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The Impact of Technological Innovation on Improving the Financial Performance of Iraqi Commercial Banks: An Empirical Study

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Abstract: Due to the increase in the volume of banking activity and the expansion of its spread, the management of banks has paid increasing attention to introducing mechanization in the banking work in order to keep pace with the increasing development in banking services by providing the latest machines and advanced computers. On the basis that the banking sector is the stepping stone for economic activities, the movement of money and investment, and is obligated to keep pace with the rapid and active development of the movement.

The current research aims to evaluate modern technology technologies and their impact on the level of performance of Iraqi banks, as the research sample consisted of 19 banks listed on the Iraq Stock Exchange, and the research concluded that despite the electronic banking services provided by the bank, they remain limited and are not up to par. To the required level, as it was compared to what is witnessed in the global banking arena, as well as the existence of a large discrepancy between the performance levels of private banks resulting from the variation in the expertise and efficiency of the departments of these banks and the level of technological techniques used, which is clearly reflected in their success in performing their banking activities.

The research recommended a set of recommendations, the most important of which is not to be satisfied with a limited number of electronic services, as banks in Iraq must provide more electronic services and innovate new electronic services, benefit from the experiences of international banks and competition, and pay attention to employing the Internet more in banking operations, which will facilitate the communication process. Whether in other banks or with customers.

Key words: financial accountant performance, technological innovation, new technologies

INTRODUCTION: The banking industry has witnessed technological developments in the field of communication and globalization, and an increase in the number of branches, and dealers, which led to an increase in the volume of transactions in the banks, which led to the intensification of competition between these banks. With regard to the quality of the banking services provided as well as the diversification in them, interest in the banking sector was a duty and a necessity. For most of the developed countries on the path of growth. (McGee et al 2015).

The performance of the banking sector faces many constraints (Guthrie and Neumann 2007), the most important of which is the determinant of modern technology. Contributes to adding a strong competitive advantage to banks that adopt their technological methods to settle their business (Dangolani 2011). The birth of banking technology came with the advent of plastic cards and automatic teller machines (ATMS) in the 1960s. Later, in 1983, The rapid growth in banking technology hitting the banking sector caused an uproar in banking (Sundarraj, R. and J.Wu 2015). Moreover, banks built in traditional buildings are starting to hit the threshold of online customers. The two primary devices that disrupt banking technology to gain access to people's hands are smartphones (the web app) and computers (the website). Likewise, disruptions also led to the development of these devices, which ultimately led to a cost-effective and efficient technology to deliver banking services faster (Joseph, Sikhon et al., 2005).

Electronic Banking Services (EBS) is an intuitive way to offer new and traditional banking products and services directly to the customer through electronic communication channels. He is now a customer who conducts a banking transaction electronically without visiting a real institution (Al-Agband 2006). EBS includes systems that enable individual clients to access their accounts, perform transactions quickly, and obtain current and undated information about the latest financial products and services through public or private networks. It accommodates many platforms such as internet banking, telephone and television banking services, automated teller services, mobile banking services, and personal computer-based and offline banking services (Akhisar, Tunay et al. 2015). Many of these technology services have become commonplace in the world. Customers now have the opportunity to enjoy the benefits offered by advanced electronics. Like; Automated teller machines, cell phones, personal digital assistants, personal computers, and banking service experience through advanced information technologies (Laukkanen and Lauronen 2005). EBS has become the path to e-commerce (Alagheband 2006).

This study indicates that there are measurable links between the level of modern banking technology and financial performance. This study aims to analyze the financial data of Iraqi commercial banks for the 2016-2019 fiscal periods. Financial analysis is also used to quantitatively examine the differences in performance between commercial

banks in Iraq based on approved performance indicators. Banks are rated based on their financial metrics and performance for each bank. In addition to determining the level of technological techniques used according to the measurement matrix adopted in the study. The present study examines the different technological techniques from the techniques used in many of the previous studies. The current study is also distinguished by examining the effect of applying modern banking technologies on performance in the Iraqi banking environment. Unlike many previous studies that have adopted the questionnaire to collect data, the current study adopts a quantitative approach based on the actual historical data of the research sample banks.

1. Literature review

Several studies have examined the factors affecting the financial performance of companies.

2-1 Kolodinsky, Hogarth et al. (2004) study tried to explore the factors that affect the adoption or intention to adopt three electronic banking technologies and the changes in these factors over time. Using a dataset commissioned by the Federal Reserve, the paper found that comparative advantage, complexity/simplicity, compatibility, observability, risk tolerance, and product engagement are related to adoption. Income, assets, education, gender, marital status, and age also affect adoption. Adoption changed over time, but the effects of other factors on adoption did not. The implications for both the banking industry and public policy are discussed.

The research literature has seen several studies aimed at understanding customers' attitudes towards banking technologies, thus providing development planning and marketing implications. However, although banking technologies contain many information systems (IS) components, there is a dearth of research considering them from an IS perspective. Sundarraj and Wu (2005) study fill this gap by looking at three combinations: utility, usability, and use, all of which are rooted in the information systems literature. It examines user perceptions of these combinations and their relationships for both online and phone banking.

2-2 Bauer and Hein (2006) study explore the demand for remote access to bank accounts by consumers and finds that when technology is new, traditional risk-return models, including variables that allow for heterogeneous risks, add strength to the adoption decision modelling. The risk perceived in internet banking is seen to be responsible for some reluctance to embrace it. Ironically, older consumers are less likely to adopt online banking services regardless of their risk tolerance. However, younger consumers were found to be early adopters only when they have relatively high-risk tolerance levels.

2-3 Berndt, Saunders et al. (2010) argue that banks in developing countries are increasingly relying on innovative technologies such as mobile banking, landline banking, Internet banking, and automatic teller services (ATM) to penetrate existing markets new ones. The banking industry in South Africa, as a developing economy, is seen as developed, but offering banking facilities to "nonbankers" in South Africa remains a challenge. Consumers are not equally ready to adopt technology-based products, with technological predisposition identified as "the tendency of people to embrace and use new technologies to achieve goals in home and work life." In the examined developing economy, a Technology Readiness Index (TRI) score of 2.53 was calculated for urban consumers. This TRI score is much lower than for an advanced economy like the USA, which has a score of 2.88. Consumers are not ready to adopt the technology that banks must consider when developing products and investing resources to increase customer satisfaction (Berndt, Saunders et al. 2010).

2-4 Harris, Cox et al. (2016) survey to assess the relevance of mobile, Internet, and Hardware banking services across multiple age groups. Factor analysis and analysis of variance were used to assess responses. The results show that older consumers see more value in traditional Hardware banking. All ages are equally interested in emerging technologies (online), and younger users are more interested in the latest technology.

2-5 OLANREWAJU (2016) study tested the effect of information technology on the regulatory performance of Nigerian banks. The introduction of Information and Communication Technology (ICT) has affected employee performance and customer feedback. OLANREWAJU with customer and employee responses to technological innovation and their effects on Nigerian banks' performance. Fifteen (20) significant banks were selected for the research. Two blank hypotheses have been developed based on a questionnaire distributed to assess whether there is a significant relationship between technological innovation and customer satisfaction; Nigerian bank employees' technological innovation and performance have been demonstrated. Four hundred and fifty (450) questionnaires were distributed to clients to test the first hypothesis, 400 of which were collected with 88.88% of the distributed questionnaires, and chi-square was used to test the hypothesis. The results of OLANREWAJU revealed that technological innovation affected bank employees' performance, customer satisfaction, and improved banks' profitability. The study recommends the effective management of technological innovation to improve employee performance, customer satisfaction, sustainable profit, increase return on investment, returns on equity, and enhance competitiveness in the Nigerian banking industry.

2-6 Siddik, Sun et al. (2016) study aim to test the effect of EBS on banks' performance level. Using panel data from 13 banks from 2003 to 2013, this study empirically investigated the impact of EBS on Bangladeshi banks' performance measured in return on equity, return on assets, and net interest margin. The combined bottom-line expected square analysis results show that EBS positively contributes to the banks' ROE with a two-year interval. At the same time, an adverse effect is found in the first year of adoption. This study's empirical results are of greater interest to developing countries such as Bangladesh. It will attract bank management and policymakers' attention to pursue such policies for expanding EBS.

2-7 Salleh, Yusoff et al. (2017) study investigated the effects of technology-based strategy on an Islamic bank's performance. The questionnaires were distributed using an appropriate sampling method and the Statistical Package for Social Scientists (SPSS) to analyze the data already collected. The result indicated that the relationship between the technology-based strategy on the Islamic bank's performance is positively correlated.

2-8 Giovanis, Assimakopoulos et al. (2019) study determine the factors that affect the adoption of consumer banking technologies for self-service mobile phones and the degree of influence of all factors that lead to their use. Using mobile banking (MB) as a reference service and building on previous field studies, the Extended Technology Acceptance and Usage Theory (UTAUT) model was proposed and experimentally validated to investigate technical, social, channel, and personality influence potential customer use intentions. Results show that technical factors that express anticipated innovation success and social impact are the key determinants of the decision to adopt methyl bromide, accompanied by channel-related factors that express risk and perceived trust in methyl bromide use and the imagination of potential consumers. Moreover, the consideration of service experience as a moderating variable showed a significant difference in social impact impacts and perceived confidence in adoption intent among potential users with high and limited experience with the service.

2-9 Malik and Mudrifah (2020) study analyzed the impact of the High Participatory Work System (HIWS) and technology adaptation on the Indonesian banking sector's performance. Also, determine whether the perceived leadership behaviour has succeeded in modifying the impact of HIWS and technological adaptation on the performance of the banking sector in Indonesia. Data of 96 respondents were performed via a questionnaire measured with 1 (not wholly agree) to 5 (completely agree) on a Likert score and analyzed with the associative method using the PLS software. The result indicates that the implementation of HIWS in the banking sector has a positive but not a significant impact on performance. Simultaneously, test results indicate that technology adoption has a significant impact on the banking sector's positive performance. As for the moderation variables in the form of perceived leadership behaviour, the effect of HIWS on the performance weakens; otherwise, it enhances the impact of technology adoption on the Indonesian banking sector's performance.

2-10 Alsaad and Almaamari (2020) study examined the drivers of bank performance. Specifically, the paper focuses on the extent to which service quality, innovation, technology, employee engagement, competitiveness, and EBS affect the bank's performance. This paper will be a focused literature study of the bank's performance factors. Quality of service, innovation, technology, employee engagement, competitiveness, and EBS have significantly impacted its performance.

Considering previous studies' review and the most superior results they have reached, the previous studies are consistent and even integrated into many aspects with the current study. However, the current study is characterized as benign, one of the few studies on the researcher's knowledge that studies the effect of applying modern banking technology techniques on banks' financial performance. The present study also tests different technological techniques from the techniques used in many of the previous studies. The current study is also characterized by testing the effect of applying modern banking technologies on performance in the Iraqi banking environment. Moreover, unlike many previous studies that have adopted the questionnaire to collect data, the current study adopts a quantitative approach based on the research sample banks' actual historical data. Based on the above, the research is based on the following hypotheses:

There is a statistically significant relationship between modern banking technologies and the bank's financial performance level. Hence, the following sub-hypotheses are formulated :

- The first sub-hypothesis: There is a statistically significant relationship between modern technology and the level of banking financial performance.
- The second sub-hypothesis: There is a statistically significant relationship between the Hardware components' use and financial banking performance.
- The third sub-hypothesis: There is a statistically significant relationship between individuals' skills and the level of financial banking performance.
- The fourth sub-hypothesis: There is a statistically significant relationship between communication networks and financial banking performance.

- The fifth sub-hypothesis: There is a statistically significant relationship between the use of the database and the level of financial banking performance.

Sixth sub-hypothesis: There is a significant relationship between the Use of Software and financial banking performance.

2. The methodology

For evaluating financial performance, the following financial indicators will be used:

A. Liquidity indicators: These are indicators by which we measure the facility's ability to fulfill its obligations in the short term. With this ratio, we measure the facility's ability to meet its short-term liabilities(Ahmed, &Naser., El Talla, Al Shobaki, , (2018:66)

- Cash to total deposits.

- Cash and investments to total deposits.

B. Profitability indicators: which measures the number of profits achieved by banks, and the indicators are (Erina and Lace 2013:27)

- Return to total assets.

- Return to capital.

C. Capital adequacy indicators

- These indicators measure banks' capital adequacy and ability to meet all obligations without exposure to any risk. The indicators are (Fatima 2014:771)

- Equity to total assets.

- Equity to total deposits.

D. Operating indicators

- Which measures the ability of banks to manage their money and not to keep their financial resources idle. The indicators are (Kwak, Chung et al. 2006:651)

- Cash credit to total deposits.

- Investments to total deposits.

As for the section on measuring modern technologies, a measurement matrix contains a list that checks the technological level of the research sample banks, which covers the research objectives. The arithmetic means will be compared to the paragraphs' sample answers. Furthermore, calculating the intensity of the answer on the scale for modern technological technologies. The measurement matrix includes (39) items divided into six axes: (the use of information technology, the use of Hardware components, the level of individuals, the use of communication networks, the use of the database, the Use of Software) as shown in **appendix 1** in the appendices. Moreover, based on the research objectives and the established hypotheses, and before testing the hypotheses, the following multiple regression model was constructed:

$$FP = \alpha_0 + \beta_1 A + \beta_2 B + \beta_3 C + \beta_4 D + \beta_5 E + \beta_6 F + \epsilon$$

- FP = Financial performance.

- α_0 = constant.

- A = Use of modern technology.

- B = Use of Hardware components.

- C = personnel level.

- D = use of networks.

- E = Database usage.

- F = software usage.

- β_1 to β_6 = the regression coefficients for the independent variables A to F, respectively.

- ϵ = Standard approximation error.

4- Research sample

The research community is the banks' annual reports listed in the Iraq Stock Exchange and the stock and secondary market. To measure the financial performance level by analyzing the financial reports from 2016 to 2019 for the research sample companies, the research community included all banks in the stock market (19) banks as shown in **appendix 2**. Moreover, the researcher aimed to analyze all banks' financial reports in the research community. The number of banks in the research sample reached (19) banks representing (100%) of the total community.

Also, (380) matrix of measurement distributed selectively to bank employees. (20) measurement matrices were distributed to each bank by sending them through the primary e-mail first and then sending them through the employees' e-mail obtained from the HR departments in banks. The matrix was sent to (Chairman of the Board, Deputy Commissioner, Department of Information and Communication Technologies, Information Security Department, Banking Services Department, Research and Development Department, Information Technology

Department, Human Resources Department, Operations Department, Risk Management Department). The number of distributed forms reached (380) forms, the number of forms received and included in the analysis was (339) forms, and the number of non-received forms reached (41) forms. Google Form has been used to design, distribute, and retrieve the form. The sample content of (7%) of Chairman of the Board, and (8%) of them work as Managing Director, as the sample of professionals was targeted because the subject of research relates to professionals who work in the banking sector more than others to ensure a more useful and accurate measurement.

5- Reporting the results

5.1 Financial performance of Iraqi banks

The results of 2016 indicate that cash to total deposits ranged between 0.56 as an upper limit at Bank of Baghdad and 0.08 as a minimum in Middle East Bank, with an annual average of 0.299 and a standard deviation of 0.11. The index of cash and investments to total deposits ranged between 0.96 in the Bank of Baghdad and 0.19 at a minimum in Middle East Bank, with a mean of 0.52 and a standard deviation of 0.207. The results also indicate that the return to total assets index is between 0.25 as an upper limit in Al-Mansour Investment Bank and 0.01 minimum in North and Middle East Bank, with an average of 0.041 and a standard deviation of 0.056 (More details shown in **appendix 2**). The return to capital index ranged between a maximum of 0.80 in the Bank of Mosul and a minimum of 0.11 in the National Islamic Bank, with a mean of 0.41 and a standard deviation of 0.20. The equity index to total assets ranged between a high of 0.92 in the Commercial Bank of Iraq and a minimum of 0.03 in the National Bank of Iraq, with a mean of 0.24 and a standard deviation of 0.25. The index of property rights to total deposits ranges between 0.63 as a maximum in Al Khaleej Commercial Bank and 0.03 as a minimum in Al Ahli Bank of Iraq, with an average of 0.20 and a standard deviation 0.16. The index of a cash credit to total deposits ranges between 0.81 as a maximum in North Bank and 30.0 as a minimum in Al-Ahli Bank of Iraq, with an average of 0.49 and a standard deviation of 0.20. The index of investments to total deposits ranged between a maximum of 0.52 in the Bank of Baghdad and a minimum of 0.09 in Sumer Commercial Bank, with an average of 0.22 and a standard deviation of 0.13.

Second, as for the year 2017, the results indicate that the cash index to total deposits, in general, witnessed a noticeable change during 2017 compared to 2016, as its level increased. It ranged between a maximum of 0.72 in the National Bank of Iraq and a minimum of 0.14 in the Middle East Bank, with an average of 0.33, while it was 0.299 and a standard deviation of 0.147. The index of cash and investments to total deposits also increased from what it was in 2016. It ranged between 1.08 as a maximum in the Iraqi Commercial Bank and 0.22 as a minimum in the Middle East Bank, with an average of 0.613 and a standard deviation of 0.25. The return to total assets index also rose from its level in 2016. It ranged between 0.31 as an upper limit in the Iraqi Commercial Bank and 0.0007- a lower limit in Elaf Islamic Bank, with an average of 30.0 and a standard deviation of 70.0. The return to capital index ranged between 20.7 as a maximum in the Iraqi Investment Bank and -0.05 as a minimum in Dar Al Salam Bank, with an average of 0.27 and a standard deviation of 0.24 (More details are shown in **appendix 2**). The return to capital index decreased in 2016 at the upper and lower limits and the average. The equity index to total assets ranged between 0.19 as an upper limit in the Commercial Bank of Iraq. It was much higher than this limit is 2016, while it reached a minimum of 0.02 in the National Bank of Iraq, with an average of 0.097 and a standard deviation of 0.053. The results indicate that property rights indicate total deposits between a maximum of 0.29 in the Commercial Bank of Iraq, which is much lower than it was in 2016, while it reached a minimum of 0.03 in the National Bank of Iraq, with an average of 0.14 and a standard deviation of 0.074. On the other hand, the cash credit index to total deposits ranged between a maximum of 0.77 in the Kurdistan Bank, which increased than it was in 2016, while it reached a minimum of 0.02 in the National Bank of Iraq, with an average of 0.40 and a standard deviation of 0.18. The index of investments to total deposits ranged between an upper limit of 0.52 in the Iraqi Commercial Bank, which was lower than it was in 2016, while it reached a minimum of 0.11 in Bank of Babel, with an average of 0.27 and a standard deviation of 0.13.

Third, The results of 2018 indicate that the cash index to total deposits ranged between a maximum of 0.72 in the Bank of Baghdad, which is higher than the level it was in 2017, while it reached a minimum of 0.14 in the Middle East Bank, with an average of 0.4 and a standard deviation of 0.16. The index of cash and investments to total deposits ranged between an upper limit of 1.05 across Iraq, which is higher than it was in 2018. It reached a minimum of 0.21 in the Middle East Bank, with an average of 0.71 a standard deviation of 0.22. The return to total assets index is between 0.41 as an upper limit in the Kurdistan Bank. This level generally decreased over the three years, and a minimum of 0.04 in Gulf Commercial Bank, with an annual average of 0.04 and a standard deviation of 0.09. The return to capital index ranged between a maximum of 0.9 in Babil Bank, which is higher than in 2016 and 2017, and a minimum of 0.08 in Gulf Commercial Bank, with an annual average of 0.39 and a standard deviation of 0.28. The results indicate that the equity index to total assets ranged between 0.47 upper bound in Khaleeji Commercial Bank, which is higher than its counterpart in 2017, and 0.03 minimum in United Investment Bank, with an average of 0.19 and a standard deviation of 0.13. The equity index to total deposits ranged between 1.09 as an upper limit in Babylon

Bank, significantly higher than in 2017 and 2016. A minimum of 0.03 in United Investment Bank, with an average of 0.31 and a standard deviation of 0.277. The cash credit index ranged between 1.15 as an upper limit in the Basra National Bank, which is higher than it was in 2017, and 0.01 minimum in Assyria International, with an average of 0.53 and a standard deviation of 0.289. The index of investments to total deposits ranged between a maximum of 0.73 in a bank across Iraq, which is higher than in 2017, and a minimum of 0.1 in Gulf Commercial Bank, with an average of 0.318 and a standard deviation of 0.17 (More details are shown in **appendix 2**).

Finally, the results for the year 2019 indicate that the cash index to total deposits ranged between 0.64 upper limits in Ashur International Bank, which is lower than the level it was in 2018, while it reached a minimum of 0.1 in North Bank, with an average of 0.35 and a standard deviation of 0.137. The index of cash and investments to total deposits ranged between an upper limit of 0.86 in the National Bank of Iraq, which is lower than it was in 2018 and less than in 2017, while it reached a minimum of 0.19 in North Bank, with an average of 0.56 and a standard deviation of 0.239. The return to total assets index ranged between 0.42 as an upper limit in a bank across Iraq. This level is higher than in 2017 and 2018, and 0.01 minimum in Elaf Islamic Bank, with an annual average of 0.145 and a standard deviation of 0.124. The return to capital index ranged between 0.91 as an upper limit in the Iraqi Commercial Bank, which is higher than in 2017 and 2018. A minimum of 0.14 in Babylon Bank, with an annual average of 0.45 and a standard deviation of 0.21. The equity index to total assets ranged between a maximum of 0.9 in Bank of Baghdad, which is higher than its counterpart in 2018, and a minimum of 70.0 in Sumer Commercial Bank, with an average of 0.29 and a standard deviation of 0.2. The equity index to total deposits ranged between a maximum of 0.48 in the Iraqi Investment Bank, which is significantly lower than in 2018, and a minimum of 0.05 in the National Bank of Iraq, with an average of 0.239 and a standard deviation of 0.12. The cash credit index ranged between a high of 0.96 in Al-Mansour Bank, which is lower than it was in 2018, and a minimum of 0.04 in the National Bank of Iraq, with an average of 0.47 and a standard deviation of 0.25. Finally, the investment index to total deposits ranged between an upper limit of 0.52 in Mosul Bank, which is lower than it was in 2018, and a minimum of 0.12 in United Investment Bank, with an average of 0.29 and a standard deviation of 0.12 (More details are shown in **appendix 2**).

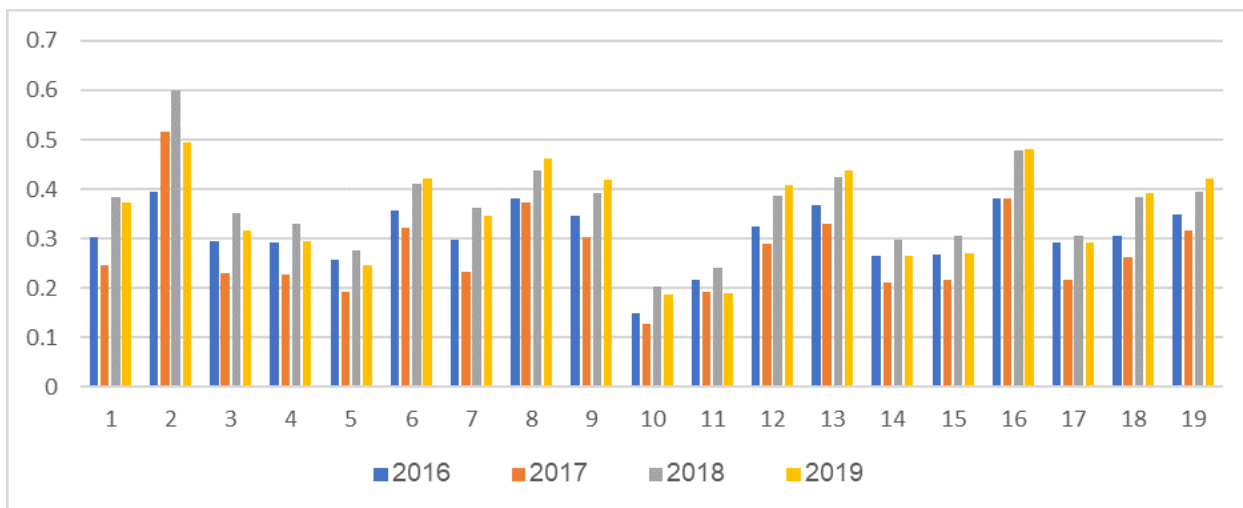


Fig. 1. Annual comparison of Iraqi banks financial indicators

In general, it is noticed that banks varied in the degree of their liquidity and investments. These are the Middle East, North Bank, and Sumer Commercial Bank. It is also noted that there are banks that achieved high profitability, namely: the Iraqi Commercial Bank, the Kurdistan Bank, and the Bank of Baghdad, while there are banks that achieved low profitability, namely the National Bank of Iraq, the Islamic Bank of Iraq and the Islamic Bank of Elaf, while there were four banks whose profitability was weak, namely: Babel Bank and Bank Assyria International and Bank across Iraq. And the Middle East Bank.

It is also noted that there are banks that enjoyed a high degree of safety, namely the Iraqi Commercial Bank, the International Development Bank, the Mosul Bank, and the Sumer Commercial Bank. Simultaneously, some banks enjoyed a low degree of safety, namely the National Bank of Iraq, the United Bank for Investment, and the Islamic Home Bank. At the same time, some banks had a degree of safety. They have weak, namely Ashur International Bank, Iraqi Investment Bank, and Al-Mansour Investment Bank. In addition to that, some banks invested their money in investments to a large extent. Their operating rate was at the expense of employment in credit, namely: the Iraqi Commercial Bank, Ashur International Bank, Mosul Bank, Baghdad Bank, and Kurdistan Bank, while there are banks

that invested part of their money in investments, namely: Bank across Iraq And the United Investment Bank, while there were three banks that invested a small part of their money in investments: the National Bank of Iraq, the North Bank and the Middle East Bank.

5.2 Modern technological techniques in the Iraqi banks

Table 1. The answers to the sample members can be summarized as follows:

Section		Excellent availability	Sufficiently available	Partially available	Limited availability	Not available
The use of modern technology	Total	133	405	641	525	1008
	Answer ratio	5%	15%	24%	19%	37%
Use of Hardware components	Total	440	447	277	375	156
	Answer ratio	26%	26%	16%	22%	9%
Individuals skills	Total	459	416	429	529	201
	Answer ratio	23%	20%	21%	26%	10%
Use of networks	Total	352	465	575	341	301
	Answer ratio	17%	23%	28%	17%	15%
Database in Use	Total	484	480	406	304	21
	Answer ratio	29%	28%	24%	18%	1%
Software in Use	Total	306	387	581	1049	728
	Answer ratio	10%	13%	19%	34%	24%

It is evident from the directly above table that 37% of the sample members find that the use of modern technology, in general, is not available at all, and it is the highest percentage among the sample respondents. While only 5% believe that the use of modern technology in banks, the research sample is excellent. AFRA's sample responses tended to measure the use of modern technology in general towards partial availability, limited availability, or no availability at all, at a rate of 80%. It is worth noting that 78% of the sample members acknowledged the lack of online banking service for customers, and 96% admitted that there is no direct money transfer service for the customer via Western Union, and 71% of the answers indicate that there are insufficient ATMs to serve customers. And the provision of withdrawal and deposit services.

For the second section of the measurement matrix, it is evident from the above table that 26% of the sample individuals find that the use of Hardware components in the research sample banks is sufficiently available, which is the highest percentage among the respondents' answers. While only 9% believe that the use of Hardware components in banks, the research sample is not available. The sample members' responses tended to measure the use of Hardware components in general towards availability, excellent and adequate, at a rate of 52%. On the other hand, 48% acknowledged the partial or limited availability or complete lack of hardware availability. It is worth noting that 47% of the sample members acknowledged the availability of computer work mainly in the bank's business, and 34% admitted the partial availability of Hardware components commensurate with the nature of the banks' work and that 20% admitted that there were no continuous updates in the Hardware components used.

For the third section, it is evident from the above table that 26% of the sample members find that the level of individuals specialized in modern technologies and qualified to deal with them is available in a limited way in the banks of the research sample, which is the highest percentage among the responses of the sample members. While only 23% believe that the level of individuals specializing in modern technologies and qualified in banks, the research sample is excellent. The sample respondents tended to measure the level of individuals in general towards availability, excellent and sufficient, at a rate of 43%. On the other hand, 57% acknowledged the partial or limited availability or complete lack of availability for the levels of qualified individuals. It is worth noting that 42% of the sample members acknowledged the partial availability of the integrated training plan for specialized courses in banking technologies to develop their programming capabilities, and 39% acknowledged the partial availability of technical competencies specialized in information technology.

For the fourth section, it is obvious that 28% of the individuals find that the banking environment level is partially available in the research sample banks, which is the highest percentage among the respondents' answers. While only 23% believe that the level of use of communication networks in banks, the research sample is sufficient. The sample respondents tended, in general, towards availability, excellent, adequate, at 40%. On the other hand, 60%

acknowledged partial or limited availability or complete lack of availability for acceptable use of communication networks. It is worth noting that 49% of the sample members acknowledged the sufficient availability of an internal work network. This network connects devices through the Internet for electronic data exchange, and 35% acknowledged the partial availability of centralized control over data and information used for customer service. For the fifth section, it is obvious that 29% of the individuals find that using the database in the banking environment is sufficiently available in the banks of the research sample, which is the highest percentage among the respondents' answers. While only 28% believe that the banks' level of database usage, the research sample is sufficient. The respondents of the sample tended towards availability, excellent and sufficient, at 57%. On the other hand, 43% admitted to partial or limited availability or lack of availability for reasonable use of the database. It is worth noting that 41% of the sample members acknowledged the excellent availability of a system that controls attempts to access databases and verifies the person (user)'s ability to obtain information, and 40% of the sample admitted the sufficient availability of databases that improve the relationship between the user and the system.

For the sixth section, it is apparent that 34% of the individuals find that the level of software used in the banking environment is available in a limited way in the banks of the research sample, which is the highest percentage among the respondents of the sample on the sixth section. While only 24% believe that the level of software used in banks, the research sample is not available. The sample respondents tended towards availability, excellent and sufficient, at a rate of 23%. On the other hand, 77% admitted to partial or limited availability or lack of availability for fair use of advanced software aimed at customer service. It is worth noting that 71% of the sample members acknowledged the absolute lack of electronic applications that facilitate the follow-up of customers' transactions to transfer and receive money. Furthermore, 52% of employees' responses in banks acknowledged the absolute lack of an electronic signature in transactions.

It is also obvious from the measurement matrix results that the sample members' response rates to the extent of using modern technology ranged between 8% for Babel Bank and 45% for Iraqi Commercial Bank. Simultaneously, Hardware components ranged between 22% for the Middle East Bank and 88% for the Iraqi Commercial Bank. The Iraqi Commercial Bank, Baghdad International Bank, and the International Development Bank have achieved the highest availability of modern technological technologies. On the contrary, the Babylon Bank, the Middle East Bank, and the Elaf Islamic Bank have all achieved the lowest modern technology availability rates. Response rates for the availability of an adequate level of working individuals ranged between 17% and 70%, 14% to 70% for the communication networks section, 29% to 88% for the database use section, and 11% to 41% software use section. Consequently, the highest availability was for the Hardware components and the database usage section, while the lowest availability was for software use and modern technology.

5.3 Examination of hypotheses

To test the primary hypothesis that "there is a statistically significant relationship between modern banking technologies and the level of banking performance," the above multiple regression model of this paper was used as inputs for the SPSS. The following table shows the test result:

Table 2. Model Summary

Model	R	R Square	Adjusted R Square	Std. The error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1 ^a	.978	.956	.934	.02100	.956	43.240	6	12	.000

a. Predictors: (Constant), IT

It is evident from the above table that the value of the correlation R between modern banking technologies and the level of financial banks performance has reached 0.978, a ratio indicating a clear positive correlation between the two variables. The following ANOVA test shows the statistical significance of the relationship between the variables.

Table 3. ANOVA test

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.114	6	.019	43.240	.000 ^b
	Residual	.005	12	.000		
	Total	.120	18			

a. Dependent Variable: FP

b. Predictors: (Constant), IT

The ANOVA test results above indicated that the calculated F value reached (43.240), which is less than the tabular value, which means that the main hypothesis is accepted at a level of significance of 1%. As for the sub-hypothesis test, the following table illustrates the sub-hypothesis states:

Table 4. ANOVA sub-hypothesis tests

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.093	1	.093	60.572	.000 ^b
	Residual	.026	17	.002		
	Total	.120	18			

a. Dependent Variable: FP

b. Predictors: (Constant), The Use of modern technology

2	Regression	.106	1	.106	131.374	.000 ^b
	Residual	.014	17	.001		
	Total	.120	18			

a. Dependent Variable: FP

b. Predictors: (Constant), Use of Hardware components

3	Regression	.107	1	.107	13.879	.000 ^b
	Residual	.013	17	.001		
	Total	.120	18			

a. Dependent Variable: FP

b. Predictors: (Constant), Individuals kills

4	Regression	.112	1	.112	235.816	.000 ^b
	Residual	.008	17	.000		
	Total	.120	18			

a. Dependent Variable: FP

b. Predictors: (Constant), use of networks

5	Regression	.111	1	.111	16.771	.000 ^b
	Residual	.009	17	.001		
	Total	.120	18			

a. Dependent Variable: FP

b. Predictors: (Constant), Database in Use

6	Regression	.099	1	.099	80.510	.000 ^b
	Residual	.021	17	.001		
	Total	.120	18			

a. Dependent Variable: FP

b. Predictors: (Constant), Software In Use

The first sub-hypothesis' ANOVA test results show that the calculated F value is (60,572), which is higher than the tabular value; therefore, accepting the first sub-hypothesis within 1% of significance. Also, acceptance of the second sub-hypothesis at a level of significance of 1%. The fourth sub-hypothesis and the sixth sub-hypothesis are also accepted at the 1% level of significance.

The third sub-hypothesis' ANOVA test results show that the calculated F value is (13.879), which is less than the tabular value; hence, the third sub-hypothesis is rejected within 1% of significance. Also, the fifth sub-hypothesis is rejected at the 1% level of significance.

In general, hypothesis testing results show that the use of modern technology, Hardware components, communication networks, and software that would raise customer service level is directly related to the banking financial performance. In contrast, the level of individuals and the database's use is not statistically significant to performance level.

6- Conclusion and Recommendation

6-1 Conclusion

Given the global trend towards knowledge economies, banks are shifting towards new performance appraisal methods. The most important of which is the use of information and communication technology to enhance performance, focused primarily on modern technologies in using knowledge to lift the performance level and the trend towards globalization and acceleration of technology. Information technology has expanded and diversified the range of services provided by banks. It has also made it possible to provide banking services through new distribution outlets such as the ATM, its website, and mobile phone applications. Information technology has also contributed to the distribution of the target market size for banks and the consideration that banking services have become more available to customers. Competition has a significant role in banking performance. It works to develop and improve banking work and performance, and it seeks banks to keep pace with the rapid developments in the global banking sector.

However, the bank's electronic services remain limited and do not rise to the required level than what is witnessed in the global banking field. Banks in the research sample suffer from low use of the Internet and communications to develop banking services. Exceptionally few Iraqi banks provide electronic services or provide phone applications that help simplify internal financial transactions. The Iraqi banks' banking equipment and software are also suitable for regular banking practice and are not ideally developed or well developed.

Moreover, The banking financial performance concept is fundamental to clarify the bank's strengths and weaknesses and define its march and its continuation in light of various environmental factors and intense competition. Modern standards for evaluating banking financial performance focus on return and risk and achieve a trade-off between return and risk. Financial performance's effectiveness increases with the policy's efficiency and effectiveness in managing its funds and using modern technological techniques. Therefore, a large discrepancy between private banks' performance levels resulting from the variation in these banks' expertise and efficiency and the level of technologies used is reflected in their success in performing their banking activities.

6-2 Recommendations

Paying attention to the Internet more in banking operations will facilitate communication, whether with other banks or with customers. It is also Paying more attention to training employees on modern banking technologies. Banks should also gain customer loyalty by providing EBS that does not contribute to shortening time and reducing costs, such as mobile phone applications. Moreover, increasing marketing and introducing electronic banking products to banks that use the applications and the Online Banking service. Furthermore, providing the necessary protection and security devices to prevent the bank from fraud or hacking is consistent with modern technologies and maintaining the solidity and durability of the banking system's infrastructure by increasing investment spending.

Banks' management should support modern information technology investment to keep pace with local and international technological developments and ensure its continuation in the banking market and its entry into global markets. The Iraqi bank must also expand and increase modern technological devices such as automatic teller machines (ATM), various electronic cards, and modern services using advanced technology. They represent a significant factor in increasing the profitability of banks meeting the aspirations of customers. Besides, banks in Iraq should find a transparent and integrated legislative system that would remove restrictions and encourage the banking sector to engage in information technology and keep abreast of regional and international developments in the banking sector.

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Appendices

Appendix 1:

Section	NO.	Statement	Excellent availability	Sufficiently available	Partially available	Limited availability	Not available
Modern technology	1	The bank owns modern, advanced technological devices (devices, means, tools)	16	107	103	107	6
	2	The bank has a number of automated teller machines (ATMs) that meet the needs of	23	75	92	92	57
	3	The bank has several types of automatic teller machines (automatic teller machines for withdrawing money only and others that provide various services such as transferring	1	4	16	76	242
	4	The bank provides customers with several types of electronic cards	34	98	102	93	12
	5	Availability of Online Banking service to transfer and receive funds and inquire about	34	8	8	23	266
	6	Providing direct services through the Western union system to customers without the		1	4	8	326
	7	The bank provides banking services via SMS via mobile phone	2	45	173	76	43
	8	Providing communication with clients through the Internet to facilitate internal work	23	67	143	50	56
Use of Hardware components	9	Working in the bank is mainly computer	159	88	25	50	17
	10	Sufficient computers are available to complete the banking business	114	90	29	98	8
	11	Modern computers are available specialized in the work of banks	32	105	59	89	54
	12	What is in the bank of material components commensurate with the nature of its work	86	116	58	69	10
	13	Update hardware developments	49	48	106	69	67
Individuals skills	14	Individuals who are good at handling technological components	101	103	62	51	22
	15	Technical specialized competencies in information technology	58	45	57	132	47
	16	In-house expertise in the computer that meets the terms of employment	77	73	88	69	32
	17	Employees fluent in using ready-made application software	71	59	88	79	42
	18	An integrated training plan for specialized courses in banking technologies in order to develop their programming capabilities	73	34	69	144	19
	19	Managers possessing the skills and experience needed to deal with information	79	102	65	54	39
Use of networks	20	Provides an internal work network, a network that connects devices through the Internet for electronic data exchange	55	167	97	12	8
	21	The bank provides the extranet network: that is, the network of communication with the relevant departments and banks	57	48	102	56	76
	22	Email, Outlook, Lasefiche or the like are used among bank branches	73	69	58	66	73
	23	A direct link in providing data that facilitates the use of banking business, especially in the rapid flow of information.	69	87	99	84	
	24	Centralized control of data and information is done by the bank's use of the customer service network.	33	32	119	67	88
	25	The bank is keen to provide advanced means that guarantee network security	65	62	100	56	56
Database in Use	26	Efficient systems are in place to run the databases	52	55	131	98	3
	27	A system is available that controls access to databases and verifies the authority of the person (user) to obtain information	140	101	65	15	18
	28	A specialized team at the bank is available with the ability to search for data to present	59	104	98	78	
	29	Databases collect, prepare, and store files	100	86	76	77	
	30	Databases that improve the relationship between the user and the system	133	134	36	36	
Software in Use	31	Provides a variety of software that meets the needs and objectives of the bank	44	34	101	160	
	32	Internal electronic correspondence is officially approved by the bank	27	76	98	138	
	33	The bank has electronic points of sale	68	78	34	159	
	34	By providing electronic check collection services	35	29	54	99	122
	35	The bank adopts the electronic signature	19	33	43	68	176
	36	The bank has the specialized ability to develop software	9	18	52	171	89
	37	Electronic applications are available to facilitate the follow-up of customers' transactions to transfer and receive funds and inquire about the direct balance	42	23	23	12	239
	38	The information provided by the software in identifying the strengths or weaknesses of the alternatives available to do the work	17	67	78	154	23
	39	The use of hardware and software in general to facilitate work for employees and	45	29	98	88	79

Appendix 2: Financial Indicators of Iraqi banks

Financial Indicators of 2016										
No.	Banks	Liquidity		Profitability		Capital adequacy		operating		Average of financial indicators
		Cash to total deposits	Cash and investments to total deposits	Return to total assets	Return to capital	Equity to total assets	Equity to total deposits	Cash credit to total deposits	Investments to total deposits	
1	The National Bank of Iraq	0.46	0.9	0.009	0.53	0.03	0.03	0.03	0.44	0.304
2	Iraqi Commercial Bank	0.18	0.36	0.11	0.51	0.92	0.17	0.7	0.2	0.394
3	Iraqi Islamic Bank	0.32	0.45	0.05	0.41	0.14	0.19	0.67	0.12	0.294
4	The United Bank for Investment	0.29	0.53	0.02	0.36	0.2	0.17	0.54	0.22	0.291
5	The Islamic National Bank	0.35	0.63	0.01	0.11	0.11	0.14	0.44	0.27	0.258
6	Ashur International Bank	0.42	0.63	0.03	0.67	0.1	0.21	0.58	0.21	0.356
7	Iraqi Investment Bank	0.31	0.56	0.02	0.15	0.21	0.29	0.59	0.25	0.298
8	International Development Bank	0.3	0.81	0.04	0.24	0.23	0.34	0.57	0.51	0.380
9	Gulf Commercial Bank	0.3	0.39	0.06	0.39	0.42	0.63	0.44	0.13	0.345
10	Middle East Bank	0.08	0.19	0.01	0.2	0.23	0.15	0.19	0.13	0.148
11	North Bank	0.22	0.32	0.01	0.15	0.06	0.05	0.81	0.1	0.215
12	Al Mansour Bank for Investment	0.31	0.52	0.25	0.57	0.09	0.19	0.48	0.18	0.324
13	Mosul Bank	0.41	0.66	0.02	0.8	0.12	0.2	0.52	0.21	0.368
14	Elaf Islamic Bank	0.27	0.38	0.03	0.34	0.14	0.17	0.69	0.1	0.265
15	Babylon Bank	0.31	0.57	0.01	0.4	0.06	0.1	0.44	0.25	0.268
16	Bank of Baghdad	0.56	0.96	0.011	0.62	0.32	0.034	0.029	0.52	0.382
17	Sumer Commercial Bank	0.2	0.3	0.05	0.2	0.36	0.59	0.54	0.09	0.291
18	Bank across Iraq	0.24	0.5	0.03	0.71	0.08	0.1	0.52	0.26	0.305
19	Kurdistan Bank	0.16	0.32	0.02	0.46	0.9	0.15	0.63	0.15	0.349
	Average	0.299	0.525	0.042	0.412	0.248	0.205	0.495	0.228	0.307
	Standard Deviation	0.109	0.202	0.055	0.200	0.249	0.158	0.204	0.127	0.060

Financial Indicators of 2017										
No.	Banks	Liquidity		Profitability		Capital adequacy		operating		Average of financial indicators
		Cash to total deposits	Cash and investments to total deposits	Return to total assets	Return to capital	Equity to total assets	Equity to total deposits	Cash credit to total deposits	Investments to total deposits	
1	The National Bank of Iraq	0.72	0.97	-0.001	-0.04	0.02	0.03	0.02	0.25	0.246
2	Iraqi Commercial Bank	0.61	1.08	0.31	0.72	0.19	0.29	0.41	0.52	0.516
3	Iraqi Islamic Bank	0.42	0.72	-0.002	-0.05	0.02	0.25	0.12	0.35	0.229
4	The United Bank for Investment	0.22	0.48	0.01	0.27	0.05	0.06	0.46	0.26	0.226
5	The Islamic National Bank	0.28	0.41	0.001	0.02	0.07	0.08	0.54	0.13	0.191
6	Ashur International Bank	0.38	0.88	0.02	0.31	0.1	0.13	0.26	0.49	0.321
7	Iraqi Investment Bank	0.27	0.43	0.01	0.33	0.06	0.1	0.51	0.16	0.234
8	International Development Bank	0.34	0.93	0.11	0.63	0.17	0.22	0.25	0.33	0.373
9	Gulf Commercial Bank	0.29	0.73	0.01	0.42	0.07	0.12	0.35	0.43	0.303
10	Middle East Bank	0.14	0.22	0.01	0.22	0.04	0.06	0.18	0.14	0.126
11	North Bank	0.19	0.32	0.0017	0.014	0.17	0.24	0.43	0.16	0.191
12	Al Mansour Bank for Investment	0.37	0.51	0.09	0.4	0.07	0.1	0.61	0.17	0.290
13	Mosul Bank	0.17	0.64	0.04	0.39	0.17	0.23	0.52	0.47	0.329
14	Elaf Islamic Bank	0.32	0.53	-0.0007	-0.0008	0.09	0.1	0.44	0.21	0.211
15	Babylon Bank	0.32	0.43	0.01	0.13	0.09	0.11	0.52	0.11	0.215
16	Bank of Baghdad	0.51	0.96	0.02	0.52	0.09	0.19	0.31	0.44	0.380
17	Sumer Commercial Bank	0.23	0.41	0.0007	0.004	0.17	0.21	0.53	0.17	0.216
18	Bank across Iraq	0.33	0.6	0.01	0.24	0.09	0.12	0.43	0.27	0.261
19	Kurdistan Bank	0.27	0.4	0.06	0.64	0.12	0.15	0.77	0.13	0.318
Average		0.336	0.613	0.037	0.272	0.097	0.147	0.403	0.273	0.272
Standard Deviation		0.143	0.244	0.071	0.239	0.052	0.073	0.176	0.135	0.086

Financial Indicators of 2018										
No.	Banks	Liquidity		Profitability		Capital adequacy		operating		Average of financial indicators
		Cash to total deposits	Cash and investments to total deposits	Return to total assets	Return to capital	Equity to total assets	Equity to total deposits	Cash credit to total deposits	Investments to total deposits	
1	The National Bank of Iraq	0.46	0.64	0.04	0.72	0.11	0.14	0.54	0.41	0.383
2	Iraqi Commercial Bank	0.7	1.03	0.02	0.06	0.42	1.09	1.15	0.33	0.600
3	Iraqi Islamic Bank	0.45	0.62	0.05	0.42	0.15	0.23	0.73	0.17	0.353
4	The United Bank for Investment	0.36	1.01	0.01	0.53	0.03	0.03	0.02	0.65	0.330
5	The Islamic National Bank	0.3	0.43	0.01	0.05	0.19	0.26	0.84	0.12	0.275
6	Ashur International Bank	0.34	0.98	0.05	0.58	0.46	0.41	0.01	0.45	0.410
7	Iraqi Investment Bank	0.41	0.72	0.02	0.33	0.19	0.33	0.58	0.32	0.363
8	International Development Bank	0.6	0.73	0.08	0.19	0.31	0.52	0.91	0.16	0.438
9	Gulf Commercial Bank	0.44	0.54	-0.04	-0.08	0.47	0.93	0.77	0.1	0.391
10	Middle East Bank	0.14	0.21	0.02	0.3	0.13	0.33	0.3	0.2	0.204
11	North Bank	0.34	0.55	-0.005	-0.03	0.14	0.2	0.52	0.21	0.241
12	Al Mansour Bank for Investment	0.5	0.64	0.04	0.2	0.29	0.47	0.81	0.14	0.386
13	Mosul Bank	0.62	0.92	0.03	0.8	0.09	0.17	0.46	0.3	0.424
14	Elaf Islamic Bank	0.34	0.61	0.07	0.52	0.1	0.1	0.41	0.22	0.296
15	Babylon Bank	0.18	0.63	0.03	0.45	0.11	0.13	0.48	0.44	0.306
16	Bank of Baghdad	0.72	0.98	0.04	0.9	0.1	0.19	0.5	0.4	0.479
17	Sumer Commercial Bank	0.34	0.61	0.03	0.62	0.08	0.1	0.4	0.27	0.306
18	Bank across Iraq	0.32	1.05	0.03	0.22	0.2	0.29	0.24	0.73	0.385
19	Kurdistan Bank	0.21	0.71	0.41	0.67	0.11	0.13	0.48	0.44	0.395
Average		0.409	0.716	0.049	0.392	0.194	0.318	0.534	0.319	0.366
Standard Deviation		0.159	0.221	0.089	0.279	0.130	0.270	0.282	0.169	0.087

Financial Indicators of 2019										
No.	Banks	Liquidity		Profitability		Capital adequacy		operating		Average of financial indicators
		Cash to total deposits	Cash and investments to total deposits	Return to total assets	Return to capital	Equity to total assets	Equity to total deposits	Cash credit to total deposits	Investments to total deposits	
1	The National Bank of Iraq	0.44	0.86	0.021	0.73	0.42	0.054	0.035	0.43	0.374
2	Iraqi Commercial Bank	0.41	0.86	0.23	0.91	0.24	0.28	0.71	0.31	0.494
3	Iraqi Islamic Bank	0.39	0.52	0.03	0.57	0.12	0.19	0.48	0.23	0.316
4	The United Bank for Investment	0.32	0.45	0.05	0.41	0.14	0.19	0.67	0.12	0.294
5	The Islamic National Bank	0.18	0.27	0.12	0.3	0.33	0.25	0.29	0.23	0.246
6	Ashur International Bank	0.64	0.8	0.13	0.71	0.12	0.1	0.62	0.26	0.423
7	Iraqi Investment Bank	0.19	0.29	0.42	0.3	0.26	0.48	0.63	0.19	0.345
8	International Development Bank	0.51	0.84	0.22	0.34	0.36	0.39	0.61	0.43	0.463
9	Gulf Commercial Bank	0.51	0.77	0.21	0.6	0.28	0.2	0.34	0.45	0.420
10	Middle East Bank	0.19	0.21	0.02	0.16	0.24	0.17	0.31	0.19	0.186
11	North Bank	0.1	0.19	0.02	0.19	0.22	0.43	0.24	0.13	0.190
12	Al Mansour Bank for Investment	0.42	0.52	0.21	0.35	0.26	0.25	0.96	0.3	0.409
13	Mosul Bank	0.45	0.84	0.14	0.31	0.34	0.42	0.48	0.52	0.438
14	Elaf Islamic Bank	0.18	0.26	0.1	0.31	0.72	0.15	0.2	0.19	0.264
15	Babylon Bank	0.36	0.54	0.03	0.14	0.26	0.19	0.39	0.25	0.270
16	Bank of Baghdad	0.36	0.62	0.19	0.66	0.9	0.25	0.62	0.25	0.481
17	Sumer Commercial Bank	0.36	0.8	0.01	0.43	0.07	0.08	0.08	0.51	0.293
18	Bank across Iraq	0.41	0.63	0.42	0.71	0.12	0.14	0.42	0.28	0.391
19	Kurdistan Bank	0.38	0.51	0.2	0.51	0.25	0.33	0.89	0.3	0.421
Average		0.358	0.567	0.146	0.455	0.297	0.239	0.472	0.293	0.353
Standard Deviation		0.134	0.233	0.122	0.213	0.199	0.119	0.247	0.118	0.093