capital. From the assimilation perspective, services are supplier-dominated, meaning that they adopt innovations from other industries instead of inventing them. This is in line with Pavitt's innovation taxonomy (1984).

OECD (2005) described the characteristics of service innovation in the Oslo manual as:

1. Unlike manufacturing innovation, service innovation relies less on conventional R&D investments. Gaining knowledge, either through acquiring equipment, intellectual property or collaboration, are important to service innovation.
2. As human resources are vital in providing services, it is crucial for services to secure a workforce with relevant expertise to facilitate service innovation.

3. Sizes of the firms affect innovativeness. Larger companies are likely to be more innovative. Noted also that entrepreneurship enhances innovation process.
4. Intellectual property is of great importance especially in the areas of business methods and software.

In this paper, the classification of innovations will be based on the Oslo manual for measuring innovation (OECD, 2005), which separates innovations into four types: product innovation, process innovation, marketing innovation and organisational innovation.

Although there is an increase in the awareness of innovation in the service industry, less is known of the economic impact of innovation in the service industry. Cainelli et al., (2006) conducted an empirical research aiming to examine if and to what extent does innovation affect service firm's economic performances. One issue arose during the research in that at the time, proper indicators to measure innovation activities in service firms were not sufficiently accessible. This caused data constraints and methodological complications (Coombs and Miles, 2000). Nonetheless, it is confirmed by several sources that innovation activities exist in services with a variation of magnitude and configuration across industries

(Eurostat, 2001; Evangelista, 2000). It is also reported that, by analysing ICTs data, technologies are utilized heavily in the service industry and that it is relatively more apparent that technologies do impact services economically (OECD, 2000a,b; 2002a). The results of the research suggested that innovation is indeed a crucial element of firms' behaviours and it also influences firms' business performance. Innovating firms and non-innovating firms have diverse levels of productivity and growth. Firms with higher innovation activities show superior performance in comparison with firms with lower innovation activities. A more extensive analysis performed by the researchers also found out that there are more conditions contributing to innovation affecting the economic performances of the firms. A straightforward existence of innovation positively affects firms' performance; however, it is found that companies' spending of monetary capital assigning to the development or acquiring of innovation and the character of innovation activity taken place also influence firm's effectiveness and efficiency. The diverse degree of firms' devotion towards innovation results in different amount of productivity amongst the industry. This is especially true for firms' efforts to internally develop as well as externally acquiring ICTs which include both software and hardware. The descriptive data analysis in this research confirmed that the degree of productivity has a positive and critical relationship to firms' preceding expenditures in innovation; this includes not only the accumulated innovation

spending but also the diverse types of the investments. Cainelli et al., (2006) noted that ICTs investments impacts productivity the most compared to other innovative investments.

Technological innovations, according to OECD (1991), are innovations that integrate developments from various fields of science such as engineering, applied and pure science, and industrial arts. Some examples of technological innovations are innovations from the electronics, information system, and pharmaceuticals industries (OECD, 1991). While technological innovations are commonly linked with product and process innovation, non-technological innovations are connected to marketing and organizational innovations. The fundamental factor contributing to the difference between the two types of innovation is naturally the role of technology. In this sense, technological innovations mostly involve the process of developing or adopting technologies with innovative novelty while non-technological innovations are not obliged to be related to the technological shift nor new technology adoption; they can exclusively rely on the development and implementation of a new business scheme, new organisational conceptualisation, or new business activities. It has been shown that there is a link between technological and non-technological innovations, as marketing innovation usually accompanies product or service innovations. Companies introducing a new

production or delivery process are also frequently found to be exhibiting marketing innovation as well. This coincides with the research result that companies have incentives to carry on non-technological innovation if they develop technological innovations. It has been noted that companies combining technological and non-technological innovations show superior sales growth in contrast with those who introduce only technological or only non-technological innovations. (Schmidt and Rammer, 2007). It is expected that when combining innovations, improved sales growth is caused by an increase in sales from new market penetration (market innovation) and a decrease in operating cost from a more efficient new process (process innovation). This effect only occurs if the company implement both market and organisational innovations at the same time. Combining technological and non-technological innovations can also improve companies' profit margin; however, this is only restricted to the combination of organisational and product innovations. Interestingly, it has been found by the research that companies that introduce exclusively technological innovations without developing non-technological innovations enjoy better profit margin than companies implementing both types, suggesting that extensively investing in both types will sometimes result in an increase in costs more than benefits.

Amongst the many facilitators of service innovation, information technology is considered to be one of the most significant variables according to Liu (2013). Schmidt and Rammer (2007) suggested that service firms commonly show a higher share of non-technological innovation activities than technological innovation activities, with the exception of telecommunication and computer services firms. This agrees with Pavitt's innovation taxonomy (1984) characterising service firms as supplier dominated meaning that services tend to be the adopters of new technologies developed by firms in the manufacturing industry.

There have been different views on what measure should be used to evaluate the benefit of a certain technological innovation. Return on Investment (ROI) has been the key metric to determine the benefit gained in comparison with what was invested to adopt and prepare that technology to be ready for use (Delgado, 2017). A contrasting view on using ROI to measure innovation performance argued that the most innovative technology does not have ROI as the ROI calculation does not reflect the other values in a new technology (Krueger, 2013). Similarly, Botchkarev and Andru (2011) proposed that ROI can only measure financial benefits but not efficiency or effectiveness of that technology. It was suggested that it is not beneficial to make decisions based solely on ROI as a measurement (Botchkarev and Andru, 2011). On the other hand, Graham (2015) suggested that

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efficiency alone is not sufficient to measure technologies and an increase in output or a decrease in cost can be more beneficial in determining the performance of a technology.

Method

The literature review found there was comparatively little research into accountancy firms specifically despite their importance to the economy and as a result, the research questions formulated were quite broad in their scope in order not to restrict the knowledge that could be gathered from this study.

1. What factors motivate accountancy firms to adopt technological innovations?
2. Are accountancy firms motivated to adopt or develop technical innovations?
3. How do these technological innovations affect the firms' business performance?

A qualitative exploratory methodology was applied in order to investigate emerging themes with in depth interviews being chosen to conduct the research to allow for flexibility and to be able to understand different perspectives and influences (Healy and Perry 2000), especially if the information might be varied in nature and where clarity might be required (Ticehurst and Veal 2000). Thematic analysis was used to analyse and present the data. Five interviews were performed (see Table 1), all face to face apart from one video conference lasting

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approximately 1 hour. All were accounting firms based in the US offering accounting, tax and consulting services to a variety of clients in a variety of industries. All participants had been working in the industry for at least 10 years and all were in positions to strongly influence their own company in terms of strategic and operational direction.

Table 1: Summary of Accounting Firms Interviewed

Firm	Size	Scope	Participant
A	Small	Regional	Senior manger
B	Medium	International	CIO
C	Small	Domestic	Partner
D	Medium	Domestic	Partner
E	Large	International	Partner

The questions comprised of the following to guide the semi structured interviews; Basic details about the companies location, number of employees, locations and the services it offers.

Do you consider it to be an innovative company, give examples?

Does your company have a policy regarding innovation in the workplace? Is there a forum where employees can share views?

What technological innovations are currently adopted by the firm, what was the latest one adopted?

What was the reasoning behind adopting these?

How does the company determine the benefits of these innovations? how can you tell if its worth It?

What past innovations were tried which didn't work?

What other innovations would the company consider adopting in the future and why?

What companies in the field do you consider innovative and why?

The data was then converted into themes using NVivo software to aid coding and presenting data and the data was split into themes which are discussed in detail in the following sections

Results and Discussion

As part of the semi structured interviews, participants were initially asked what they felt were the main drivers of technological innovations were in their organisation and the results are summarised in Table 2.

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Table 2: Drivers of technological innovations as ranked by participants

Firm	Driver 1	Driver 2	Driver 3
A	Efficiency	Employee Retention	Realisation rate
B	Efficiency	Profit	Survival
C	Data Protection	Employee Retention	Client Retention
D	Efficiency	Profit	Client Retention
E	Efficiency	Profit	Employee Retention

Participants were asked to discuss and rank the drivers of technological innovation in their firms, the results are summarised in Table 2. They additionally commented as follows:

Firm A suggested "*To increase efficiency is absolutely the biggest reason to innovate. They mostly target document flows, which is one of the biggest pains, but if you don't do it an audit can get out of hand really quick.*" Also A mentioned "*The younger generation like the technology and want to use the new software*

products because it is interesting versus doing things manually which is boring. Innovative is fun. Things can get really stale accounting or auditing, it's a generation thing with millennials, they like seeing how much quicker things can be done."

Firm B commented "*Number one is always efficiency, as we are a service company we use time and material, if someone can save us 10 minutes of doing something redundant and go and work for a customer then we earn money*." And also "*Right now, its all moving to a digital world, businesses that do not adapt to this transformation cannot keep up with demand. So the old ways of working will not get you that, its also survival, we just have to keep up with that*."

Firm C commented "*I have a client that really cares about privacy, innovations have to allow us to be efficient and effective and keep our prices competitive*." And "*Employee retention for sure, and it is part of the flexibility of workplace and work hours. We have a secure portal to load documents rather than unsecured mail which allows employees to work flexibly, work at home, wherever they are which helps with retention.*"

Firm D said "*20-30 years ago we would price everything on time and materials, but with technology this doesn't make sense, there is no reason to pass all the savings along to clients especially when they are happy with the results.*" And "*We want to see what is accelerating across our projects and its effectively related to what our clients demand. Everything comes down to the clients.*"

Firm E responded "*It improves efficiency which is really important for a service firm*" and "*It enhances communications and connectivity with employees, it helps with the staff retention of millennials, in the next 5 years 47% of the workforce will be millennials.*"

The data from the remainder of the semi structured interviews was split into themes as follows:

Specific Business Tasks

(1) Communication

This is important for all firms to connect and transfer information both internally and externally. More advanced technologies used included instant messaging across the network which also allows the display of presentations, sharing screens, and can give remote control of the computer to other users.

Recently firms A and D introduced a collaborative project management system cloud-based file sharing and document flow software. The client is able to see document requests and status and see progress of project. Prior to this, things were manually tracked by Excel Spreadsheet which was more labour intensive.

Firm A said *"It allows us to upload all our requests into the cloud and the client to see the request, when the client uploads they can mark it as fulfilled. In terms of document flow managing, it saves so much time as there is absolute clarity on where the document request stands, senior managers don't have to manually track progress anymore as its managed for them"*

(2) Performance Monitoring

Firms use different types of technologies to evaluate the companies performance overall. Firm D invested a significant amount in business intelligence tools. They had a system which can monitor employees' billable hours, and compare expected to actual hours worked. It also analyses the companies' backlog of work which assists in planning, budgeting and forecasting.

Firm D *"We have more work than we have staff, so the big thing that comes out of it is we need to start hiring, an early warning to get our recruitment function built*

up. The strategic thing is that…it allows up to identify market trends better…you can find warm currents in the market and start investing in those from a marketing perspective. The whole system allows us to look at what is accelerating across our projects and what effectively the client demand is"

Firm E had a system to allow rescheduling of work to a non-busy season which also aided the work life balance of staff.

For employee performance, Firm C, a smaller firm adopted a more manual approach which can be time consuming and prone to human error.

Firm E has automated this and claims to have helped in the following way *"Our turnover rate is lower, or workforce has stayed stable, which in a booming economy you would not expect, but we think it is our culture and performance management"*

C explained why they used a manual system *"The system we have is not better than off the shelf products, it just gets the job done. The off the shelf products would be nice but not for the price. It would track employees progress better, it would be more contemporaneous rather than every six months we could get the feedback loop to be faster"*

(3) Data Analysis

Most of the firms interviewed adopted data analytical tools from suppliers (off the shelf or collaborations with bigger companies) due to it being expensive and time consuming. The software helps firms extract, sort and find trends and anomalies in data sets. Firm C suggest it saves 10-12 hours on each job. Firm E also used tools in an unconventional way to identify errors or frauds *"Not only are we looking at data analytics we are evaluating the use of data in our audits to look for errors or fraud. I think this is very innovative as I haven't seen it done by many other firms"*

(4) Security

Due to the sensitive and confidential nature of the clients data, every firm interviewed had security systems such as firewall, antivirus and VPN. Firm C also had a self destruct feature for those working off site and described an incident where an unauthorised person tried to access data *"As soon as somebody tried to get into the computer more than 3 times the hard drive ate itself"*

Russell (2014) mentioned how cloud technology has reformed the accounting industry. It was said that the innovation would help clients seamlessly integrate all technology providers. Scalability is one significant benefit of this innovation but from interviewing a partner in Firm C, the main reason why the company has not incorporated this cloud technology in their practice, though was offered cloud-based services from suppliers more than once, is because of security issues. As they mainly work with highly confidential client data which is subject to information theft, they are still wary about adopting cloud-based software which would require data to be stored in a server not on-premise.

(5) Infrastructure

This was categorised as mostly software solutions used in executing work assigned to different departments of the firm. Firm E adopted an in house audit software

developed with its international branch. Firm A revealed they were linking their own system with the clients accounting software via the cloud allowing more analytical work to be done saving time on both ends. Firm A also mentioned there were compatibility issues when they merged with another practice that used different software. Firm D tried to centralise the technology platform used by their clients *"We used to do book keeping and accounting for a client using their systems, now we would standardise it across one technology platform, we now have a central payroll processing team that manages payroll for all our clients instead of having an accountant working with our client doing each task, now we can centralise into operation teams or centres"*

Firm E mentioned they have outsourced routine procedures to a centre in India where employees are hired at a lower rate and where the centre uses the same technology platform, due to the 12 hour time difference it effectively allows the company to be active 24 hours a day. The extra staff augment the auditing team allowing for faster turnaround and efficiency.

However, Firm A described how a new workflow tool was eventually discarded despite it potentially easing the workload as there was resistance for users who were more familiar with their existing way of working.

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Firm A said *"We built a new system six years ago which took a lot of time but didn't work. At the end of the day they felt more comfortable using Excel spreadsheets and switched back, even though this is more prone to errors and requires more manual input"*

Wider Activities

(1) Culturing Innovation

Most firms are trying to foster an innovative culture, Firm B explained *"We are trying to create a culture of innovation, it is one of our goals right now. I have heard in smaller groups they are trying to innovate, it is one of our management goals for this year"*

Firm D Says that it holds annual company meetings for innovation which discusses implementations over the last year and future plans, also by holding meetings and doing exercises with employees. Employees are encouraged to speak out, share ideas including incremental improvements. Firm B says whilst it doesn't have an explicit forum for employees, the culture allow them to speak their mind.

Small and medium accounting firms are often joined in a network creating an alliance. Through this network firms learn about new technologies or methodologies Firm A said *"We talk about new innovations and technologies with*

our management group and that is where we beta test and we decide on whether the cost-benefit is there for implementation"

Firms used external news and market data as a source of information. Firm E has its own platform to keep up to date with changes in client industries which they use in conjunction with external sites. In addition, competitors communicate indirectly through technology suppliers e.g. if a competitor collaborates with a supplier to create a new technology, the supplier might also sell this technology to other firms.

(2) Collaboration

Firm D holds an annual competition where employees can pitch their ideas to a panel and the winning idea is implemented and Firm A also tries to engage with younger staff members *"We include members of the younger generation in the decisions we make, if decisions are made solely by people at the top you can fall victim to groupthink"*

Firm D also mentioned that the clients' exact requirements also influence the technology that might be used *"Our clients will come up with certain things depending what industry they are in…and we will figure out viable solutions for them and give them options.*

Accounting firms often lack the ability to develop a new technology autonomously if they are not large enough or do not possess enough resources or time. In order to stay competitive they often set up requirements for a software or process as goals for a third party to develop which is more cost effective than trying to create new technology from scratch themselves.

(3) Reaction

How a firm reacts to changes and expectations can determine the adoption or rejection of innovations. When facing with changes in the market trend, the firm may maintain the ability to compete in the market by adapting to the change. This may lead to the firm to adopting a change, which can be technological or non-technological. In order to compete, or at least survive in the market, it is important that the firm takes action and innovates or it risks being pushed out of business by more advanced competitors. A change can be introduced in hopes of reducing cost to offer a more competitive fee, improve quality of service, improve efficiency and productivity, or to help develop a new service or deeper expertise in the same industry in order to add value. As mentioned by Firm B;

"It is really a survival thing. ...More and more people are connected this way and businesses that do not adapt themselves for this transformation cannot keep up

with that demand. The old ways of working will not get you that; it's also survival. Firms are forced to be in sync with the market."(B)

Reacting to expectations is different in that it involves less about firm's monetary value, but more about fulfilling a certain notion from others. Clients expect the firm to not only carry out a professional service, but also to introduce them to new technologies, as mentioned by Firm D":

"Another example is we do a lot of outsourced accounting. For smaller businesses, they don't have accounting departments nor bookkeepers and controllers. ...In addition to us doing and maintaining book records for the company, we bring all the software…The client is no longer just paying us for our resources and our time, part of our services is related to using technology as well." (D)

Clients also expect the firm to have a professional quality, resulting from being a protector of their sensitive information, keeping themselves updated with information security technologies in order to safeguard client data. If data were to be leaked, firms would be subject to lost business, poor reputation, and expensive lawsuits. Firm C explained,

"We have also adopted, because we have so much private information, an extra layer of security," and, "The most important driver for innovation could be professional expectations because we are the record keeper of these things and be in an organised fashion; that is the expectation of the profession."

Being a professional services firm also means that the firms have to keep updated with industry data and regulation updates to maintain a high quality level of services. Firms bring in a lot of data technologies to help them be more knowledgeable and build trust and good relationships with clients. Firms are now looking into experimenting with an additional new service to offer to existing clients as opposed to attracting new clients.

(4) Employee expectations

Firms have to adapt to employee needs as deemed reasonable and, if possible, maintain a stable workforce as it is, after all, a labour-intensive business involving many professionals. Every firm has mentioned employee retention as one of the most important drivers for adopting or developing innovations. Firm C mentioned that they let people work remotely to reduce their employee turnover:

"…The San Francisco Bay Area is nuts right now with their employments, particularly accountants. It is really hard to find them. There is a lot of competition and the traffic to here is bad. We need to take a serious look at it. It is hard to invest and train new people to replace old ones." (C)

A change in the workforce demographic also plays a role in the firm's course of action towards innovation adoption. Firm E claimed, "*In the next 5 years, 47% of the workforce will be millennial's."* Firms show a similar trend in reacting to the emergence of millennial workforce. Firm D and E claimed that they had developed a new, timely individual performance system to accommodate millennial's, as they believed that millennial's want more feedback:

"… Because we know in our firm's studies that the younger millennial's generation wants feedback more frequently." (E)

"I think what's going on in the employee base is they want more feedback on their performance, ideally with more feedback, you will get to a better level of performance." (D)

Firm A believes that it should adopt new technologies as their millennial employees would be excited to use them, increasing job satisfaction:

"The younger generations like being a part of the technology and they want to use all the new software products out there because it is interesting versus doing things manually – which is boring. People want to stay on the leading edge of technology because it is interesting and fun. Innovation is fun. Things can get stale really fast in auditing or accounting." (A)

Measuring the effect of innovation using Business Performance

During the interview, a separate interview question was asked to find how the firms measure the success of each innovation. Firm A and E use profitability measures (realisation rate and ROI respectively). Firm A, B and D mentioned that they use qualitative measures (feedback from users – A and B; meet client requirements – D). Firm E also used employee retention to determine the success of technological innovations in combination with ROI. Firm C, however, revealed that there is no metrics used to measure innovation success. This is because the firm decides to adopt technological innovations that are deemed necessary, while other firms choose to adopt innovations to enhance performance. Deriving from the interviews with the participating management of accounting firms, we categorised

through coding the summary of the aspects of business performance that is affected by the use of technological innovations.

(1) Quality

One aspect of measuring business performance is looking at the quality of its output. In advisory, quality work would be reflected in the ability to find the best solution for clients, while accountants would focus more on lowering the risks of intentional and unintentional errors in financial statements, in order to ensure trustworthiness of information users. Every firm interviewed expressed the importance in using technologies to help improve the quality of work. Firm E mentioned technology use in providing knowledge to professionals and tailoring service to client industries:

"*Our knowledge base has worked through many of the industry specific things so that professionals have tailored standard for each industry*." (E)

While Firm C suggests that it uses technologies to ensure compliance with accounting and auditing standards:

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"Several years ago our standards changed after the Enron and Arthur Andersen thing. We had to be able to show that the workpapers were completed within 60 days, and then they're locked and you can't change them. There's no other way to do that other than an electronic timestamp." (C)

Firm D revealed that innovations also help improve the accuracy of data which is an important aspect in professional firms:

"This will improve client communication and information flow, accuracy of information and most importantly the consolidation of all the information that our clients need in one location." (D)

(2) Productivity

Technological innovations are also introduced in accounting firms to improve productivity. This can be interpreted as a decrease in time required to provide services. Participants mentioned several ways that technological innovation helped them achieve higher productivity rate and efficiency rate. Every firm mentioned the use of technologies to improve document, information, or work flow. Firm A claimed that innovations improve its document flow process which helps eliminate the risk of time used for non-relevant tasks:

"To increase efficiency is absolutely the biggest reason to innovations. They mostly target document flows, which are one of the biggest pains, but if you don't do it an audit can get out of hand really quick." (A)

Firm C discussed how innovations help them save time used for each job because they provide higher data processing capacity and automation:

"It saves us 10 – 12 hours on every job. Before this we used excel and you have to spend a lot of time making sure that data has been imported to excel properly and then you can sort through it but the data is massive in quantity. It would take a lot of time." (C)

Similarly, Firm E has a similar view related to time cost. Off-shoring to another country is a strategy that they use in order to increase productivity:

"We use them as an augmentation to audit staff. It allows us not to gain efficiency, but fast turnaround time to client because you are operating 24/7. I think it is pretty innovative." (E)

(3) Profitability

Accounting firms adopt technological innovations to help improve their profitability. It can be done by reducing cost, attracting and retaining clients, and offering more lines of services to either existing or potential clients. All participants admit to using technological innovation for profitability purposes in different ways. Firm E uses technologies to automate and mitigate redundant and irrelevant tasks which helps reduce cost:

"The main purpose would be automation of areas that don't require human judgment or the decision making can be programmed in an algorithm. For example, risk assessment process in Horizon. This is to reduce cost, improve efficiency, turnover time, scheduling, and synergy." (E)

Firm B revealed that it is now experimenting with new services through the use of new technologies:

"I feel like this is something we will get out of this innovation and then increase of revenue through an innovative service." (B)

While Firm A mentioned the increase of realisation rate (percentage billed vs percentage collected) through an innovative technology:

"We also went through a process called LeanCPA (taking out the inefficiencies) which helped us see more than 5% increase in realization." (A)

Expertise in using and implementing technological innovation for clients in specific industries has made an advantage for accounting firms with an advisory function. With in-depth training and abundant experiences, the process of technology implementation can be done with less time and material than before. The knowledge possessed by employees who correspond in person with clients enables them to act as trusted advisors. This, in turn, results in an increase client satisfaction due to the client's positive expectation towards positive results and perceived employee reliability. In addition, because of the competence of a highly-skilled workforce, the company can change its price benchmarking strategy from using cost-based pricing, calculated from the use of time operated and work material, to value-based pricing, derived from market value of the output or estimated value-in-use of the client. Firm D is the only firm who has mentioned and emphasised the effect of technology on the firm's value and pricing strategy. This impact is demonstrated by the positive effect on firm's profitability due to the wider gap between service cost and charged service fee as mentioned:

"…The clients would still get the same value, but they also get the benefit of us being really good at it…What we have now done is, and this is one of the innovations that technology has forced us to do, trying to price most of our consulting services on a value-based pricing scale… Twenty to thirty years ago, we used to price everything on time and materials, but with technology it does not make sense to price on time and materials. There is no reason to pass along all this saving to our clients." (D)

(4) Competitiveness

As a for-profit business, CPA firms must find ways to stay competitive to prevent the risk of going out of business by losing market share. All participants mentioned that they use technologies to stay competitive in different ways. Firm C mentioned that one of the strategies used to keep staff retention rate stable or lower is allowing them to work from home. With the aid of multiple advanced technologies, the firm and the remote employees can connect and continue to work together despite the workers not being in the office:

"It has to do with flexibility and it means technology-wise with the privacy issue that they have to have a private place or a home office set up for them but it's all employee retention for good people." (C)

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Firm C also mentioned that these technological innovations help them offer competitive service fees to clients:

"Innovations have to allow us to be efficient and effective and keep our prices competitive." (C)

Firm B used technologies to attract new clients and leveraging their existing client base to gain market share and generate more revenue:

"That is the result you can actually anticipate from this; that will be wonderful. If it also expands our service portfolio then I think that will be a bonus. It could be adding more clients to the firm or allows us to add more services. Even if you don't have more clients, if you can offer a new service to existing clients it still counts." (B)

Conclusions

A number of innovations were identified by the study driven by client expectation and the drive for efficiency. The results suggest that accounting firms engage in direct communication and collaboration with their employees, clients, alliances,

and suppliers as a source of technological innovations. The results agree with Freel (2006), that p-KIBs depend on the cooperation between the client and the supplier in introducing innovation. However, it was determined that accounting firms also depend heavily on their alliance companies. Indirect learning of new technologies is made in collaboration with competitors, through the connection of their mutual supplier. Accounting firms can make decisions regarding the adoption or rejection of new technologies based on changes in the industry and expectations from their employees or clients. The results found many common themes in the technological tools used in their organisations. This paper classifies technological innovations prevalent in the accounting firms into five categories based on their intended purposes: (i) communication; (ii) performance monitoring; (iii) data analysis; (iv) security; and (v) infrastructure purposes.

During interviews, participants were asked to rank the three most important drivers for introducing technological innovation to their firms. After analysing the results from each participant, the three most mentioned drivers were efficiency, profit, and employee retention. Accounting firms do not directly adopt technologies to improve financial performance, instead they utilise technologies mainly to achieve higher efficiency through time saving, automation, and improving workflows. These firms leverage technologies to increase revenue by reducing cost of time and

material, expanding lines of services, attracting more clients, and improving profit margin through changing pricing strategy. As it is currently difficult to hire qualified professionals, firms seek to improve their work process by using new technologies in hopes of attracting employees and stabilising employee retention rate.

When asked about the metrics the firms use to measure the success of a technological innovation, 3 out of 5 participants mentioned that they use qualitative factors, or user feedback and requirement fulfilment as the main measurements of performance. An improved profitability shown through realisation rate and ROI of innovation was mentioned by 2 out of 5 participants as the innovation success metrics. One participant revealed that they did not have a success metric, as innovations are perceived as a necessity. This is contrary to the literature, regarding measuring innovation success. Delgado (2017) argued that ROI has been the key metric to use, while this research found that only one accounting firm mentioned ROI. Participants tended to think of qualitative factors (feedback, requirement fulfilment) more because they have experienced resistance to change from users. Two accounting firms discussed how they introduced a new work process with the incorporation of new technology – and failed. Even after investing time and capital to develop, adopt, and train employees to prepare for transitions, the firms still

risked having to discard the new change due to the unfamiliarity and resistance from employees. Planning for adopting or developing technological innovation should cover both quantitative factors (profit projection) and qualitative factors (user feedback) to reduce the risk of failing, which would adversely affect the firm's business performance.

From analysing interview data and current trends in the accounting industry, trends demonstrated that firms are engaging into more: (i) remote work policies; (ii) big data analysis; (iii) merger and acquisitions; and (iv) cloud computing technologies. Further investigation showed that each trend has different implications on technological innovation in accounting firms. As a result of an employee shortage, accounting firms, which are naturally labour intensive face difficulties in hiring and retaining qualified professionals. In an attempt to decrease employee turnover and increase employee retention, accounting firms are increasingly allowing employees to work from home. Employee to firm connection and collaboration are enabled through the use of technologies. Though remote employees may be more beneficial for the firm, additional precautions should be taken. Remote connections increase the risk of sensitive data being accessed by unauthorised parties. As such, IT security should be improved and monitored constantly, as a data breach can cause serious damage.

With the growth of big data, accounting firms are increasingly adopting several forms of data analytical tools. These tools help to process large amounts of data accurately, find valuable insights, and eliminate irrelevant tasks. Using data analytics tools increase the degree of automation in professionals' work process, which means lower-skilled employees are less critical to providing efficient services. Professionals can avoid risks of self-obsoleting by increasing their own value. As rudimentary tasks are eliminated, work processes will shift to become more analytical. Accounting firms are engaged more and more in mergers and acquisitions. There are cases of accounting firms acquiring a new firm in the same field, technology-based firms, and/or creative-based firms. By acquiring and merging with firms from other fields, the acquiring accounting firms are widening their knowledge base, which helps to equip them with more capacities in other industries. Referring to Miles' domain knowledge for KIBs (2011), the growing trend of M&A causes the acquiring accounting firms to shift more towards the middle of the domain triangle as they expand their knowledge towards technical and creative knowledge. Pavitt's innovation taxonomy (1984) argued that service firms are supplier dominated. The M&A trend may change the view of accounting firms (as service firms) as lacking capabilities (Tether et al., 2001) to innovate. It is worth noting that there is a risk in most M&As, involving the clashing of existing technologies from both parties. One interview participant revealed that they had

experienced a decrease in efficiency due to the lack of compatibility of the legacy and new firm's work systems. This can often be eliminated by leveraging cloud-technology and employee training.

Limitations and Future Work

It would be of benefit to add interviews from a wider range of accountancy firms and also from different ranks and functions within forms to gain a different perspective of the drivers of technological innovation in different parts of the firm. It would also be useful to investigate how employees can be more entrepreneurial with training or by joining networks (Bin Jia and Phillips 2014, Phillips, 2010) Another topic of interest could be to address the issue of first mover advantage vs late adopters when it comes to technological innovation and whether early adopters in this industry gain significant advantage over later adopters.

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