

## AI AND ROBOTIC PROCESS AUTOMATION IN FINTECH: ANALYZING THE SHIFT TOWARDS DIGITIZED CUSTOMER SERVICES AND OPERATIONAL EFFICIENCY

Pascal Muam MAH<sup>1</sup>, John MUZAM<sup>2\*</sup>, Tomasz PEŁECH-PILICHOWSKI<sup>3</sup>,  
Daniel Tambi MBUH<sup>4</sup>, Eyong AKO<sup>5</sup>

<sup>1</sup> AGH University of Science and Technology, Poland; mah@agh.edu.pl,  
ORCID: 0000-0001-6851-1518

<sup>2</sup> Silesian University of Technology, Poland; john.muzam@polsl.pl,  
ORCID: 0000-0002-5163-7576

<sup>3</sup> AGH University of Science and Technology, Poland; tomek@agh.edu.pl,  
ORCID: 0000-0003-2212-7806

<sup>4</sup> University of Bamenda, Bamili, Cameroon; tambi2015@yahoo.co.uk,  
ORCID: 0000-0001-6937-8392

<sup>5</sup> University of Bamenda, Bamili, Cameroon; akorolly87@yahoo.com,  
ORCID: 0009-0005-8689-6788

\* Correspondence author

**Introduction:** The need to replace human interaction in financial sectors with robotic process automation (RPA) has led to advanced services that have boosted productivity in financial sectors. RPA has systematically improved the output quality of financial services with high efficiency, service effectiveness, human resource engagements, advanced personnel management supports, employee loyalty, and customer satisfaction.

**Objectives:** The study aims to lay out systematic measures for potential customers to self-evaluate financial sectors before engaging in their services. Also, aims to understand how Fintech uses AI and RPA to advance the amalgamation of traditional financing into a digitized system with modern services.

**Problem:** Fintech with the help of RPA has led to social interactions through advanced transformative financial services that have pushed potential customers into limbo.

**Method and Material:** The study developed three pre-train deep learning techniques of digital evaluators called robotic process automation indicators. Bank satisfactory score survey was sample to validate and determine the study statistical data. Bank satisfactory score (BSAT) and bank effort score (BES) were used to examine banking services. Each robotic process automation indicator (RPAI) helps to evaluate five (5) financial service transformations identified by the study.

**Results:** Based on the Bank satisfactory score survey validation statistics, the bank satisfaction score (BSAT) and bank effort score (BES) a score of 2.2 and 2.2 respectively was recorded which indicates that the said bank is very affordable for customers.

**Conclusion:** The study concluded that Fintech is the best part of cognitive robotic process automation of intelligent systems empowered by cognitive computing technology that assists financial sectors and customers using best practice services.

**Keywords:** Fintech, robotic process automation, artificial intelligence, financial service transformation, deep learning.

## 1. Introduction

Lately, the banking sector has been able to achieve a lot in its entirety (Arasli et al., 2005). The banking sector has been able to focus on services in the last ten years, which has greatly engaged the financial sectors with a wide variety of users and clients through social and communicative interactions with RPA. Banking services are the best options for servings and have tremendously impacted banking activities. Information technology and other digital support technologies like artificial intelligence, big data, cloud computing, the internet of things, deep learning, and natural language processing, banks have broken their boundaries (Zhao, Zhang, 2021). Recently, customer satisfaction has improved tremendously with the help of modern machine learning algorithms (Pouyanfar et al., 2018). Deep learning algorithms have helped improve learning and customer satisfaction improved as well. Since the unprecedented changes in the traditional banking systems to a digitalized format, banking engineers have been working hard to train advanced robotic process automated systems to detect loopholes and manage customers' demands. Robotic process automation has been able to detect money laundering with the help of modern machine learning algorithms which has helped to prevent financial monitoring (Villar, Khan, 2021; Madakam et al., 2019). There is a need for separate transactions such as money laundering from legitimate transactions and machine learning is needed for it to reach its full capacity in tracing out unwanted transactions (Gotthardt et al., 2020).

In today's world, digital transformation is creating value for financial sectors with the help of robotic processes (Mavlutova, Volkova, 2019; Ulas, 2019). Robotic process automation is used as specialized computer programs known as software robots to fulfilled financial transactions. The modern banking system has realized that one of the best options is advancing sales, optimizing services to achieve customer satisfaction, and upholding safety management (Bose, 2009; Poirier, 1999). Analyses have weak big gains with the use of direct, optimize, and discovering of it is a much bigger leap to take the output. Digital financial services and loan-issuing applications use machine learning algorithms with the help of alternative devices such as smartphones, and related devices to help in evaluating loan eligibility. Artificial Intelligence is one of the Fintech services that help in optimizing sales and prices as well as prevent fraudulent transactions of digitized content. Artificial intelligence has homeowners build wealth by optimizing debt (Riikkinen et al., 2018). Robotic process automation has tremendously

changed financial sectors in many ways that have advanced savings and improved business processes. With the help of robotic process automation banks have relatively achieved customer satisfaction. Artificial intelligence, biometrics, and cloud services, big reduce the costs of payment transactions by optimizing the cost of accounting services with the use of robots (Melnychenko et al., 2020). Robotics process automation with the help of artificial Intelligence is a live serving system in the banking sector that has tremendously boosted customer satisfaction. Machine learning algorithms are nowadays used to achieve high-level network security for financial sectors. Robotic process automation built on a well-developed machine learning-enabled algorithm provides financial sectors with a technology that gives advanced market insights and allows managers to identify specific market changes.

Robotic process automation built on a well-developed machine learning technology can access customer information, interpret strange behaviors and compare with previous activities (Kumar et al., 2019). The ability to track and identify unnecessary activities and follow up using recognized patterns algorithms has helped maintain security with most financial services and automated processes. Recognizing pattern algorithms can be used to achieve customized support systems that work similarly to a real human but solve threats, queries, and concerns tailored to customer's needs.

## **2. Literature Review**

Robotic Process Automation (RPA). This is a kind of software that is consistent and error-free in operations performed by the robot (Met et al., 2020). Financial technology enhances innovative services that financial sectors use to execute financial transactions and manages fraudulent transactions (Zheng et al., 2022; Bouzidi et al., 2022). Tremendous growth has been seen in the financial sector and digital service industry recently (Zhou et al., 2015). Financial services are probably the most digitized industrial sector (Rasheed et al., 2019). Bank financing has been found as the main source of funds for small and medium enterprises with its significant growth which can be seen in their e-commerce activities.

### **2.1. Focus areas of robotic process automation in Fintech**

This section explains the most advanced areas where robotic process automation and artificial intelligence are applicable in the financial sector. RPA of software robots to automate processes are easy to configure (Gotthardt et al., 2020). Robotic process automation are providing intelligent service recognition that makes it possible to automate a variety of financial processes that transform used traditional methods into executed digital services. Artificial intelligence is enabled system software that helps to verify the information and generates digital banking transactions, records, and documents (Engin, Treleaven, 2019; Mosteanu, Faccia, 2020).

### **2.1.1. Robotic process automation and artificial intelligence for credit decisions**

Artificial Intelligence provides faster robotic process automation that securely processes financial transactions more accurately. RPA firms, focus on artificial intelligence-based issues and not directly on audit automation (Moffitt et al., 2018). Modern robotic process automation help in the assessment of potential borrowers at less cost, and securely accounts for a wider variety of factors than humans (Beerbaum et al., 2022). The coming of modern machine learning algorithms has led to better-informed data-oriented services and data-backed decision automatons (Kunwar, 2019; Sculley, 2014). Fintech has introduced credit scoring with artificial intelligence-based methods using more complex and sophisticated rules compared to those used in traditional credit scoring systems. This system has led to more secure meaningful credit monitoring and evaluation and has reduced credit default.

### **2.1.2. Robotic process automation and artificial intelligence for investment Trading**

Since the development of robotic process automation, financial services like investment, have had a tremendous change (Fernandez, Aman, 2018). Information on investments has increased steadily over the past decades (Michaely et al., 2008). Machine learning algorithms have trained advanced quantitative high-frequency trading systems that automatically recognize the best trading opportunities (Ashta, Herrmann, 2021). Findings have shown that automated trading is more accurate in predicting than humans. Investment in automated trading has expanded rapidly across the globe.

### **2.1.3. Robotic process automation and artificial intelligence for risk management**

Thanks to robotic process automation systems have led to advanced risk mitigation. Robotic process automation in financial sectors has come with automated services that remind systems of the initial time and alert them on closing time. Robotic process automation allows vast amounts of data to be handled on short notice with the help of cognitive computing. Robotic process automated algorithms analyze past risk cases and compare them with newly identified early cases of potential future issues (Beerbaum, 2022). Machine learning algorithms deliver comparable accuracy in risk management to other software systems and applications (Leo et al., 2019). To identify current and future research issues, automated data quality monitoring algorithms need (Thoben et al., 2017).

### **2.1.4. Robotic process automation and artificial intelligence for Fraudulent Prevention**

In the past two decades, artificial intelligence has been very successful in fraud prevention. Auditors will require a good understanding of analytics and artificial intelligence in areas of information protection (Griffiths, Pretorius, 2021). The future of financial technology with advanced robotic process automation is making financial services look very bright (Fernandez, Aman, 2018). Fraud detection systems built on well-developed Robotic process automation help analyze clients' behavior, location, and buyers' habits with aim of triggering a security mechanism.

### **2.1.5. Robotic process automation and artificial intelligence for Personalized Banking services**

Robotic process automation benefits both employees and customers within the financial sector (Met et al., 2020). Since banking services move digital, a lot of comforts have been enhanced at the individual user's level. Artificial Intelligence has empowered digital systems with smart chatbots that provide customers with comprehensive self-help solutions. The banking sector now has years of data related to customers and employees thanks to RPA (Kumar, Balaramachandran, 2018). With a prime objective to reduce call centers' workload, robotic process automation has been able to enact a smooth transformation from traditional banking services into digitalized services.

## **2.2. Analysis of the three (3) robotic process automation indicators of social implications in the Fintech model**

The following are financial implications identified by the study to help customers make better choices.

### **2.2.1. Financial processes operations**

Financial processes operations can be called financial primary processes. Financial operations must be monitored carefully to prevent any breaches of being applied (Tsai et al., 2016, March). Financial processes operations in the banking sector deal with the core business value chain. Also, they deliver value to the customer and stand a chance to boost the production of products and services. Financial process operations represent essential business activities that accomplish business goals, vision, objectives, and mission. The integration of operations and finances must take into account that budgeting models applied for financial control emerged earlier than operational scheduling models (Guillén et al., 2006). Some of the core financial process operations are:

- Customer financial orders.
- Financial processing of products operations.
- Financial accounting management operations.

### **2.2.2. Financial process support**

Financial process support is also known as financial secondary processes of banking. Supporting processes, and finally, its effects mainly at the firm level open the black box of financial innovation (Mention, Torkkeli, 2012). These are financial processes that involve back-office support services in a bank. Financial process support functions in a way that keeps the banking sector running. One key difference between financial process operations and financial process support is that financial process support does not directly provide value services to customers but financial process operations do. The environment which supports financial services sales dialogs (Felfernig et al., 2007). Some of the core services of financial process support are:

- Financial automated management suport.
- Virtual HR management suport.
- Digital security services and safety management suport.

### **2.2.3. Financial process management**

These are the digital process services of determining, measuring, monitoring, evaluating, and controlling the activities that directly relate to financial procedures and network systems. Financial management is essential for increasing wealth and equity (Chandra, 2013). One of the key differences between financial process support and financial process management is that financial process management provides value services directly to the customers while financial process support does not. Process management impacts organizational performance (Hernaus et al., 2012).

Some of the financial process management are:

- Financial services of internal communications management.
- Financial services of governance.
- Financial process strategic planning management.
- Financial services of budgeting management.
- Financial services of infrastructure management.
- Financial services of capacity management.

## **2.3. Fintech social implications of RPA for Financial service transformation**

The following paragraphs provide detailed elements that potential customers sourcing for the best financial sectors can use to find out the best alternative. In this section, two approaches are applied: robotic process automation indicators and financial service transformations.

### **2.3.1. Three (3) robotic process automation indicators of social implications in the Fintech model**

These are self-developed three pre-train deep learning techniques of systematic digital evaluators that the study uses to measure and compare different financial sectors. The system works in an inverse relationship. The higher the value the lesser should be the choice of selection. The lower the value the more attractive the selection choice. A higher value indicates a higher cost and a lower value indicates a lower cost of financial service transformations. The following are three robotic process automation indicators:

- Financial process operations.
- Financial process supports.
- Financial process management.

The table below represents elements of financial sectors that the study uses to match with some elements of financial transformation evaluators. The two systems can help customers predetermine the best financial sector that they can use to select the most appropriate institution.

**Table 1.***Robotic process automation and financial service transformations evaluators*

<b>Robotic process automations indicators</b>	<b>financial service transformations evaluators</b>
Financial process operation	Cost of personnel re-skilling
	Cost of financial operations
	Cost of financial services
	Feeling of richness in consumers
	Error cost
Financial process supports	Cost of personnel re-skilling
	Cost of financial operations
	Cost of financial services
	Feeling of richness in consumers
	Error cost
Financial process management	Cost of personnel re-skilling
	Cost of financial operations
	Cost of financial services
	Feeling of richness in consumers
	Error cost

Source: Author's Own copy.

Table 1 above-mentioned factors are closely linked with financial digital services. The study uses them to indicate their direct relationship with most financial services in the Fintech model.

### **2.3.2. Five (5) financial service transformations evaluators of digital services**

These are elements of financial services that the study uses to help potential customers understand if a financial sector is providing services at an affordable cost or not. The robotic process automation indicators are examined along with financial service transformations across three sectors of the finance sector using scoring criteria. Once a higher value is indicated, the financial service transformation records a high value for all its services. This is because the factors that determine financial service transformation are a chain that interrelates and flow throughout digital services. The following are financial service transformation.

**Table 2.***Five (5) plus and minus financial service transformations evaluators of digital*

<b>Five (5) financial service transformations evaluators of digital services</b>	<b>Five (5) favorable financial service transformations evaluators of digital services</b>	<b>Five (5) unfavorable financial service transformations evaluators of digital service</b>
Cost of personnel re-skilling	Available personnel Re-skilling	Unavailable personnel Re-skilling
Cost of financial operations	Low costs of financial operations	High costs of financial operations
Cost of financial services	Low cost of financial services	High cost of financial services
Feeling of richness in consumers	Advance a feeling of richness in consumers	Low feeling of richness in consumers
Error cost	Low error cost	High error cost

Source: Author's Own copy.

Table 2 above elements are in general conation. They neither represent nor indicate a positive value or a negative value. A positive value represents flexible and easy-to-get financial sectors accessible to customers.

### **2.3.3. Five (5) favorable financial service transformations evaluators of digital services**

The following elements represent the aspects of financial service transformation that represent a bet option for potential customers.

- Available personnel Re-skilling.
- Low costs of financial operations.
- Low cost of financial services.
- Advance a feeling of richness in consumers.
- Low error cost.

The following points above represent aspects of financial technology that provide very cheap service. The higher the value of financial service transformation n evaluators of digital service shows the level of financial sectors.

### **2.3.4. Five (5) unfavorable financial service transformations evaluators of digital services**

The following elements below indicate the financial services transformation evaluators that modern sectors use. The study uses these elements to present higher cost and expensive services, and providers.

- Unavailable personnel Re-skilling
- High costs of financial operations
- High cost of financial services,
- Low feeling of richness in consumers
- High error cost

Unfavorable financial transformations evaluators of digital technology are the aspects of FinTechs that enable very expensive services. The products are very expensive and a common man can't afford them. The study presents these elements not to lower bank stands but to help customers to evaluate their stand and determine their capacity in times of choice.

## **3. Results**

This section provides details on how the results of the study were developed. The study uses a Bank satisfactory score survey to developed the statistics for this study The survey received responses which help the study to determine and validate the results of the study presented in table 3 link to responses (Reference, 43). The study developed a method on how to evaluate different banking systems. The evaluation can be evaluated based on the observation of any user or customer in comparison with other banking sectors. The following paragraphs provide a step-by-step evaluation method.



### 3.1. Bank Satisfaction (BSAT) Score

A BSAT Score is a value or service of a bank that reflects how a customer feels about a specific contact/product/service. The name is derived from the term bank satisfaction (BSAT) Score.

The study makes use of multiple scores for different rates for customers and accumulated them into an average BSAT Score, which tells how happy customers able to make a decision. This score can be used to benefit many other customers in terms of deciding their best-performing banks, retaining customers, and much more (Ying et al., 2016).

### 3.2. How to Calculate a BSAT Score

On a scale of 1–5, how satisfied a customer is with the bank service?

Different methods to ask find out: “On a scale of 1-5, how satisfied are the bank service” This is commonly referred to as the “BSAT Question”. With your BSAT Question, you can then use the BSAT formula below to calculate the mean average of all the scores.

$$\text{BSAT Score} = \frac{\text{Sum of all scores}}{\text{Sum of the Maximum Possible scores}} \times \text{Maximum Score}$$

For example, let’s say that we collected question from a single customers and it gave us the following responses.

**Table 3.**

*Robotic process automation and financial service transformations evaluators*

Robotic process automations indicators	Financial service transformations evaluators	Measurement range					BSAT Question	BSAT Score	Max. score
		1	2	3	4	5			
Financial process operations	Cost of personnel re-skilling	1	2	3	4	5	Cost of personnel re-skilling is?	1	5
	Cost of financial operations	1	2	3	4	5	Cost of financial operations is?	2	5
	Cost of financial services	1	2	3	4	5	Cost of financial services is?	4	5
	Feeling of richness in consumers	1	2	3	4	5	Feeling of richness in consumers is?	2	5
	Error cost	1	2	3	4	5	Error cost is?	1	5
Financial process supports	Cost of personnel re-skilling	1	2	3	4	5	Cost of personnel re-skilling is?	2	5
	Cost of financial operations	1	2	3	4	5	Cost of financial operations is?	4	5
	Cost of financial services	1	2	3	4	5	Cost of financial services is?	1	5
	Feeling of richness in consumers	1	2	3	4	5	Feeling of richness in consumers is?	3	5
	Error cost	1	2	3	4	5	Error cost is?	2	5
Financial process management	Cost of personnel re-skilling	1	2	3	4	5	Cost of personnel re-skilling is?	2	5
	Cost of financial operations	1	2	3	4	5	Cost of financial operations is?	5	5
	Cost of financial services	1	2	3	4	5	Cost of financial services is?	1	5
	Feeling of richness in consumers	1	2	3	4	5	Feeling of richness in consumers is?	2	5
	Error cost	1	2	3	4	5	Error cost is?	1	5

Source: Author’s Own copy.

Table 3 represents elements of Robotic process automation indicators, financial service transformation evaluators, BSAT Questions, BSAT Score, and Maximum score. These elements help the study demonstrate how potential customers can evaluate a bank. The higher the amount the cost of services in the bank and the lower the amount the lower the cost of services in the bank.

**Table 4.**

*Bank satisfaction range*

BSAT range score	1	2	3	4	5
Grade	Low cost	Fairly cost	Moderate cost	Costly	Very costly

Source: Author's Own copy.

Table 4 provide possible items and grading system to measure the level of expensiveness or affordability.

**Table 5.**

*Bank satisfactory score and Maximum score rates*

Bank satisfaction (BSAT) Question	BSAT Score	Maximum score
Cost of personnel re-skilling is?	1	5
Cost of financial operations is?	2	5
Cost of financial services is?	4	5
Feeling of richness in consumers is?	2	5
Error cost is?	1	5
Cost of personnel re-skilling is?	2	5
Cost of financial operations is?	4	5
Cost of financial services is?	1	5
Feeling of richness in consumers is?	3	5
Error cost is?	2	5
Cost of personnel re-skilling is?	2	5
Cost of financial operations is?	5	5
Cost of financial services is?	1	5
Feeling of richness in consumers is?	2	5
Error cost is?	1	5
Total	33	75

Source: Author's Own copy.

In table 5, we would simply divide our total BSAT score of 29 by our total of maximum score of 75 and multiply that by maximum score of 5.

### Solution

$$\text{BSAT score} = 1+2+4+2+1+2+4+1+3+2+2+5+1+2+1$$

$$\text{Total of maximum score} = 5+5+5+5+5+5+5+5+5+5+5+5+5+5+5$$

$$\text{Maximum score} = 5$$

$$\text{BSAT Score} = \frac{\text{Sum of all scores}}{\text{Sum of the Maximum Possible scores}} \times \text{Maximum Score}$$

$$\text{BSAT Score} = \frac{33}{75} \times 5 = 2.2$$

### 3.3. Bank Effort Score (BES)

Bank Effort Score (BES) is a bank service metric that measures the levels of effort of its services and employers put into a certain interaction with customers to achieve customer's satisfaction.

#### 3.3.1. How to Calculate a Bank Effort Score

Bank Effort Score = Sum of all bank satisfaction Scores ÷ Total sum of all bank satisfaction score respondent.

Bank Effort Score = BES

Sum of all bank satisfaction Score = SBSS

Total sum of all bank satisfaction score respondent=TSBSSR

$$\text{Bank effort Score} = \frac{\text{Sum of all bank satisfaction score}}{\text{Total sum of all bank satisfaction scores respondent}}$$

#### Solution

SBSS ::)  $1+2+4+2+1+2+4+1+3+2+2+5+1+2+1 = 33$

SBSSR :::)  $(1+2+4+2+1+2+4+1+3+2+2+5+1+2+1) = 15$

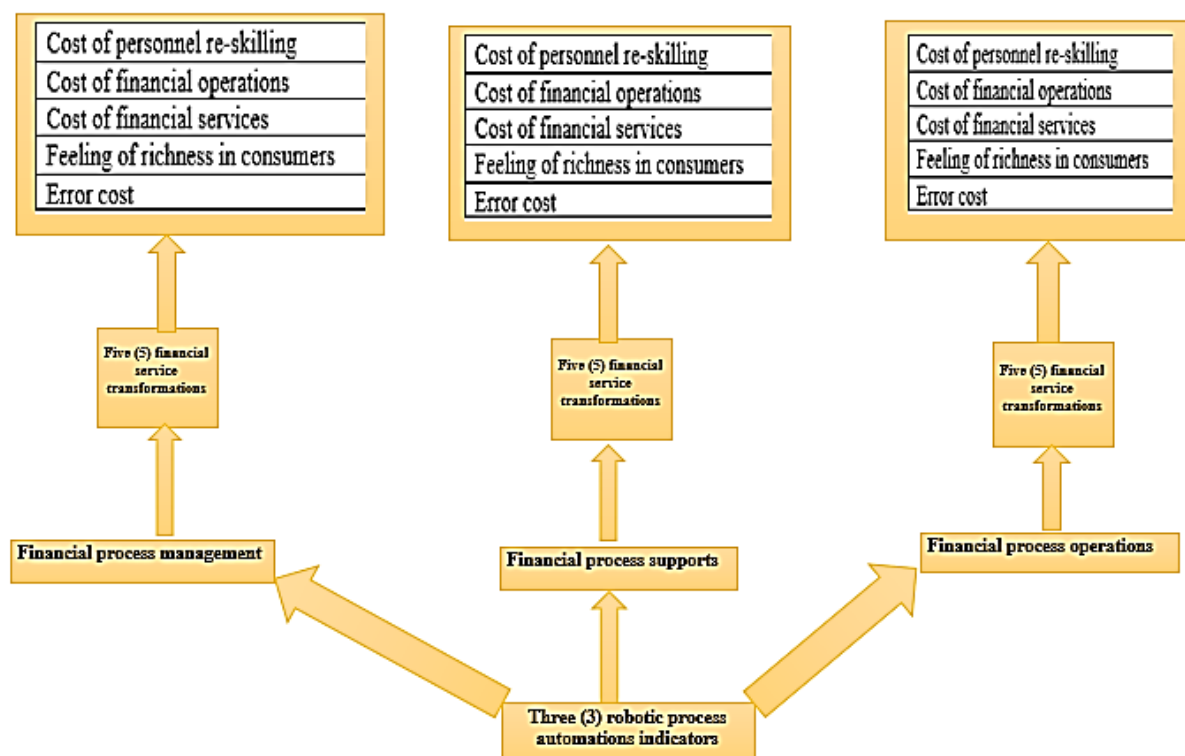
$$\text{Bank effort Score} = \frac{33}{15} = 2.2$$

## 4. Method

In this section the study presented the stages used in the development of the study. First step was to identify the core basic elements that interconnected all aspects of the study. The first step was to identify the three robotic process automations indicators. Secondly, the study selected some financial service transformations evaluators. The financial service transformations evaluators are made up of financial service transformations evaluators, favorable financial service transformations evaluators, unfavorable financial service transformations evaluators, and bank satisfactions range and grade. Thirdly, bank satisfaction score and grades. Lastly, the decision tree.

### 4.1. Three (3) robotic process automations indicators

This section contains financial process management, financial process supports and financial process operations.



**Figure 1.** Robotic process automation indicators.

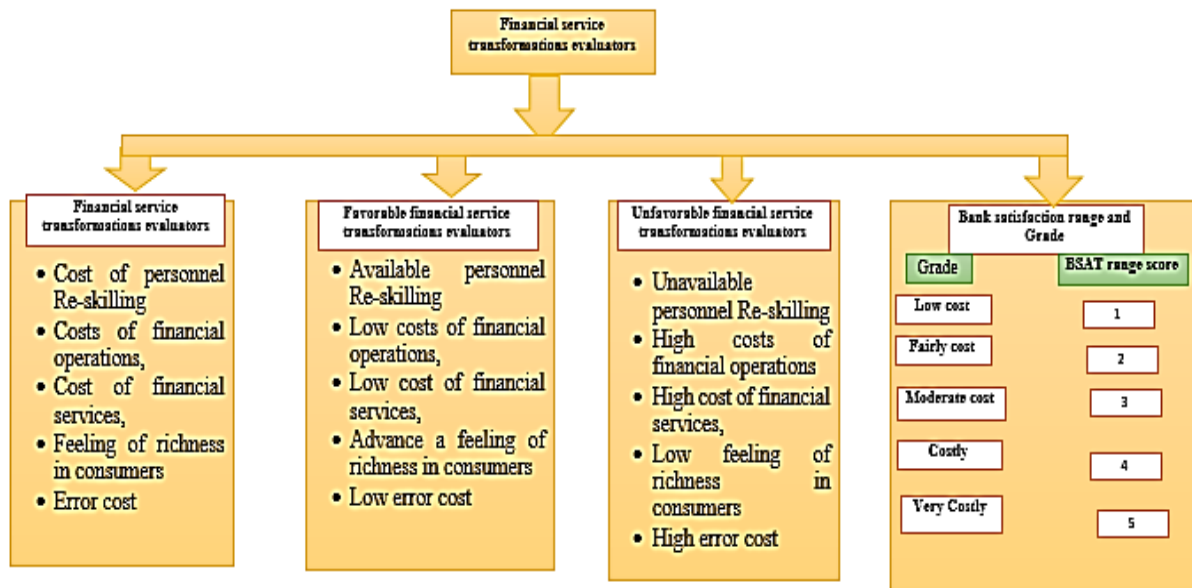
Source: Author's Own copy.

Figure 1 above uses the three robotic process automation of financial process management, the financial process supports, and financial process operations to ensure each element of financial service transformations satisfied the five indicators of bank services for potential customers.

The section uses financial process management to evaluate bank services using the cost of personnel Re-skilling, cost of financial operations, cost of financial services, feeling of richness in customers, and error cost. Also, uses financial process supports to evaluate bank services using the cost of personnel Re-skilling, cost of financial operations, cost of financial services, feeling of richness in customers, and error cost. Lastly, uses financial process operations to evaluate bank services using the cost of personnel Re-skilling, cost of financial operations, cost of financial services, feeling of richness in customers, and error cost.

#### 4.2. Financial service transformations evaluators

This section consists of financial transactions evaluators, favorable financial transactions evaluators, unfavorable financial service transformations evaluators, and bank satisfactions range and grades



**Figure 2.** financial service transformations evaluators.

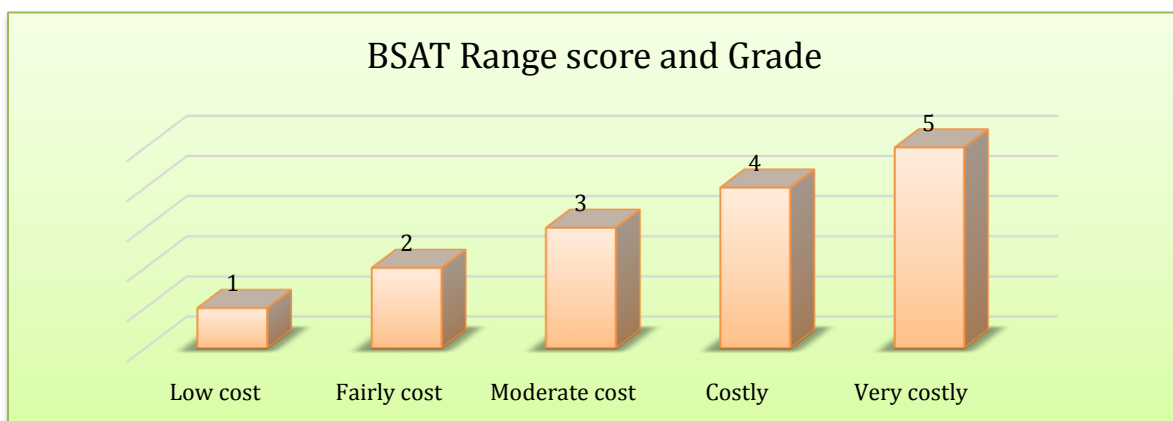
Source: Author’s Own copy.

Figure 2 above uses the cost of personnel Re-skilling, cost of financial operations, cost of financial services, feeling of richness in customers, and error cost to evaluate bank services with regards to the three robotic process automation indicators.

Also, to effectively engage the three robotic process automation indicators and the five financial transactions evaluators. Bank satisfactions range and grades are used. The lower the cost of services the better the bank and the higher the services the more expensive is the bank.

**4.3. Bank satisfactions range score and grades**

The bank satisfaction range score is abbreviated as BSAT. The bank satisfaction range helps banks and customers target the best possible choice and services



**Figure 3.** Bank satisfaction range.

Source: Author’s Own copy.

Figure 3 above provides grades of lower cost, fairely cost, moderate cost, costly, and very costly.

The range grows with fewer engagements. The higher the range score the less necessary the bank services.

#### 4.4. Decision three

Decision three used in the study helped in the implementation of statistical analysis and understanding of the concept developed using deep learning techniques.

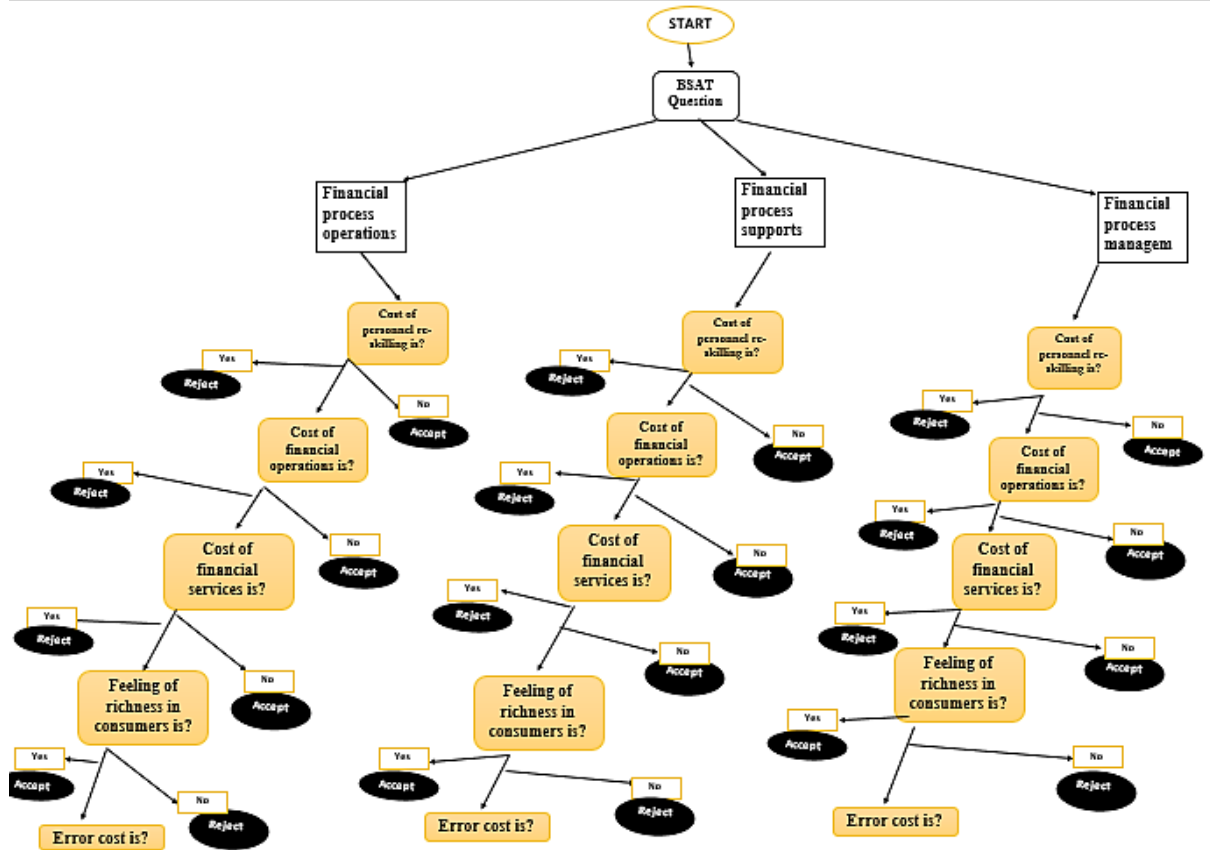


Figure 4. Decision tree.

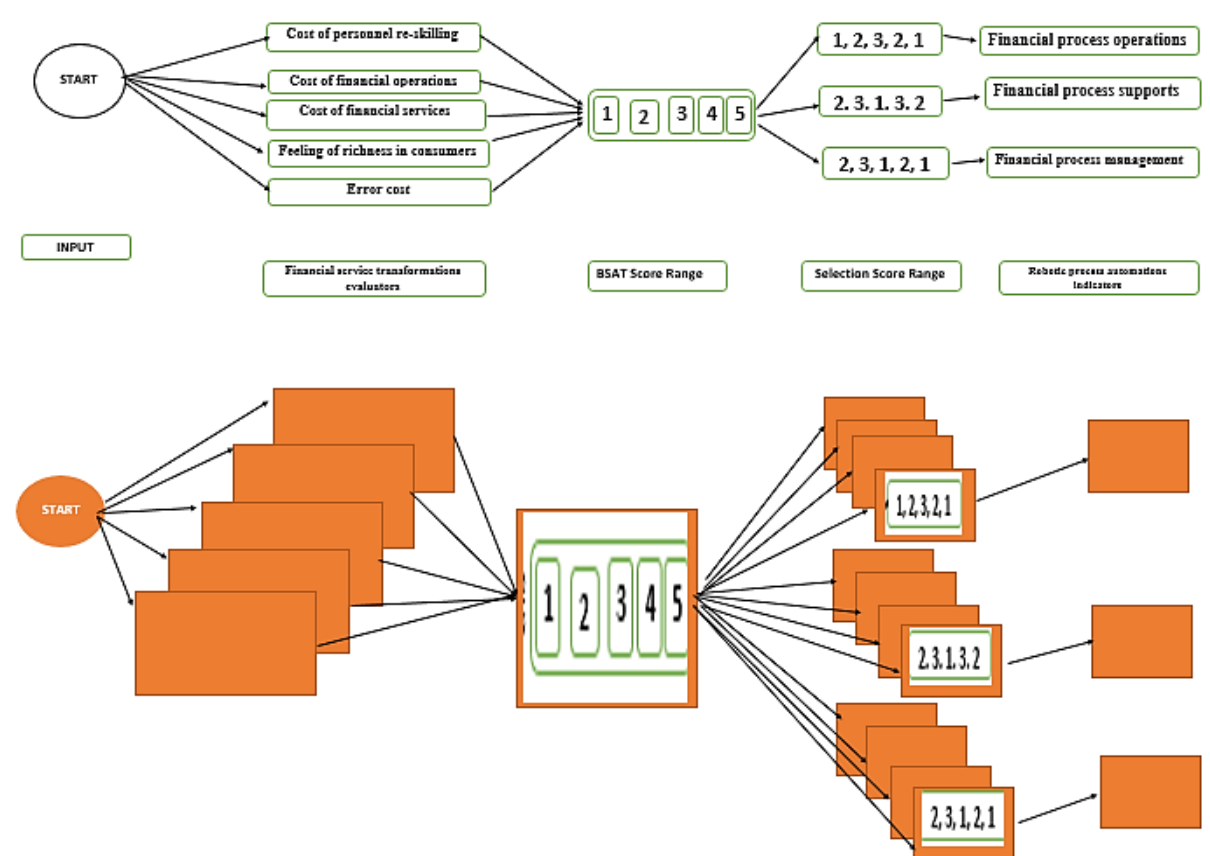
Source: Author’s Own copy.

Figure 4 above is a decision tree that breaks down five elements of financial process operations, the financial process supports, and financial process management. The maximum range score is used here with values between 1 to 5. The values of 1 and 2 are affordable while 3, 4, and 5 grades are unaffordable grade. All five 5 elements reflect cost except one which determines the richness of the customer. The statement "NO" reflects the least cost for some of the 4 grades or elements of the decision tree while the element determines the richness of customers. Also, in the decision tree, "YES" indicates high cost for some 4 elements of the decision tree except one of the elements that determine the richness of customers.

The decision tree uses bank satisfaction questions to determine if the bank services are at an affordable cost or not. All three robotic process automation indicators of financial process operations, the financial process supports, and financial process management uses the same questions that reflect the five financial service transformations.

### 4.5. Deep learning Architect summarization of BSAT Model

The figure below presents the pre-train steps require to compute the result presented in the study. Unlike other figure represented in the study, this part of the study allow an in-depth understanding of various steps needed to construct a computational system that will help in evaluating various financial systems.



**Figure 5.** Architect summarization of BSAT.

Source: Author’s Own copy.

Figure 5 represents five stages of evaluating financial sectors to determine whether winch provides the best and cheapest financial services. The first step is the input data followed by financial service transformation evaluators, followed by BSAT service range, selection score range, and robotic process automation. The output of proposed architect achieves the desired output when it reaches an appropriate selection score range with an in-depth evaluation of the cost of the services of robotic process automation.

## 5. Conclusion

We examine Fintech for social and communications of robotic process automation and how intelligent automation empowered by cognitive computing improves financial services. We examine robotic process automation indicators and financial service transformations evaluators that, can be adequately implemented to assist customers with digital services and can also assist banks in updating technical controls, Based on bank satisfaction score (BSAT) and bank effort score (BES) a score of 2.2 and 2.2 respectively and was recorded which indicates that the said bank is very affordable for customers. The study concluded that Fintech is the best part of cognitive robotic process automation of intelligent systems empowered by cognitive computing technology that assist financial sectors and customers using best practice services.

## 6. Licence Open Access

This data is licensed under a Creative Commons Attribution 3.0 International License, which permits use, sharing, adaptation, distribution and reproduction in any medium or format, as long as you give appropriate credit to the original author(s) and the source, provide a link to the Creative Commons licence, and indicate if changes were made. Link: [GitHub - MahPascal/Survey-responses](#)

## References

1. Arasli, H., Mehtap- Smadi, S., Katircioglu, S.T. (2005). Customer service quality in the Greek Cypriot banking industry. *Managing Service Quality: An International Journal*, 15(1), 41-56.
2. Ashta, A., Herrmann, H. (2021). Artificial intelligence and fintech: An overview of opportunities and risks for banking, investments, and microfinance. *Strategic Change*, 30(3), 211-222.
3. Beerbaum, D.O. (2022). Artificial intelligence ethics taxonomy-robotic process automation (RPA) as business case. *Available at SSRN*.
4. Bose, R. (2009). Advanced analytics: opportunities and challenges. *Industrial Management & Data Systems*.



5. Bouzidi, Z., Amad, M., Boudries, A. (2022). *Deep Learning-Based Automated Learning Environment Using Smart Data to Improve Corporate Marketing, Business Strategies, Fraud Detection in Financial Services, and Financial Time Series Forecasting*. International Conference on Managing Business Through Web Analytics. Cham: Springer, pp. 353-377.
6. Chandra, R. (2013). *Financial management*. BookRix.
7. Engin, Z., Treleaven, P. (2019). Algorithmic government: Automating public services and supporting civil servants in using data science technologies. *The Computer Journal*, 62(3), 448-460.
8. Felfernig, A., Isak, K., Szabo, K., Zachar, P. (2007, July). The VITA financial services sales support environment. *Proceedings of the national conference on artificial intelligence, Vol. 22, No. 2*. Menlo Park, CA; Cambridge, MA; London; AAAI Press; MIT Press, p. 1692.
9. Fernandez, D., Aman, A. (2018). Impacts of robotic process automation on global accounting services. *Asian Journal of Accounting and Governance*, 9(1), 127-140.
10. Gotthardt, M., Koivulaakso, D., Paksoy, O., Saramo, C., Martikainen, M., Lehner, O. (2020). Current state and challenges in the implementation of smart robotic process automation in accounting and auditing. *ACRN Journal of Finance and Risk Perspectives*.
11. Griffiths, L., Pretorius, H.W. (2021, June). *Implementing Robotic Process Automation for Auditing and Fraud Control*. International Conference on Society 5.0. Cham: Springer, pp. 26-36.
12. Guillén, G., Badell, M., Espuna, A., Puigjaner, L. (2006). Simultaneous optimization of process operations and financial decisions to enhance the integrated planning/scheduling of chemical supply chains. *Computers & Chemical Engineering*, 30(3), 421-436.
13. Hernaus, T., Bach, M.P., Vukšić, V.B. (2012). Influence of strategic approach to BPM on financial and non- financial performance. *Baltic Journal of Management*.
14. Kumar, K.N., Balaramachandran, P.R. (2018). Robotic process automation-a study of the impact on customer experience in retail banking industry. *Journal of Internet Banking and Commerce*, 23(3), 1-27.
15. Kumar, V., Rajan, B., Venkatesan, R., Lecinski, J. (2019). Understanding the role of artificial intelligence in personalized engagement marketing. *California Management Review*, 61(4), 135-155.
16. Kunwar, M. (2019). *Artificial intelligence in finance: Understanding how automation and machine learning is transforming the financial industry*.
17. Leo, M., Sharma, S., Maddulety, K. (2019). Machine learning in banking risk management: A literature review. *Risks*, 7(1), 29.
18. Madakam, S., Holmukhe, R.M., Jaiswal, D.K. (2019). The future digital work force: robotic process automation (RPA). *JISTEM-Journal of Information Systems and Technology Management*, 16.

19. Mavlutova, I., Volkova, T. (2019, October). *Digital transformation of financial sector and challenges for competencies development*. 7th International Conference on Modeling, Development and Strategic Management of Economic System (MDSMES 2019). Atlantis Press, pp. 161-166.
20. Melnychenko, S., Volosovych, S., Baraniuk, Y. (2020). Dominant ideas of financial technologies in digital banking. *Baltic journal of Economic studies*, 6(1), 92-99.
21. Mention, A.L., Torkkeli, M. (2012). Drivers, processes and consequences of financial innovation: a research agenda. *International Journal of Entrepreneurship and Innovation Management*, 16(1-2), 5-29.
22. Met, İ., Kabukçu, D., Uzunoğulları, G., Soyalp, Ü., Dakdevir, T. (2020). Transformation of business model in finance sector with artificial intelligence and robotic process automation. In: *Digital business strategies in blockchain ecosystems* (pp. 3-29). Cham: Springer.
23. Michaely, H.J., Attenberger, U.I., Dietrich, O., Schmitt, P., Nael, K., Kramer, H., ..., Walz, M. (2008). Feasibility of gadofosveset-enhanced steady-state magnetic resonance angiography of the peripheral vessels at 3 Tesla with Dixon fat saturation. *Investigative radiology*, 43(9), 635-641.
24. Moffitt, K.C., Rozario, A.M., Vasarhelyi, M.A. (2018). Robotic process automation for auditing. *Journal of emerging technologies in accounting*, 15(1), 1-10.
25. Mosteanu, N.R., Faccia, A. (2020). Digital systems and new challenges of financial management—FinTech, XBRL, blockchain and cryptocurrencies. *Quality-Access to Success Journal*, 21(174), 159-166.
26. Poirier, C.C. (1999). *Advanced supply chain management: How to build a sustained competitive advantage*. Berrett-Koehler Publishers.
27. Pouyanfar, S., Sadiq, S., Yan, Y., Tian, H., Tao, Y., Reyes, M.P., ..., Iyengar, S.S. (2018). A survey on deep learning: Algorithms, techniques, and applications. *ACM Computing Surveys (CSUR)*, 51(5), 1-36.
28. Rasheed, R., Siddiqui, S.H., Mahmood, I., Khan, S.N. (2019). Financial inclusion for SMEs: Role of digital micro-financial services. *Review of Economics and Development Studies*, 5(3), 571-580.
29. Reference 43, GitHub - MahPascal/Survey-responses.
30. Riikkinen, M., Saarijärvi, H., Sarlin, P., Lähteenmäki, I. (2018). Using artificial intelligence to create value in insurance. *International Journal of Bank Marketing*.
31. Sculley, J. (2014). *Moonshot!: Game-Changing Strategies to Build Billion-Dollar Businesses*. RosettaBooks.
32. Thoben, K.D., Wiesner, S., Wuest, T. (2017). “Industrie 4.0” and smart manufacturing - a review of research issues and application examples. *International journal of automation technology*, 11(1), 4-16.

33. Tsai, W.T., Blower, R., Zhu, Y., Yu, L. (2016, March). *A system view of financial blockchains*. IEEE Symposium on Service-Oriented System Engineering (SOSE). IEEE, pp. 450-457.
34. Ulas, D. (2019). Digital transformation process and SMEs. *Procedia Computer Science*, 158, 662-671.
35. Villar, A.S., Khan, N. (2021). Robotic process automation in banking industry: a case study on Deutsche Bank. *Journal of Banking and Financial Technology*, 5(1), 71-86.
36. Ying, Y., Jing, F., Nguyen, B., Chen, J. (2016). As time goes by... maintaining longitudinal satisfaction: a perspective of hedonic adaptation. *Journal of Services Marketing*.
37. Zhao, D., Zhang, W. (2021). FinTech Towards Intelligent Finance. In: *Artificial Financial Intelligence in China* (pp. 1-16). Singapore: Springer.
38. Zheng, K., Zheng, L.J., Gauthier, J., Zhou, L., Xu, Y., Behl, A., Zhang, J.Z. (2022). Blockchain technology for enterprise credit information sharing in supply chain finance. *Journal of Innovation & Knowledge*, 7(4), 100256.
39. Zhou, W., Arner, D.W., Buckley, R.P. (2015). *Regulation of digital financial services in China: Last mover advantage*.