Impact of Artificial Intelligence on Thai Banking Structure

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ABSTRACT

Artificial Intelligence is the fastest evolving go-to technology for all the companies to personalize experience for themselves and their customers. The technology itself is getting much better and a lot smarter with easy to use functions making it comfortable to use, allowing more and newer industries to adopt the AI for various applications. Banking sector is becoming one of the first adopters of AI. The purpose of this research was to find out the impact of Artificial Intelligence in the Thai banking structure. To carry out this research, 3 top banks namely Bangkok bank, Kasikorn bank, and Siam Commercial Bank; were selected as they were the early adapters of Artificial Intelligence. The study applied a survey method to collect the data using convenient sampling method. 190 responses were recorded ranging from middle level managers to the front-line staffs of these three banks. It was a 100% response rate through the use of questionnaire. The statistics used to analyze was the correlation. The study concluded that the implementation of AI in banks has helped the banks to deliver effective services. Banks were able to maintain a standardized reporting format. The security and surveillance of the banks has been greatly boosted by the integration of AI. On the other hand, the fear of the AI as a job replacement and awareness of AI might become roadblocks to further growth of AI. The empirical evidence of this research also suggests AI applicants are utilized by corporation and value savings in current industries. AI services are there to satisfy employees, discover fraud, and access individual trustworthiness which is what the Thai banks are found to be doing as well. It can be said that the implementation of AI in Thai banking system can be seen as a revolutionary step for the upcoming future.

Keywords: Artificial Intelligence, Surveillance, Effective Services, Standardized Reports

INTRODUCTION

Artificial Intelligence (AI) is the fastest evolving go-to technology for all the companies across the world to personalize experience for individuals and their customers. The technology itself is getting much better and a lot smarter with easy to use functions making it comfortable to use, allowing more and newer industries to adopt the AI for various applications. Banking sector is becoming one of the first adopters of AI. And just like other segments, banks are

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exploring and implementing the technology in various ways. Investment Banks are adopting computer programs to enhance capabilities of business by the implementation of sophisticated artificial intelligence to reduce fraudulent practices, improve customer response, offer standard customer service, enable virtual assistant to offer real time solutions, digital documentation etc. Improved infrastructure, data mining etc. have redefined banking operations with the help of machine intelligence. They are applying big data analysis to collect information about their customers like income, work profile, personal details, and credit worthiness to offer various banking products through ATMs like loan facilities. The users have to accept the terms and conditions post verification through a registered mobile number which is making it easier for the banks to know who their customers are and keeping records. The usage of AI is increasing at a rapid pace it is said by 2025, the global AI market to grow almost $60 billion whereas in 2016 it was $1.4 billion (G, 2019). Investment in AI startups grew by 6 times since 2000. Whereas, already 77% of the devices we use feature one form of AI or another. 97% of mobile users are already using AI-powered voice assistants. (Geisel, 2015)

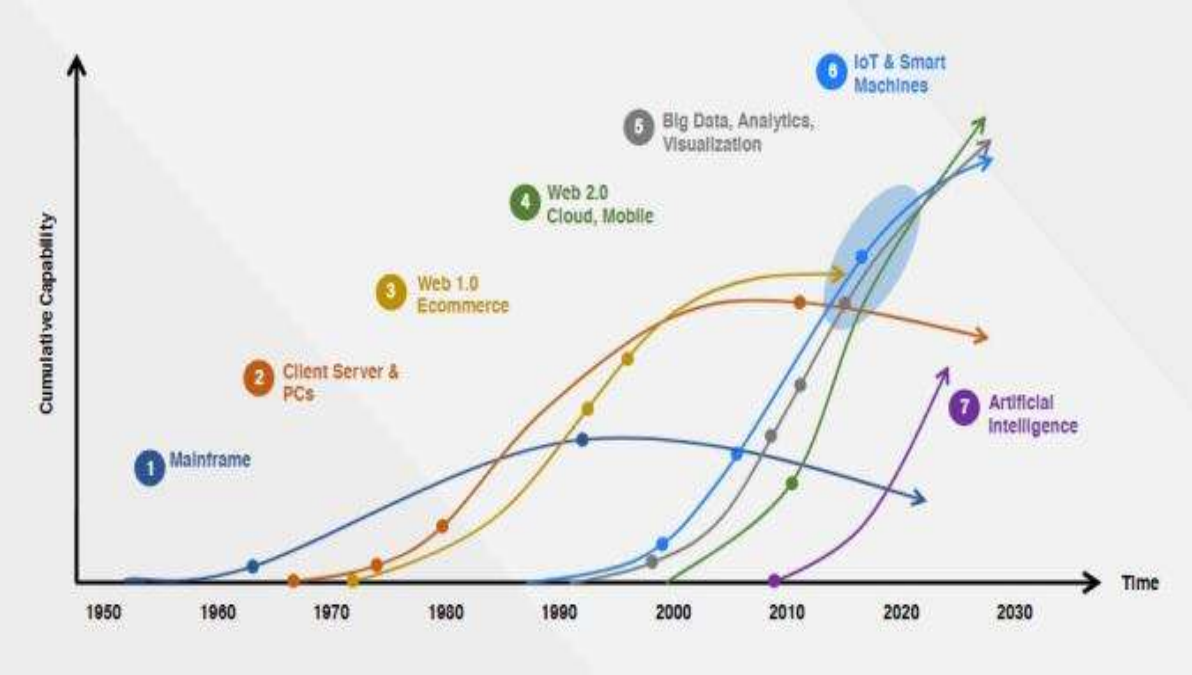

Figure 1: Timeline of Artificial Intelligence (Source: Eberwein, 2018)

Scope of Study

The fourth industrial revolution has brought forward the ground breaking technology that seems to entice everyone as days go by. By 2025, the global AI market is expected to be almost $60 billion; in 2016 it was $1.4 billion. The Global GDP will grow by $15.7 trillion by 2030 thanks to AI. AI can increase business productivity by 40%. AI startups grew 14 times over the last two decades. Investment in AI startups grew 6 times since 2000. Already 77% of the devices we use feature one form of AI or another. (Goudarzi, Hickok, & Sinha, 2018) said that Cyborg technology will help us overcome physical and cognitive impairments. Google analysts believe that next year, 2020, robots will be smart enough to mimic complex human behavior like jokes and flirting. The introduction of AI has been the center of attention for technological giants but now things have changed. AI's breakthrough into the banking sector

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has brought forward a new wave of innovation and ideas. The vast limitless capabilities of AI teaming up in a sector where big data is the key to fortune and profits has baffled everyone making them skeptical about this new technology. AI will affect business with the arrival of 5G infrastructure as more data is input and processed, bridging the online and offline worlds. Venture capital firms prefer to invest in AI startups, (Panachit, 2016) reported that in Asia, investment in AI increased from US$6 billion in 2016 to $12 billion in 2017. Analysts project AI investment globally to reach $36.8 billion in 2025, with 60% related to big data and the rest dealing with image recognition. (Giovani, 2017) said that the technological advancement will surely help the banks to improve their overall performance such as better and smoother customer services which will potentially increase the banks revenue. The banking sector plans to move to facial recognition for electronic know-your-customer regulations, as well as block chain and machine learning for fraud detection. The future of finance will be seen as a stage for increasing competition among industry giants where emerging Fintech and AI applications will be the game changer. However not all good comes from such change. The introduction of AI is seen as a disruption upon the present scenario that will create job loss at basic level. Many are concerned what the future holds with the presence of AI in our lives. According to the McKinsey Global Institute, "by 2030, intelligent agents and robots could replace as much as 30 percent of the world's current human labor." (Willow, 2018). However, AI also has many foreseeable positive outcomes. While AI could make many agricultural and manufacturing jobs obsolete, it could allow for the people previously in those jobs to work in higher-level jobs. This would mean that people would be working in fields that require more education and knowledge, which has the potential to increase innovation and benefit economies. Additionally, AI has the potential to affect global issues such as healthcare and poverty.

LITERATURE REVIEW

Related Theories and Literature

Aazhvar (2019) showed in his research concluded that Artificial intelligence has several edges to supply for the banking sector. AI is ever-changing business processes and customer-facing services within the banking sector in Republic of India. It is additionally being used to meet restrictive compliance, observe fraud, and assess individual trustworthiness.

Kunwar (2018) articulated that as a results of the analysis, it's found that AI is moving across an outsized front in recent years. Regardless of business, AI offers money establishments prospects across their worth chains, through important changes starting from ancient procedures to radical, industry-changing apply. AI has multitudinous, real use examples that modify the event of company revenue growth and value savings in current industries.

Vijai (2019) concluded that AI has several edges to supply for the banking sector. Artificial intelligence is changing business processes and customer-facing services in the banking sector in India. It's conjointly getting used to satisfy regulatory compliance, observe fraud, and assess individual trustworthiness. The applying of AI has the potential to create more economical business processes, supply customized services, and assist in larger goals like monetary inclusion.

Goudarzi, Hickok, & Sinha (2018) explained that Artificial intelligence is dynamical business processes and client facing services within the finance sector in Asian nation. It's additionally being employed to satisfy restrictive compliance, discover fraud, and assess individual

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trustworthiness. The applying of AI has the potential to make more economical business processes, supply customized services, and assist in larger goals such as money inclusion.

Sullivan (2018) summarized that Automation & AI market in Thailand are fifth part of the largest within the world with the worth over one trillion by 2035. Thailand has strategic blessings from being several regional hubs ranges from automotive and electrical & electricity producing hubs to a medical hub. These industries are the main engine driving automation and AI adoption in Thailand.

Theoretical Background

Operational Efficiency Theory: The term "efficiency" is beheld in both the industrial organization and strategic management collected works as the product of firm-specific factors such as management skills, innovation, cost control and market share as determinants of current firm performance and its stability. According to (Kalluru & Bhat, 2009), Operational efficiency is the proficiency of a corporation to curtail the unwelcome and maximize resource capabilities so as to deliver quality products and services to customers. An organizational operational efficiency depends on factors like skillful and proficient workers, proper technological progression, proper procurement carries out, return to scale of the businesses, and supply chain controlling among many others. Relatively, more efficient firms tend to maintain more stability levels in terms of output and operating performance compared to their other industry peers (Mills & Schumann, 1985).

Reporting standardization Theory: Standardized reporting is an intricate type of reporting process that aims to produce consistent, reliable, actionable information from disparate systems or sources. A reporting process is standardized if it can be applied across different business units or sub-units in an organization. The processes that generate and collect the data to be reported on must remain the same across all the business units (Kondracki, 2016). For an organization to understand the status of conditions in real time, and make decisions quickly, standardized reporting is required. A universal understanding of information enables clarity and transparency. Clarity supports effective communication based on trust. And studies show that effective communication leads to enhanced productivity and deeper customer relationships.

Surveillance Theory: Surveillance is the monitoring of behavior, activities, or information for the purpose of influencing, managing or directing. This can include observation from a distance by means of electronic equipment, such as closed-circuit television (CCTV), or interception of electronically transmitted information, such as Internet traffic (Whitfield & Landau, 2009). It can also include simple technical methods, such as human intelligence gathering and postal interception.

Technology Acceptance Model Theory: According to (Davis, 1986) Technology Acceptance Model (TAM) is an information system theory that models how users accept and use a new technology. The TAM model explains when the users are provided with new technological model there are many variables that come into play notably;

- Perceived Usefulness (PU): (Davis, 1986) defines it as the degree to which a person believes that using a particular system would enhance his or her job performance.
- Perceived ease-of-use (PEOU): (Davis, 1986) defines it as the degree to which a person believes that using a particular system would be free from effort.

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The figure below describes the Technology Acceptance Model (TAM) theory:

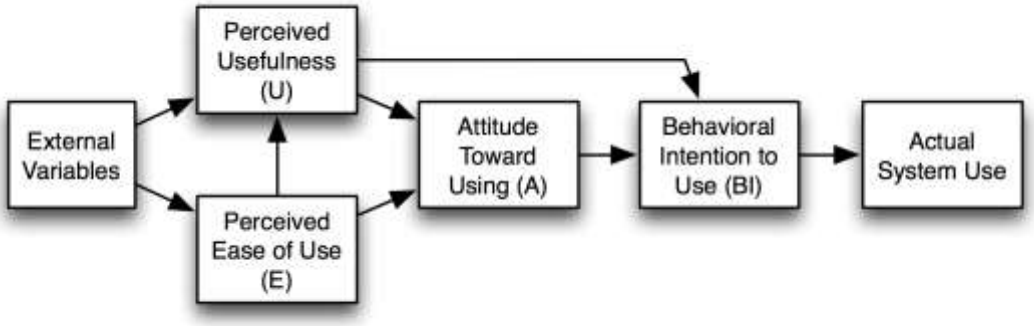

Figure 2: Technology Acceptance Model Theory (Source: Davis, 1986)

RESEARCH METHODOLOGY

Conceptual Framework

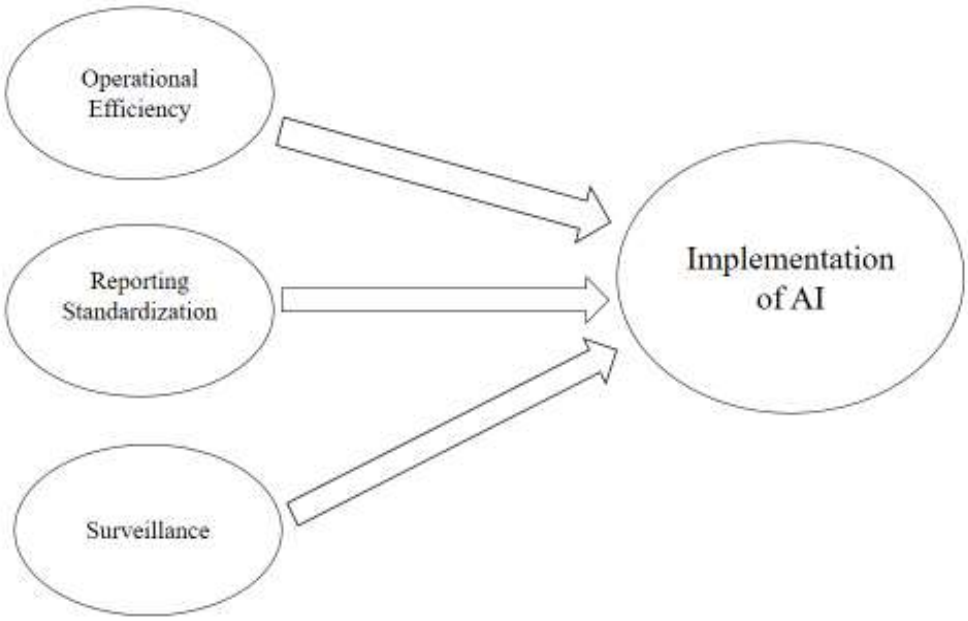

Figure 3: Theoretical Framework of the Study

We have taken operational efficiency, reporting standardization, and surveillance as the three variables under which the relationship will be shown towards the implementation of AI of the three banks namely Siam Commercial Bank (SCB), Bangkok Bank, and Kasikorn Bank.

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Proposed Hypotheses

For the development of this study, the following null hypotheses have been developed to test the relationship between the various factors that'll lead to the impact of AI in Thai banks. The following hypotheses are formulated for the study:

$H0_1$: There is no significant relationship between operational efficiency towards the implementation of AI in banks

$H0_2$: There is no significant relationship between reporting standardized towards the implementation of AI in banks

$H0_3$: There is no significant relationship between surveillance towards the implementation of AI in banks

Data Collection

The study is targeted towards the commercial banks of Thailand. As, Thailand is slowly leaning towards the implementation of AI; during 2018 around 20 Thai enterprise were early adopters of AI, in particular conglomerates, banks, telecom operators and retail. (Sullivan, 2018) said that there aren't a lot of banks that have begun using AI limiting our sample size to the top 3 banks in Thailand which are Siam Commercial Bank (SCB), Bangkok Bank and Kasikorn Bank. The sample size for this study is calculated by G* Power program with the effect size of 0.8 estimated to be around 50 responses from each of the banks making it a total of 150 responses. To collect the data, convenient sampling method was adopted. Convenience sampling is a non-probability sampling technique where subjects are selected because of their convenient accessibility and proximity to the researcher.

Measurement

Questionnaires: A questionnaire is defined as a research instrument that consists of a set of questions or other types of prompts that aims to collect information from a respondent (Giovani, 2017). The data was obtained using a guided questionnaire distributed to the bank employees. The questionnaire has been verified by our project advisor and respectively other advisors of Independent project as well. Furthermore, the sample size selected for the report gives the accurate and reliable data. As, only three banks of Thailand which are undertaking the projects by the means of Artificial Intelligence are only included in the sample size of the research report. The questionnaire was extracted from the previous research reports for ensuring the reliability of the survey. There won't be any incomplete or irrelevant data to ensure the validity of the research report and the means of distributing the questionnaire is very proper to cause no errors in the process. During collection of the data the questionnaire were translated into Thai Language for the proper understanding of the questions and block any external factors influencing the misinterpretation of the research questions.

Structure and pattern of variables under study

The structure and pattern of variables of data represents the three Banks under study along with the number of samples taken. Table 1 presents the number of banks under study with their name, abbreviations and the number of samples under study. From the table, it is observed that total number of samples from SCB is 62, from KB is 63 and the BB is 71.

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Table 1: List of samples of Banks selected under study

Name of the Banks	Abbreviations	Observations
Siam Commercial Bank	SCB	62
Kaikorn Bank	KB	63
Bangkok Bank	BB	71

Data Collection Procedure

The quantitative analysis is performed here for the primary data collected from surveying 196 bank employees and potential users of banking sector of some selected banks i.e. Siam Commercial Bank, Bangkok Bank, and Kasikorn Bank across Thailand. For this analysis, only respondents who have submitted complete responses were included and partial or incomplete responses were excluded. For conducting this survey all the participants were pre-informed about the aim of study and the survey was conducted via e-mail and QR code after obtaining required permission and information from respective banks.

Methods of Data Analysis

For the analysis of the report, Statistical office package was used in the analysis and the data interpretation. The data, for the period mentioned above, were analyzed by using descriptive statistics which are frequency, percentage, mean, standard deviation, and inferential statistic which is Regression & Correlation analysis. (Hayes, 2019) states Correlation, in the finance and investment businesses, could be a measurement that measures the degree to which two securities move in connection to each other. Correlations are used in progressed portfolio administration, computed as the relationship coefficient, which encompasses an esteem that must drop between -1.0 and +1.0. A culminate positive relationship implies that the relationship coefficient is exactly 1. This infers that as one security moves, either up or down, the other security moves in lockstep, within the same direction. A perfect negative relationship implies that two resources move in inverse directions, whereas a zero relationship infers no relationship at all. It could be a measurement that measures the degree to which two variables move in connection to each other. An esteem of precisely 1.0 implies there's a culminate positive relationship between the two factors. For a positive increment in one variable, there's moreover a positive increment within the moment variable. An esteem of -1.0 implies there's a culminate negative connection.

DATA ANALYSIS

Summary of Demographic Data

For this research, 196 individuals were surveyed who worked in the different branches of the three banks which are the sample of the study, i.e. Siam Commercial Bank, Kasikorn Bank, and Bangkok Bank. Among them 101 were male and 95 were female, among which 14 of

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them from the total population were under 20 years of age, 38 individuals were among 21-25 age group, 69 individuals were from 26-30 age group, 42 individuals were from 31-40 age group, 23 individuals were from 41-50 age group and the remaining 10 individuals were over 50 years of age. Among them 25 individuals were below bachelor's degree, 86 individuals had completed their bachelor's degree and the remaining 85 had completed their post graduate degree as well. There was a range of 6 income levels in the banking structure of the 3 sample banks, the least income level i.e. under 10,000 Bahts were 15 individuals, 10,001-20,000 Bahts were 44 individuals, 20,001-30,000 Bahts were 63 individuals, 30,001-40,000 Bahts were 32 individuals, 40,001-50,000 Bahts were 29 Individuals and the highest earning range i.e. above 50,000 Bahts were 13 Individuals. Among the total 196 sample, 62 individuals were sampled from Siam Commercial Bank, 71 individuals were from Bangkok Bank and the rest 63 individuals were from the Kasikorn Bank. Among the surveyed people, 13 of them worked in Executive post or the Top management post, 45 of them worked as the middle manager, 66 of them worked in the first line, 57 of them were staff officers and the rest of the other i.e. 15 individuals were from the rest of the jobs such as, software programmer, cleaner, senior staff, program manager and so on.

FINDINGS

Descriptive Statistics

Table 2 summarizes the descriptive statistics (mean, median, mode, standard deviation, and Variance) of the three banks. As per the Table 3, the descriptive analysis is carried out across the variables such as gender, age, marital status, educational level, and income. AI impacts on banking structure, banks, and job title. The mode and the median of the variables range from 1-3. The mean of the variables ranges from 1.48- 3.28. The standard deviations of the variables range from 0.51 to 1.34 whereas, the variances of the variables range from 0.251-1.81.

Table 2: Descriptive statistics of variables under study

Statistics	Gender	Education Level	Income	AI Impact on banking sector	Bank	Job Title	Age	Marital Status
Mean	1.48	2.31	3.28	1.76	2.01	3.08	3.27	1.43
Median	1.00	2.00	3.00	1.00	2.00	3.00	3.00	1.00
Mode	1	2	3	1	2	3	3	1
St. Deviation	.501	.686	1.347	.905	.801	1.044	1.249	.497
Variance	.251	.470	1.813	.819	.641	1.091	1.560	.247

Hypotheses Finding

As per the results of the study, it has been found that there is a significant relationship between Operational Efficiency, Reporting Standardization and Surveillance towards the

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implementation of Artificial Intelligence in Banks with a significant level of 0.868 which has been found out by the use of Regression Analysis.

Findings of the study

Looking at Table 3; The Pearson correlation talks about the strength of the linear relation between the variables; operational efficiency, reporting standardization, surveillance and implementation of AI, and it can be seen that they all are positive. They also have a strong relationship among each other as each variable has got the correlation above 0.8 making it closer to the uphill perfect linear relationship of 1.

We have assumed the level of significance or the p value to be 0.05 i.e. 95% confidence level. The significant value of all our four variables; operational efficiency, reporting standardization, surveillance and implementation of AI are almost averaging 0 which is less than our significant level of 0.05. Under the following criteria, it can be said that a correlation exists among the following variables; operational efficiency, reporting standardization, surveillance and implementation of AI under the study. This provides enough evidence to reject the null hypotheses $H0_1$ $H0_2$ $H0_3$, and say that there is significant relationship between operational efficiency towards the implementation of AI in banks; there is significant relationship between reporting standardized towards the implementation of AI in banks and there is significant relationship between surveillance towards the implementation of AI in banks.

The major findings of the study are summarized below:

1. There is a significant relationship between Operational Efficiency towards the implementation of Artificial Intelligence with a significant level of 0.820.
2. There is a significant relationship between Reporting Standardization towards the implementation of Artificial Intelligence with a significant level of 0.814.
3. There is a significant relationship between Surveillance towards the implementation of Artificial Intelligence with a significant level of 0.834.

Results of the Hypotheses testing

The study shows there is significant relationship between operational efficiency, reporting standardization and surveillance towards the implementation of Artificial Intelligence in the 3 Banks using AI i.e. Siam Commercial Bank, Bangkok Bank, and Kasikorn Bank. The study is based on the primary research method. The questionnaire was converted to QR code and was being distributed among the staff and executives of the three banks. 196 individuals responded to the survey, among which 62 of them were from the Siam Commercial Bank, 71 individuals were from the Bangkok Bank, and the rest 63 individuals were from the Kasikorn Bank. To evaluate and describe the results and findings of the study, Regression and Correlation Analysis was conducted.

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Table 3: Correlation among the variables under the study

Variables		Operational Efficiency	Reporting Standardization	Surveillance	Implementation of AI
Operational Efficiency	Pearson Correlation	1	.861**	.848**	.820**
	Sig. (2-tailed)		.000	.000	.000
	N	196	196	196	196
Reporting Standardization	Pearson Correlation	.861**	1	.839**	.814**
	Sig. (2-tailed)	.000		.000	.000
	N	196	196	196	196
Surveillance	Pearson Correlation	.848**	.839**	1	.834**
	Sig. (2-tailed)	.000	.000		.000
	N	196	196	196	196
Implementation of AI	Pearson Correlation	.820**	.814**	.834**	1
	Sig. (2-tailed)	.000	.000	.000	
	N	196	196	196	196

**. Correlation is significant at the 0.01 level (2-tailed).

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DISCUSSION AND RECOMMENDATION

Conclusions

With the widespread advancement and adaptation of AI towards the various industry sectors, the study had been carried out to find out the impact of AI across the Thai banking system. 3 Thai banks namely Siam Commercial Bank, Bangkok Bank, and Kasikorn bank were taken into the study. The data was obtained through questionnaire that was distributed in both printed form and via electronic link Google Forum. Correlation had been used to check if there was any relationship between the implementation of AI and the banking performance mainly on the operational effectiveness, reporting standardization, and surveillance. The study concluded that the implementation of AI in banks has helped the banks to deliver effective services. Banks were able to maintain a standardized reporting format thanks to AI. The security and surveillance of the banks has been greatly boosted by the integration of AI. On the other hand, the fear of the AI as a job replacement and awareness of AI might become roadblocks to further growth of AI.

Furthermore, the findings and conclusion drawn from this research seems to align with the literature review of previous researchers such as (Kunwar, 2018) had stated multiple AI applicants are utilized by corporation and value savings in current industries or (Goudarzi, Hickok, & Sinha, 2018) had figured AI services to satisfy employees, discover fraud and access individual trustworthiness which is what the Thai banks are found to be doing as well or like (Aazhvar, 2019) concluded AI has several edges to supply for banking sector and (Sullivan, 2018) had stated Automation and AI market in Thailand are the fifth largest and are strategically blessed in terms of resource and hub. It can be said that the implementation of AI in Thai banking system can be seen as a revolutionary step for the upcoming future.

Hypotheses summary

As per the results of the study, it has been found that there is a significant relationship between Operational Efficiency, Reporting Standardization, and Surveillance towards the implementation of Artificial Intelligence in Banks with a significant level of 0.868 which has been found out by the use of Regression Analysis. There is a significant relationship between Operational Efficiency towards the implementation of Artificial Intelligence with a significant level of 0.820. There is a significant relationship between Reporting Standardization towards the implementation of Artificial Intelligence with a significant level of 0.814. There is a significant relationship between Surveillance towards the implementation of Artificial Intelligence with a significant level of 0.834.

FUTURE RESEARCH

This research aims to find out the dependency of the Artificial Intelligence in the Banking sector of the top 3 Thai Banks which are constantly using the means of AI in their day to day organizational work, so the three dependent variables were used i.e. Operational Efficiency, Standardization Reports and Surveillance. On the basis of these three dependent variables along with the independent variable i.e. Dependence of AI, the research was being conducted, which covers the major area of any Financial Institutions. The present study can be extended in several directions. This study can be conducted in sectors other than the banks such as manufacturing sectors, hotels, trading organization, investment firm, or hydropower companies.

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In order to minimize the limitation of the study, the future researcher can do the study in a larger population group from targeting the executives to the lower-level staffs as well. Furthermore, more banks can also be included in the sample size to make it more validated for a larger research study.

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