Usage and Impact of Artificial Intelligence on Accounting: Evidence from Malaysian Organisations

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ABSTRACT

Manuscript type: Research paper

Research aims: This study aims to investigate the use and impact of artificial intelligence (AI)-based accounting software among organisations in Malaysia.

Design/Methodology/Approach: Face-to face interview is performed with representatives from nine organisations that are using AI-based accounting software. Constant comparative method is used to analyse the data collected.

Research findings: The results highlight various adoptions of AI-based accounting software across the organisations. These are mainly used as a tool to deposit document images, to capture invoice information automatically, to monitor invoice approvals, to manage risks and also to track users' activities. The use of AI-based accounting software has accelerated productivity, improved efficiency, enhanced customer service, supported the flexible working style, increased process governance as well as saved manpower.

Theoretical contribution/Originality: This study fills the research void by providing insights into how the AI-accounting software is used, thereby benefitting organisations in Malaysia. With the arrival of industry revolution 4.0, comprehensive knowledge on the usage of AI is pertinent. The findings of this study may also serve as a foundation for future research in AI adoption.

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Practitioner/Policy implication: The findings of this study encourage industries to consider the usage of AI-based accounting software in the management of their accounts payable functions. It also provides useful guidance for practitioners on how the AI-based accounting software can be effectively applied as part of the innovation process.

Research limitation/Implications: Since the scope of this study only involves the accounting service provider, the generalisation of this study may be limited.

Keywords: Artificial Intelligence, Accounting, AI, Malaysia, Payable, Qualitative

JEL Classification: M150, M410

1. Introduction

Artificial intelligence (AI) is the catalyst of the Industry Revolution (IR) 4.0 eruption in the digital age. It makes the machine learns from experience, adjusts to new input and performs human-like tasks. With the existence of these technologies, large amounts of data can be processed, making patterns in the data more recognisable (Miller, 2019). This was also noticed by Frisk and Bannister (2017) who stated that digital technologies enable the skilful usage of data analytics, and for big data to radically improve a company's performance. In this competitive and dynamic market, all business entities need to have its competitive edge in order to stay sustainable.

AI is the main driver of the organisation in remaining competitive and sustainable (Omar, Hasbolah, & Ulfah, 2017). This is because AI is well known for its advantages in time saving, cost reduction and increased productivity (Pavaloiu, 2018). In today's dynamic business environment, organisations have no choice but to adopt the AI technology into their operations in order to stay sustainable. There are escalating trends of AI technology in the accounting operations as is evidenced by the research done by Sutton, Holt and Arnold (2016). Their study showed that the use of AI in accounting is on a strong upward trend. The application of AI can be implemented in various accounting types, such as bookkeeping, auditing, tax, and used by financial institution, and securities trading. All these operations are long and arduous when done traditionally. However, by transferring such monotonous tasks to the AI technology, accountants can spend their precious time dealing with more complex matters that require critical thoughts. By integrating AI technology with accounting databases, a

solution can be reached to mitigate the limitations faced by traditional accounting systems (Jeneesh, 2017). The integration of AI-based accounting software into the operational tasks can make the job of doing account payables (AP) and account receivables much easier and more efficient. A good management of account payables will underpin the strong alliance between a company and its suppliers. It will also improve business operations and strengthen good credit records for future expansion (Nwakaego & Ikechukwu, 2015). The conventional method of processing the AP in todays' digital transformation era is no longer conducive. Among the apparent benefits to be gained from converting conventional methods to digital forms is that organisations can eliminate the issue of lost paperwork whilst increasing operations efficiency, such as saving paper, time and space. Further to that, payments can now be processed on time to vendors, thereby building up credit reputations (Deloitte, 2015).

Regardless of the great benefits provided by AI to organisations, its adoption in Malaysia is still at its infancy stage (Omar et al., 2017). The International Data Corporation (IDC) in 2018 disclosed that within the ASEAN region, Indonesia was leading in the adoption of AI, with 24.6 per cent of its organisations having invested in AI technology. In contrast, Malaysia was lagging behind at 8.1 per cent. This shows that AI adoption by Malaysian corporations is relatively low. Evidence can be traced to the outcome of a survey conducted by the Malaysian Institute of Accountants (MIA) between July and September 2017. The finding indicated that the current adoption and usage rate of AI was only 13 per cent, which is the lowest compared to other technologies such as Microsoft applications, accounting software, cloud applications, fintech, data analytics tools, and so on. However, the growth of AI usage is expected to reach 15 per cent in three years' time (MIA, 2019). The low number of AI applications suggest that many more potentials of the tool may have been overlooked by most industries in Malaysia. This situation has raised considerable concern since AI is considered one of the drivers for IR 4.0.

Many studies have examined the use and application of AI in the field of accounting. For instance, Guo, Shi and Tu (2016) investigated the use of AI in textual analysis to examine the unstructured data of finance and accounting. The authors found that neural network worked better than other machine learning in recognising data patterns. In South East Nigeria, Chukwudi, Echefu, Boniface and Victoria (2018) analysed the use of AI in audit practices. They found a positive relationship between

the expert systems and audit process performance. Whilst these studies provide some insights into the use of AI in accounting, they were focussed on the areas of financial reporting and auditing. These studies also discussed the impact of AI on accounting by using quantitative data which may offer risks of partiality, thereby overlooking the reality of the problem.

The above limitation thus creates the need for an in-depth investigation to be conducted using a qualitative approach. A study that aims to identify the usage and actual implications of AI adoption in managing the accounts payable functions within organisations is imperative, since the outcome generated can then be used as a reference by future academic researchers who are interested in exploring the usage and impact of AI technology in the domains of accounting. The findings derived may also boost the confidence of Malaysian organisations investing in AI-based accounting systems. In this way, they would not be lagging behind other countries. Based on these expectations, the current study aims to answer the following research questions:

1. What is the purpose for organisations in Malaysia to use the AI-based accounting software in the accounts payable functions?
2. How are the organisations in Malaysia impacted by the use of the AI-based accounting software in their AP functions?

The remainder of this paper is organised as follows. Section 2 reviews the literature on AI adoption. Section 3 explains the methodology employed while Section 4 reports on the results. Section 5 discusses the findings of this study and Section 6 concludes the paper by discussing the implications and limitations.

2. Literature Review

2.1 Artificial Intelligence (AI)

Pan (2016) explained that AI is the ability of machines to understand, think and learn in a way that is similar to human beings. This indicates the possibility of using computers to simulate human intelligence. Although there are various definitions for AI, all these definitions have one similarity – they all focussed on the intelligence of the machine.

Globally, the adoption of AI technology spans multiple sectors of industries. Different industries, media and political organisations have shown a strong interest in AI adoption, therefore AI-related research

and its applications in the organisations are ubiquitous. For example, Gentner, Stelzer, Ramosaj and Brecht (2018) highlighted the use of machine learning algorithms on a customer database in their report. The database consists of the customers' and the product-related data of a manufacturing company. In this regard, machine learning was used for the data mining purpose to study the market information for the strategic foresight project even though in business-to-business (B2B) industries, analysing an entire customer base in terms of future customer potential is often done manually. The researchers found that market knowledge can be used to address management functions of the company such as product management. They were also able to provide a detailed listing of the measurement tools that would be suitable for sales. The measurement on the sales performance was then used to identify the high-potential customers based on individual needs and behaviour.

Focussing on healthcare, Bini (2018) had intended to demystify AI for practicing surgeons so that they can better understand how AI technology can be applied in their treatment. The AI technologies that were being referred to include machine learning, artificial neural networks and deep learning algorithms. These can be used as tools to support and amplify human cognitive functions. Likewise, Mehta and Devarakonda (2018) observed that AI could support intelligent data which were retrieved from electronic health records (EHR) in the near future. The combination of the EHR comprising patients' socioeconomic data with real-time data streams can be provided to machine learning to potentially solve complicated health care needs such as predictive modelling, precision medicine and population health. Chassignol, Khoroshavin, Klimova and Bilyatdinova (2018) studied the adoption of AI which had reshaped the education sector although it would not completely replace the traditional education system. The study used narrative overviews to provide a broader picture of the educational landscape in the context of AI. The study used a model which consists of four major parts of the educational process – contents, teaching methods, assessments and communication to see how they were affected by AI. It was noted that among the AI technologies which had been embedded into the educational process was an intelligent tutoring system. This was used to gather appropriate feedback for students and educational robots and the outcome was then used as teaching aids.

In Malaysia, Omar et al. (2017) studied the diffusion stage of AI in the governance of public listed companies in Malaysia. Data were derived from the latest *Annual Reports* of 806 companies listed on the

main market of Bursa Malaysia. Their aim was to examine the stage of AI diffusion, hence the Diffusion Theory was adopted to explain the diffusion process by which an innovation initiative was communicated to the member of the social system via certain communication channels. They then concluded that AI raised some behavioural and legal concerns. The behavioural concerns include employees' negative attitude towards AI adoption while the legal concerns encompass the organisations apprehensions about data security.

In general, literature has shown the AI momentum to be one of the disruptive technologies as can be noted in finance, the automotive industry, retail, travel and media while on the global basis, AI adoption had been examined in diverse industries. Despite this, there has been very few studies done on similar areas in the context of Malaysia.

2.2 Theoretical Perspective

Previous studies have examined the usage of information systems at the individual, group and organisational level (Chan, 2000). The current study focusses on the adoption of the AI accounting software at the organisational level. The AI adoption can be studied from two different fashions: 1) the user centred fashion where the user's cognition, during use, can be examined, and 2) the system centred fashion where the tasks for which the system is used are examined (Burton-Jones & Gallivan, 2007). This study uses the system centred approach where the various usage (tasks) of AI based accounting software is examined.

Burton-Jones and Gallivan (2007) mentioned that three elements of the system usage need to be considered at any level of analysis for information system studies. They include: the user (the subject using the system), the system (the information system used), and the task (the function being performed). Based on this, the samples comprised nine organisations which are using the AI auditing software as a system. The aim is to uncover the usage purpose of the AI software and its impact on the organisations concerned. The subsequent section discusses the previous studies on AI adoption and its impact as background for the development of this study.

2.3.1 AI Adoption in Accounting

The application of AI in the field of accounting has a long history, dating back to more than 25 years ago, but it is mainly applied in the areas of

financial reporting and auditing (Chukwudi et al., 2018). Research on AI application in accounting is increasing, as concurred by Sutton et al. (2016). They noted that research examining the use of AI in accounting is showing a strong upward trend since 2016. However, Gray, Chiu, Liu and Li (2014) mentioned that research on AI/expert system is on the decline. Focussing on AI technology in textual analysis, Guo et al. (2016) used the literature review method to extract evidence which compared the performance of the methods used in various studies. They finally concluded that the neural network worked better than other machine learning approaches. However, there were still some challenges in the future development of textual analysis. In another study, Chukwudi et al. (2018) examined the application of AI in audit practices in South East Nigeria. The authors stated that the accounting systems and operations had evolved from the arena of paper journals and ledgers into computerisation, such that computers were being embedded with AI technologies like expert systems and intelligent systems. A survey was used to collect the data to examine the relationship between the adoption of expert systems and its effect on the performance of the audit process. The finding showed a positive relationship between these two variables. From the literature review performed thus far, it seems clear that the research on AI topic is gaining momentum.

AI application is also being used by different industries for different purposes. AI applications in studies throughout the world vary widely in terms of the subjects used when compared to the studies done in Malaysia. To date, not much literature is available on AI usage within the financial accounting perspective. This is because a majority of these studies tend to focus on the auditing scope instead of financial accounting or bookkeeping functions. On a similar note, Sutton et al. (2016) concluded that research looking at the usability of AI techniques in the accounting domains is currently imperative. As a result, researchers including those from developing countries like Malaysia, can take the lead into examining the AI usage from the perspective of financial accounting or in bookkeeping functions.

2.3.2 Impact of AI Adoption

A few studies have empirically investigated the impact of AI in organisations. Kaplan and Haenlein (2019) reported in their research that AI will have implications on any kind of organisations, both internally and externally. From the internal perspective, AI will allow an array of

tasks to be completed faster, better and at a lower cost. More complex tasks can thus enjoy the benefit of AI too, including industries related to consulting, financial services and law. From the external perspective, the AI adoption will influence the relationship between firms and their customers, firms and other firms, and firms with the society at large.

Kokina and Davenport (2017) commented that senior accountants in large firms had commonly argued that organisations still require human accountants, whether with or without AI technology. The authors further mentioned that the skills required by an accountant may be subjected to changes in the future and that the demand for entry-level accountants will decrease in the coming years.

Davenport and Kirby (2016) stated that accounting is one of the business fields which is likely to be augmented by technology instead of being fully automated in the next couple of decades. Their claim was based on the fact that AI technologies can replace specific tasks rather than entire jobs. Therefore, the loss of employment in the short term is likely to be comparatively slow, most likely marginal rather than dramatic. Tschakert, Kokina, Kozlowski and Vasarhelyi (2016) also noted that entry-level accountants were relatively structured and because of this, they were at the highest risk of becoming automated by AI technologies. It was further mentioned that the skill required of an accountant can thus be further enhanced – from the data entry level to effective communication with clients. Accountants who are equipped with these skills would not be threatened by AI adoption even when it gets aggressive in the accounting domain.

Wright and Schultz (2018) focussed on the ethical issues of AI. They clarified and assessed the cultural and ethical implications of AI adoption for stakeholders, from labourers to nations. They used a novel framework which integrates the stakeholder theory and the social contracts theory to disclose the ethical implications of the AI businesses. Based on their study, it was proposed that organisations, policymakers and researchers take into account the ethical implications of business automation and artificial intelligence when approaching the burgeoning, and potentially, disruptive business practices.

Chukwudi et al. (2018) provided some insights of the advancement of AI and its positive influence on the accounting operations. They noted that there will be an increase in terms of accuracy and speed, an improvement in the external and internal reporting, a reduction of paper usage, increased flexibility and efficiency as well as an improved data-based system. This means that AI would transform the tedious and

painstaking nature of bookkeeping to one that is an efficient consulting service. The authors also discussed the negative side of AI within the accounting profession, for instance, the emergence of negative feelings among professionals. The same observation was noted by the research team of the University of Oxford when in 2015, it was also found that 95 per cent of the accountants had feared losing their jobs because of AI. It appeared that the fear was about machine automation taking over the roles of accountants in data analytics and number crunching. Sutton et al. (2016) and Sun and Medaglia (2019) also noted that AI application in the accounting domain posed a threat to the profession. Based on these outcomes, it can be deduced that many of the studies had expressed the same concern, which is that AI adoption would lead to job losses. It seemed obvious that AI has the ability to replace human beings who perform very repetitive and structured tasks. Nonetheless, not all studies were in concurrence. Some carried the mixed implications of AI adoption (Chukwudi et al., 2018). Some past studies (Sutton et al., 2016; Sun & Medaglia, 2019) had highlighted the negative impact of AI adoption instead of the positive impact. The reason is because there is a lack of literature focussing on the impact of AI adoption within the accounting industry. It is hoped that the current study can fill the gap by investigating how the adoption of AI may impact the organisations of Malaysia, in particular.

3. Data and Methodology

3.1 Sampling Procedures and Data Collection

In this study, organisations that had adopted the AI technology into their accounting functions were approached. The face to face interview was conducted to gather data. The interview offers a more conducive approach to gathering information and to better understand the research problem which may be experienced by respondents of the study. Through their openness, more information based on their experiences, opinions and knowledge (Patton, 2012), particularly about the AI adoption in their organisations, were obtained.

Purposeful criterion sampling was applied in the current study to gather the adequate samples for study (Bitsch, 2005; Anney, 2014). It was also applied to develop the particular research question as well as to consider the resources available to the researcher (Hesse-Biber & Leavy, 2010). The target population for this research were the organisations

located in Malaysia. They were from different industries, but their commonality is that they have adopted the AI technology into their accounts payable functions. From the web search conducted on AI software and organisations, the list comprising 43 organisations in Malaysia which had adopted the AI based accounting software or solution was obtained. Table 1 demonstrates the software brand whose websites were searched so as to detect the relevant samples for this study.

The organisations identified were contacted via email. The respondents were informed about the study, its purpose and the type of information that would be sought. A total of nine organisations expressed their interest to participate. They were further contacted to arrange for a convenient time for the interview. A copy of the interview guide was also forwarded to them.

The nine organisations were from different industries, but the representatives who participated in the interviews were from the accounting service division of the respective organisation. The interviews were conducted on a one to one basis at the time and place convenient to the interviewees. Before the interview started, the purpose of the interview was explained clearly to the interviewees. They were also assured that the information provided would be strictly used for research purposes only, and the anonymity of their names and identity would be maintained. Each interview session lasted for approximately an hour. The interview was conducted in the English language. The interviewees were asked about the AI software usage in the account payable function and its impact (see Appendix).

3.2 Data Analysis Techniques

All the interviews were recorded and transcribed verbatim. For this study, the constant comparison method was used to form the categories that emerged from the data. In this regard, the analysis attempted to look for important themes and subtexts that would reveal more about the research topic. The process of unitisation and categorisation was then performed on the data so as to analyse and interpret the data. At the unitisation stage, the information was isolated from the text and then coded.

The researcher reads the transcript and categorised the statements according to the appropriate categories (Pan, 2017). The statements which have been categorised, ranged in length from a few words to

Table 1: AI-based Accounting Software

No.	Software	
1.	Xero	Xero[1] is a New Zealand based AI accounting software which has experienced the fastest growth globally. It led the New Zealand, Australian and United Kingdom cloud accounting markets. It has over 2 million subscribers worldwide.
2.	SAP Concur	SAP Concur is part of the SAP family. It is the leader of expense management. The software is committed to simplify everyday expenses, travel and invoice management and create convenience. There are about 700 higher institutions[2] using this software to improve the management system.
3.	Wavelet	Wavelet offers the business organisation an AI solution which can expedite the decision-making, integrate different systems, and allow real time business operations management. Currently, there are 51,000 users.[3]
4.	Financio	Financio has developed the AI-based accounting software for small business owners and non-accountants in Malaysia. The feature of the AI software is localised to cater for Malaysian market requirement. It has approximately 25,700 users.[4]
5.	Beacon	Beacon Systems is a simple accounting software designed to be as streamlined as possible. It is built using automation and artificial intelligence. Currently the company has 35,000 customers.[5]
6.	Zoho	Zoho with its headquarters based in India has a range of solutions and suite of software that can be deployed to automate the business process of an organisation. The company has 50 million users[6] globally.
7.	Esker	Esker is well-known with its AI-driven software all around the world. It is an early adopter of AI technology in the market. As of today, it has over 600 thousand users from more than 50 countries.[7]
8.	Automation Anywhere	Automation Anywhere is the industry's largest Robotic Process Automation (RPA) and AI software company based in the USA. Their presence can be found at more than 90 countries globally. As of today, the company has more than 3500 customers.[8]

Notes: [1] https://www.xero.com/my/about/
[2] https://www.concur.com/
[3] https://wavelet.net/
[4] https://financio.co/malaysia
[5] https://www.beaconsbay.com/accounting-software-malaysia/
[6] https://www.zoho.com/
[7] https://www.esker.com/company/locations/malaysia/
[8] https://www.automationanywhere.com/

several paragraphs. They were then grouped into themes to answer the research questions provided earlier, based on Schulenberg's (2007) recommendations.

The validity of the qualitative data collected in this study was assessed based on three measures: credibility, confirmability and transferability (Anney, 2014). To satisfy the credibility requirements, the recorded interview data were transcribed verbatim. Recordings were replayed several times to ensure that the transcripts were accurate, and that they represented what was being conveyed by the respondents. To justify the confirmability of the data, content analysis was performed. Prior to the interview, relevant literature was reviewed thoroughly before the interview questions were designed. Following the transcriptions, all transcripts were emailed to the representatives of the organisations to obtain their confirmation on the correctness of the interview. The representatives then responded positively by giving their agreement to the authenticity of the contents. This means that the researcher can facilitate the transferability of the data to other users through 'thick description' and 'purposeful sampling'. Based on this, it can be said that the data collected for this research had fulfilled the three conditions of data validity. In brief, the qualitative data collected for this study were considered valid and reliable.

4.0 Results and Discussion

4.1 Respondents' Profiles

The findings of the study (Table 2) show that most of the organisations are from different industries and of different capacities of clientele. A majority of the organisations have adopted the AI powered accounting technology and accounts payable solution for a period of two to three years. The types of software adopted also vary between the organisations.

Table 3 outlines the profile of the representatives who participated in the interview. All representatives had a wide range of working experience within the organisations, ranging from one to 19 years. Nonetheless, the years of service do not influence the quality of the data collected. All the interviewees are also at the senior level of their positions, so they have a very good understanding of the AI adoption in their respective companies.

Table 2: Organisation Profile

Organisation	Industry	Size	Years of establishment	AI-based accounting software	Years of software used
R1	Biopharmaceutical Asia Pacific Business Service	300	40	RPA I Gen	0.5 years
R2	Pest maintenance and hygiene solution – finance shared service centre	1100	47	E Flow and Medius	3 years
R3	Accounting firm	7	3	Only You	2 years
R4	Accounting firm	5	3	Xero	0.5 years
R5	Content provider finance shared service centre	6000	17	Esker E - invoice	3 years
R6	Accounting firm	300	26	Xero	3 years
R7	Multi-level marketing Asia Pacific Business Services	400	42	Inspiro	0.5 years
R8	Accounting firm	70	10	Only You	2 years
R9	Electrical appliances global finance shared service centre	500	46	Kofax	0.5 years

Note: Size of the organisation refers to the number of employees.

Table 3: Interviewee Profile

Organisation	Interviewee	Years of service	Position
R1	N	5	Team leader of account payable
R2	P	10	Finance manager
R3	L	3	Business owner
R4	K	3	Business owner
R5	S	17	Head of account payable
R6	M	2	Finance manager
R7	Y	1	Finance manager for business unit
R8	K	19	Branch manager
R9	C	5	Team leader for Non-PO invoice division

4.2 Features of the AI-based Accounting Software

From the data collected, it was observed that most of the organisations adopted different types of AI-based accounting software. Some of those used comprised a full set of accounting software such as Xero and Only You, while the rests utilised software solutions which are embedded into the mainstream's accounting system with most of the AI-based accounting software having similar AI features (Table 2).

From the list of the main features identified from the AI-based accounting software, a comparison was made with the traditional software. It was observed that the major features of the AI-based were very different from the traditional accounting software which does not carry a huge storage of images in its system. It also does not have the machine learning ability. Hence all transactions of processing the accounts payable need to be performed manually. This is because the software does not have the OCR technology. Most traditional accounting software cannot be integrated with other software. Although a few may be able to do so, the number is extremely limited. The next section elaborates on the usage of the AI technology in accounts payable functions.

4.3 Usage of AI in Account Payable Function

The findings on the usage of AI-based accounting software in the accounts payable functions were summarised into five main usage categories: 1) storing images of invoices, 2) auto capturing of the invoice information, 3) risk management tool, 4) routing and monitoring of invoices' approval, and 5) tracking users' activities.

The first and main purpose of implementing the AI-based accounting software in the accounts payable functions was to store the images of the invoices. The repository provided in the software can leverage context-based content searches and views. Most of the respondents were using the software to store the images of the invoices. This was endorsed by respondent, R5:

> … *We tend to create one specific email address, ask Esker (AI software) to configure at the back end, all the suppliers to send their invoices to this common email. Then this email will direct link to Esker server and the invoices will store in the server.* (R5)

The next common usage of the accounting software was to auto capture the invoice information. This auto capture function is attributed to the updated version of the optical character recognition (OCR) system which is embedded in the AI technology. The OCR system is able to train itself and help in extracting text from any image by using neural networks and the ability of machine learning (Garg, Gupta, Prabhakar, Garg, & Trivedi, 2018). The representative, R4, revealed that the purpose of the AI-based software and solution was to automate information capturing. This is evidenced by the following extract:

> … *for AP information, you upload the document, it auto pulls all the information and capture the entry at the AP part…* (R4)

The AI technology that was embedded into the accounting software can further be utilised as a risk management tool. In most accounting departments, dealing with payments and accounts, is one of the most common issues encountered by the staff in the accounting department. There were fraud cases where invoices were submitted without the support of the PO or without authorised approvals noted in the system. Therefore, if there were any invoices unmatched to the authorised PO from the system, the invoice would be blocked from being processed any further into the account. This e-workflow setting can mitigate human manipulations on the PO, and the invoices approval. Thus, this system helped to mitigate risks of fraud invoices happening. The understanding was endorsed by respondent R1:

> "… *we just need to key in the PO number, the invoice number issued under this PO will come out, all the information of the invoice will show include the vendor code, so we no need to manually key in. That's how PO can match with invoice…*" (R1)

The next main function of the AI-based software was routing and monitoring the approval of invoices. The vendor invoices would be routed from the initial stage; it is then auto captured for final approval by the head of the department (HOD). This is to ensure the validity of the invoice before posting it into the accounting system. This was adopted by R5's company for its internal control purposes:

> … *Once the invoice updates, it will route to our procurement for the person in charge's approval. They will check to make sure it is genuine.* (R5)

The next common usage expected by a majority of the organisations was for the system to track the users' activities. It appears that the software adopted can generate the history log or audit trails for the transactions processed. This was highlighted by interviewee R4, in tracing the history logs of the transaction.

> … *one good thing of the Xero is that it has the history. Which is the err… so called the audit trail. Whenever you amend the information, it will show the history, the date and the time, and by whom. So, you can easily see what is he doing…* (R4)

Based on the input given by the interviewees, the main usage purpose of the AI-based accounting software for AP functions is listed through the themes and categories as portrayed in Figure 1.

The next section will deliberate on the findings of the impact of AI-based software on organisations.

4.4 Organisational Impact

The respondents from the various organisations also expressed their views on the benefits of the AI technology to their organisations, which were many. These can be further classified into six main positive impacts: improved efficiency, improved productivity, improved customer service, flexible working style, process governance and manpower saving. The most prominent impact, after the adoption of the AI technology, was improved efficiency in the accounts payable functions, as noted by interviewee R6:

> … *we need half a day to complete 100 invoices, but with Xero, only need 1 to 2 hours to complete.* (R6)

The other interviewees from R1, R2, R3, R4, R5 and R8 also shared similar opinions depicting the efficiency of the accounting functions
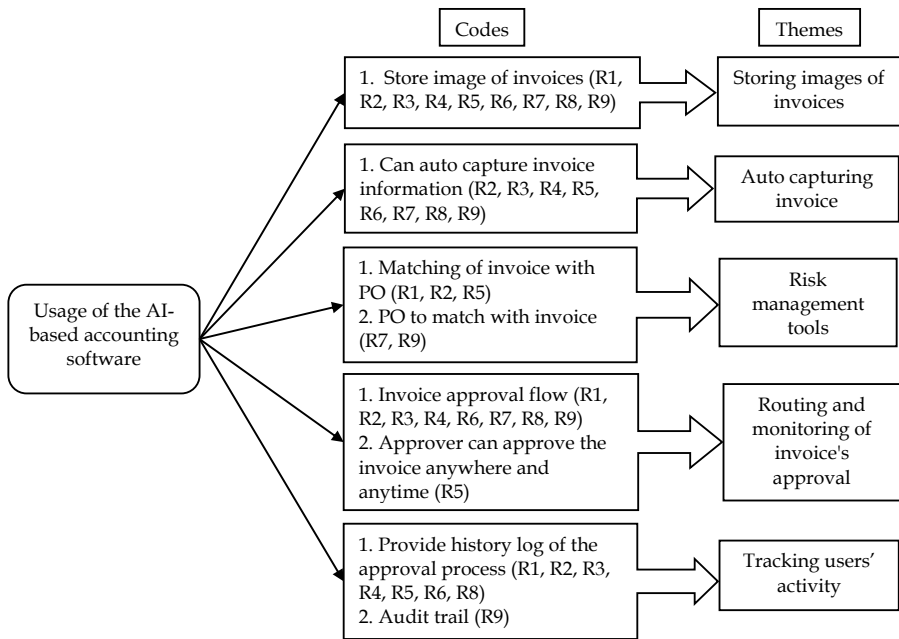
Codes		Themes
1. Store image of invoices (R1, R2, R3, R4, R5, R6, R7, R8, R9)	→	Storing images of invoices
1. Can auto capture invoice information (R2, R3, R4, R5, R6, R7, R8, R9)	→	Auto capturing invoice
1. Matching of invoice with PO (R1, R2, R5) 2. PO to match with invoice (R7, R9)	→	Risk management tools
1. Invoice approval flow (R1, R2, R3, R4, R6, R7, R8, R9) 2. Approver can approve the invoice anywhere and anytime (R5)	→	Routing and monitoring of invoice's approval
1. Provide history log of the approval process (R1, R2, R3, R4, R5, R6, R8) 2. Audit trail (R9)	→	Tracking users' activity

Usage of the AI-based accounting software

Figure 1: Main Usage of AI-based Accounting Software

within their respective organisations. The next positive impact arising from the adoption of the AI software was an increase in productivity. All of the organisations supported this benefit.

> … *The volume of the transaction is increasing. Now the productivity of the staff has increased. They can handle more volume now. Eight years ago, we have 30 staff to handle 10 entities with 8 activities. Now we have less manpower to handle volume of 10 entities with 37 activities.* (R5)

After the adoption of the AI-based accounting software, there were a few organisations which also noticed an improvement in their customer service quality. This was traced to the interview data, as expressed by interviewee R5.

> … *60% of the clients' invoices managed to be paid within the due date since the invoices can be captured on time into system …* (R5)

Not only did the customer service improved, adoption of the AI technology into the company's accounting system was also able to

implement flexible working styles. The staff were able to perform work from anywhere and anytime at their convenience. The business owner, R3 mentioned that:

> … *it is cloud based, then anywhere we can access the system, so staff can continue work from home if they choose not to stay back late at office …* (R3)

Adoption of the AI-based technology into the organisation's accounting software offered the solution for organisations to process their governance. Organisations can implement better internal controls and involve fewer human interventions in their accounts payable functions. These can mitigate fraud purchases or fraud payments from happening. Most of the organisations shared the same opinion.

> … *The process of the AP department can be standardised and align with the group policy after the adoption because the universal AI based accounting systems are utilised across all regions …* (R2)

The other interviewees from R4, R6, R7 and R9 also had the same opinion that the AI-based software can help organisations to govern the workflow of the accounting functions more efficiently. The next positive impact that was observed is manpower saving. Representatives from R1, R2, R5, R8 and R9 declared that they had saved manpower at the accounts payable after the adoption of the AI-based accounting software, as shared by interviewee, R2:

> … *initially we have more than 30 staff in AP team, but now we have around 25 only after the adoption …* (R5)

The themes and categories derived from the AI software and its impact on the organisation are illustrated in Figure 2.

4.5 Discussion

Overall, the results show that the adoption of AI is not limited to the specific size of the organisations. The small and medium sized organisations had also been able to use the AI-based accounting software effectively to obtain specific benefits.

The findings of this study indicates that the main purpose of using the AI-based accounting software is to store the images of the invoices in soft copy and to reduce the need to print hard copies. The image of the invoices could be stored in the software's database so as to facilitate
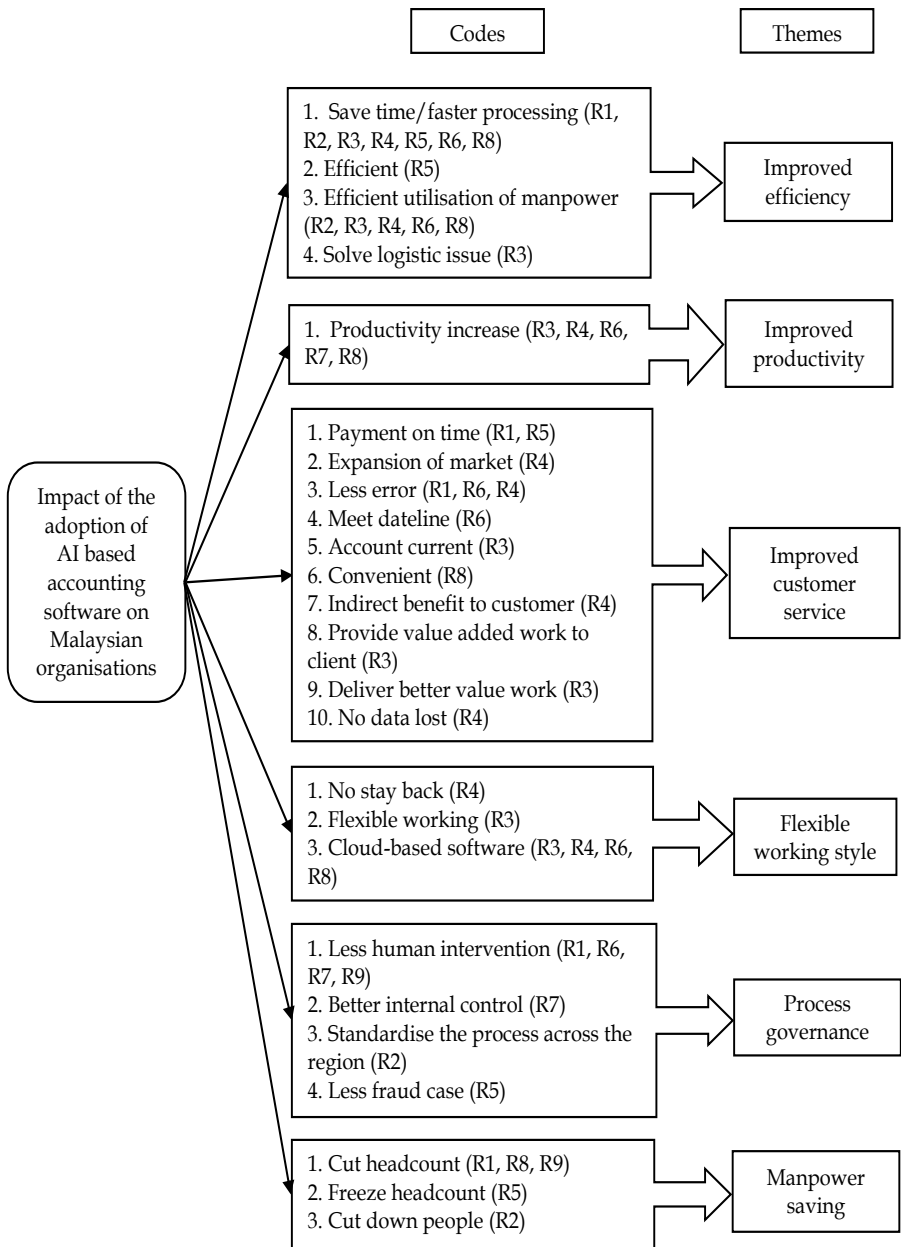
Figure 2: Impact of the AI-based Accounting Software on Organisations in Malaysia

checking and referencing. It has also reduced the issue of missing invoices. Another purpose of using the AI software is to automate the information capturing process. This function can be performed by the OCR feature that is embedded into the software. These two distinct purposes differentiate the AI-based accounting software or solution from the traditional accounting software. Tarmidi, Rozalan, Rasli, Roni and Alizan (2018) had mentioned that the OCR feature, as part of the AI system, can be used to digitise the documents and to convert the documents into editable forms. It was emphasised that the OCR application in the accounting system contributed to the enhancement of the business records of the small and medium enterprises (SME) in Malaysia.

The AI technology in the accounting software or solution is useful as one of the risk management tools. The solution can perform the matching of purchase orders (PO) and invoices. This matching is important for ensuring that invoices are genuine; it also mitigated invoice manipulations by irresponsible staff. The process of automation involves capturing the invoice, routing the invoice for approval and monitoring it. In contrast, traditional methods of manual processing for approvals are slow, hence it should be slowly abolished from current practices. The AI software can also track user activities, such as matching the history of the invoice with the PO, like when the invoice was received and approved by the person in charge. This tracking is beneficial when there is conflict about invoice issues or the payment of late invoices. The history log from the system can be referred to for investigating the root cause of any lateness of payment or missing invoices. The manual task of filing, printing the payment voucher, stamping the "paid "on invoices can thus be removed. This saves time which can be utilised more efficiently. Similar to the current findings, the study by Chukwudi et al. (2018) found the use of AI, namely expert system and intelligent agent has a positive influence on the accounting functions. However, the study did not explain with in-depth how these technologies can enhance the performance of accounting functions.

From the studies done by Microsoft and IDC Asia Pacific, results had shown that the application of AI in Malaysia would increase employees' productivity by 60 per cent. It would also double the rate of innovation by 2021 (SMEBIZ, 2019). This vision was certainly observed in the current study. Data analysed from the interviews noting the impact of AI adoption on AP functions show that the efficiency of the employees in the respective organisations has improved. The automation of the transactional process has expedited the AP processing,

and employees could complete the same amount of task in a shorter time. This means that the productivity of the employees has also increased. This finding is similar to the outcome noted by Yaser and Mina (2012) who noted a positive relationship between IT adoption and organisation productivity. With an increase in employee productivity, the staff have more time to perform other more value-added tasks for the benefit of the organisation.

The current study has also noted that AI technology enables the organisations to enhance customer service. This impact, contributed by the AI adoption of accounting software, is similar to the results of Aduloju, Olowokudejo, and Obalola (2014). They noted that the usage of IT brought positive impact on the customer service in the insurance industry. The analysis of the current study further validates the fact that AI adoption enables payments within organisations to be processed on time and clients' queries to be attended to swiftly. Reports can be generated on time to meet the deliverables' deadlines and the accuracy of the invoice transactions can be further improved. This enhanced customer service, thereby minimising customer complaints. Another impact of the AI adoption is noted in the flexible working styles which can be implemented in organisations. This flexibility can be attributed to the cloud base of the accounting software which provides staff with the opportunity to work from home or anywhere they feel convenient. This positive impact can increase staff's engagement in the organisation. Likewise, this finding concurs with the results of Parry, Battista and Olivas-Lujan (2019) who found that innovative technology can be used to support the implementation of flexible working styles in the organisation.

The AI-based accounting software has also enabled organisations to implement a better governance system. In their study Askary, Abu-Ghazaleh and Tahat (2018) also revealed that AI can generate the impact of good governance systems to produce high quality accounting information. The transitional automation provided by AI adoption can also mitigate human intervention in the process. The automated 2-way matching of the PO with invoices and the routing of the invoice approval can mitigate fraudulent activities. Finally, the last significant impact of AI adoption to organisations is manpower saving as was also noted by Hemin (2017). The automation process for some of the mundane transactional data entry would minimise the amount of manpower required.

5. Conclusion and Implications

AI has emerged to be a part of the daily lives of every individual in today's digital era. It also serves as one of the drivers for IR 4.0 and has influenced every aspect of the human life and corporate business. Due to its enormous benefits to the business world, the AI-based technology should be the focus of all researchers. Although some researchers (Tschakert et al., 2016; Davenport & Kirby, 2016) have studied the application of AI in the accounting field, none had pursued the study of AI adoption in the accounts payable functions of organisations, particularly in Malaysia. Previous studies (Chukwudi et al., 2018) had attempted to evaluate the impact of AI adoption on audit practitioners, but they had not touched on accounts payable functions. This study thus attempted to identify the usage and impact of the AI adoption by focusing on accounts payable functions among organisations in Malaysia, using the qualitative approach. The findings derived from this study can be used as a reference by other researchers to conduct more AI-related studies, especially when looking at the impact of AI adoption.

The findings of this study have shown that AI is a disruptive technology that is not limited to global tech giants and blue-chip companies. In fact, it is important for small and big organisations to consider adopting AI when performing their accounting processes. The technology of AI is excellent for replacing lower level and repetitive tasks. The potential of AI is its ability to change the way organisations operate. All it takes is for organisations to be willing to embrace new opportunities wherever and whenever possible.

The outcome gained from this study can be used as valuable insights by organisations that are planning to invest in the AI technology in the near future. The report derived from the current study serves as a reliable source of evidence to interested parties that are keen to extract the benefits of AI adoption. Organisations can now use this evidence as a guide to make better decisions for any intended future investments of the AI software, particularly for accounting functions. The MIA 2019 report had mentioned that 57 per cent of the respondents had stated that the lag in technology adoption was due to a lack of understanding about the benefits of AI adoption. Therefore, the findings derived from the current study can serve as a reliable source for others to strategise the best way to invest in the AI-based accounting software.

The results of this study can also serve as a constructive marketing tool to AI technology vendors. The AI vendor can leverage on the

findings of this study to substantiate their sales pitch to customers on the benefits of acquiring the AI-based accounting software. In addition, the vendors can work with educational institutions to introduce the learning of AI software. This could be added as one of the syllabi in the course outline in universities as an approach to prepare the younger generation to enter the workforce with practical skills on the use of AI-based accounting software in supporting business operations.

Although there is much to be gained from this study, it is also restrained by one of the limitations, which is the size of the samples. The small sampling is inevitable because the adoption of AI based accounting software is still low in Malaysia. It was a challenge to look for the target samples. The scope of this study was confined to the accounting service provider only, hence the generalisability of this study may be limited. Future studies can focus on other areas of accounting, such as accounts receivable, inventory and bookkeeping functions as a whole. There are many subfields of AI on which future researchers can investigate, such as robotic process automation. Future researchers may also consider the quantitative method of studying the relationship between AI usage and its impact on the organisation via surveys.

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Appendix

Interview Protocol

Date: XX
Interviewee: XX
Organization: XX

Introduction

The purpose of the research is to study the use and impact of Artificial Intelligence (AI) software in account payable function by corporates in Malaysia. The research aims to study three main scopes, namely the purpose of the adoption, the level of usage and the impact of the adoption to the organisation. Therefore, the purpose of this interview session is to obtain some valuable information on the use and impact of the AI software in the organisation. All the information discussed in the interview session will be kept highly confidential and will be used only for academic purposes.

Interview Questions

Section 1 – Basic Information of the Company
1. Size
2. Industry
3. AI Software used (type and description)
4. How long the software been used?

Section 2 – Purpose
1. What is the purpose to adopt this software?
2. When did your company decide to explore the usage of the AI in accounting function?

Section 3 – Level of Usage
1. How frequent this software is used?
2. Can you explain the use of AI software in Account Payable (AP) function?
3. Beside AP, does the software is used in other accounting/non-accounting function in your organisation?

Section 4 – Implication of the Adoption
1. Can you explain how the adoption of AI has improved the business processes and benefited the organisation?