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The Effect of Data Mining on the Strategic Decisions in Jordanian Local Banks

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Abstract:

This study explores how data mining techniques contribute to supporting strategic decision-making in banks operating in Jordan. As these banks increasingly rely on data to stay ahead in a competitive market, techniques such as classification and regression have become crucial in identifying patterns within large datasets. The study follows a descriptive cross-sectional methodology and collects data through a questionnaire. The sample consisted of 395 employees working in local Jordanian banks in the Irbid Governorate, selected using a simple random sampling technique. The aim of the study was to assess the extent to which data mining contributes to improving the quality of managerial decisions. The results revealed a strong relationship between the use of data mining tools and the quality of decisions made. This highlights the importance of adopting advanced data processing methods in the banking sector. The study also emphasizes the need for banks to enhance their data management and utilization mechanisms in order to make smarter decisions, reduce risks, and maintain competitiveness. Overall, the study provides valuable insights for professionals and constitutes a significant contribution to the field of business intelligence.

Keywords: *Data Mining; Strategic Decisions; Banking Sector.*

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أثر استخراج البيانات على القرارات الاستراتيجية في البنوك المحلية الأردنية

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ملخص:

تتناول هذه الدراسة كيفية مساهمة تقنيات التنقيب في البيانات في دعم اتخاذ القرارات الإستراتيجية في البنوك العاملة في الأردن. ونظرًا لاعتماد هذه البنوك بشكل متزايد على البيانات للبقاء في صدارة المنافسة، أصبحت تقنيات مثل التصنيف والانحدار ذات أهمية كبيرة في اكتشاف الأنماط داخل مجموعات البيانات الضخمة. تتبع الدراسة المنهج الوصفي المقطعي، ويتم جمع البيانات من خلال استبانة. تكونت العينة من (395) موظفًا يعملون في البنوك المحلية الأردنية في محافظة إربد، وقد تم اختيارهم باستخدام أسلوب العينة العشوائية البسيطة. وهدفت الدراسة إلى قياس مدى مساهمة التنقيب في البيانات في تحسين جودة القرارات الإدارية. وأظهرت النتائج وجود علاقة قوية بين استخدام أدوات التنقيب في البيانات وجودة القرارات المتخذة. ويبرز ذلك أهمية تبني الأساليب المتقدمة لمعالجة البيانات في القطاع المصرفي. كما تشير الدراسة إلى ضرورة تحسين البنوك لآليات التعامل مع البيانات واستخدامها بفاعلية، من أجل اتخاذ قرارات أكثر ذكاءً، وتقليل المخاطر، والحفاظ على التنافسية. وبشكل عام، تُقدّم الدراسة رؤى مفيدة للمختصين، ويُعدّ إضافة قيّمة في مجال استخبارات الأعمال.

الكلمات المفتاحية: *التنقيب في البيانات؛ القرارات الإستراتيجية؛ القطاع المصرفي.*

1. Introduction

With how fast digital data is growing, there's a real need for good ways to make sense of all that information. One method that's become really useful is data mining, which helps find hidden patterns and important info inside huge amounts of data. It mixes different fields like statistics, databases, AI, and machine learning to find trends that can help organizations make better decisions (Ledhem,2021).

Organizations today are compelled to integrate technological solutions into their decision-making processes to improve the competitiveness and operational efficiency. The banking sector, facing a lot of challenges such as automation demands, evolving customer expectations, and increased risk factors, is no exception. To address these issues, banks need to reach to the competitive advantage their vast data resources for informed the best strategic planning.

Banks in Jordan are trying to keep up competitive in the financial market. To do that well, they need to start using modern data tools and models that help with things like predicting trends and spotting risks early and faster than other competitors. While banks around the world have already started using these technologies, a lot of Jordanian banks are still just start started. This study tries to look into that and understand how data mining can actually support smart planning and decision-making in Jordan's banking sector. By applying data mining techniques, banks can make better use of their data to forecast customer needs, optimize product offerings, and strengthen decision-making processes. These improvements can enhance accuracy, reduce uncertainty, and ultimately contribute to long-term institutional success.

One of the big benefits of data mining in banking is how it helps to understand customer behavior better. By analyzing transaction histories, preferences, and interaction patterns, banks can divide customers into groups and offer more personal services. This not only makes customers happier but also helps banks to increase their sales and build stronger loyalty. In countries like Jordan, where customer needs are changing quickly, this kind of smart targeting is very important.

Also, data mining can support banks in managing risks more effectively. For example, by using classification models, banks can better judge if someone is a high-risk borrower or not. This is very helpful in credit scoring and loan approvals. With this, banks can reduce bad debts and avoid giving loans to people who are not likely to pay back. In the Jordanian market, where economic changes can affect people's ability to pay, having strong risk models is a must.

Another important point is how data mining can help in detecting fraud. With the increase in online banking and digital transactions, banks are facing more security issues. Data mining techniques like anomaly detection can quickly spot unusual activity and warn the system. This can stop fraud before it causes serious damage. For Jordanian banks trying to improve trust and security with their clients, using such tools can be a big advantage.

From a practical perspective, organizations increasingly need powerful tools to extract knowledge from large datasets. Data mining fulfills this need by allowing companies, including banks, to discover critical information, forecast trends, and make timely decisions. Daily challenges in banking, such as high demand for financial consultations, loans, and investments, limit decision-making accuracy. Proper implementation of data mining can improve future predictions and enhance decision quality based on accurate data analysis.

1.1 Main Research Question:

Is there a relationship between data mining and strategic decision-making?

Sub-Questions:

- Is there a relationship between data classification and strategic decisions in Jordanian banks?
- Is there a relationship between data regression and strategic decisions in Jordanian banks?

1.2 Objectives of the Study

- Identify the role of data mining for leaders striving to achieve organizational goals.
- Address the theoretical foundations of data mining.
- Clarify key concepts related to strategic decision-making at Jordanian local banks.
- Explain the impact of data mining on strategic decision-making in Jordanian local banks.

1.3 Importance of the Study

Nowadays, companies are gathering huge amounts of data in their systems and storage. And don't know how to use this data in the right way. Data mining has become a really important way to get useful info out of all that data. It helps businesses focus on what really matters, guess what might happen next, and make better decisions at the right time. Managers who want to make new products, go into new markets, or improve profits really need to understand what's going on around them — and data is the main thing they rely on for that. Data mining is growing fast as the new technology grow with keep updating and changing in tools and systems and the threaten that happened from the new technology in the computer world because there's just so much data out there now — from banks, shops, insurance places, and even the internet. And there is need to use these data to keep it safe and retrieve it and use it to get the best decision and as fast as can to pass all the other local and international banks With tech like scanners and digital cams, it's now way easier to find useful patterns and knowledge in the middle of all that messy data.

1.4 Research Hypotheses

To achieve the study's objectives and answer its questions, the following hypotheses were formulated:
Main Hypothesis: There is no statistically significant relationship at the ($\alpha \leq 0.05$) level between data mining and strategic decisions.
Sub-Hypotheses:

- There is no statistically significant relationship at the ($\alpha \leq 0.05$) level between classification techniques and strategic decisions.
- There is no statistically significant relationship at the ($\alpha \leq 0.05$) level between regression techniques and strategic decisions.

2. Literature Review

As digital transformation accelerates, businesses are turning to data mining tools to support analytics-driven decision-making. In banking, these tools are particularly valuable for applications like fraud detection, customer segmentation, and credit risk evaluation (Cai & Durkin, 2005). Data mining enables the discovery of meaningful patterns by using machine learning, artificial intelligence, and statistical algorithms. Several international studies support the strategic importance of data mining. For example, Hassani et al. (2018) emphasized the benefits of integrating big data strategies into banking, particularly in improving investment planning and credit scoring. Similarly, Balan (2013) showed that data mining facilitates automation in loan approvals and fraud identification.

In another case, Hamid and Ahmed (2016) demonstrated how predictive models using Naïve Bayes, J48, and Bayes Net significantly enhanced risk assessment accuracy in loan approvals. Ngai et al. (2011), through a meta-analysis, identified fraud detection and customer relationship management as key areas where data mining yields substantial impact.

Within the Arab world, research also highlights the relevance of data analytics. Arouf (2018) showed that Algerian banks benefit from business intelligence systems that enhance customer targeting and operational alignment. Meanwhile, Al-Saadi and Zabar (2013) found a direct relationship between high-quality data and effective strategic decision-making in Iraqi banks. In

Jordan, studies such as those by Ahmed (2018) and Abu Ghanem (2020) reveal that although banks gather vast customer data, limitations in analytical capacity persist. Challenges like lack of infrastructure, technical skills, and resistance to organizational change hinder progress. However, Alnajar et al. (2013) argue that proper training and tool adoption can bridge this gap.

Recent technological advancements, including the availability of user-friendly open-source platforms like RapidMiner, WEKA, and KNIME, make it easier for institutions in developing countries to implement data mining solutions. Ahmed Said (2016) recommended such tools for their practicality and effectiveness. Predictive analytics continues to grow in importance. According to Rupnik & Krisper (2016), anticipating customer behavior or potential loan defaults enables banks to proactively address risks. These capabilities are particularly important for institutions in volatile financial markets, such as those in the Middle East.

Also, some studies talked about how data mining help banks to understand customers better and make more personal offers. For example, Md Abu Sufian Mozumder (2024) found that using clustering techniques help to divide customers into groups with similar needs. This allows banks to offer services more fit to each group, which can improve customer satisfaction and loyalty. They said banks who use this way have better communication with clients and more chances to keep them.

Moreover, data mining tools not only useful for customers side, but also help in internal process of the bank. According to Mousa, & Kamel (2022), data mining help managers to find weakness in operations and improve efficiency. He explains that using decision trees and neural networks, banks can predict delays or errors in processes before they happen. This makes operations smoother and save cost. Even small banks can use these tools now because software becoming easier and cheaper.Collectively, the literature supports the idea that data mining can significantly enhance strategic decisions in banking. The challenge for countries like Jordan is not in proving the usefulness of these tools, but in ensuring the proper environment and resources exist for successful implementation. In summary, the literature consistently shows that data mining supports better, faster, and more reliable strategic decisions in banking. However, for countries like Jordan, the real challenge lies not in proving the value of data mining but in building the necessary infrastructure, culture, and skills to harness its full potential. This study seeks to bridge that gap by examining how data mining is currently used in Jordanian banks and how it could be better implemented to support strategic planning and risk management**.**

3. Research Methodology

As mentied by table This study employs a cross-sectional, quantitative approach to examine the impact of data mining on strategic decision-making in Jordanian banks. The target population comprises local banks operating within Jordan, with a sampling frame ranging from 1,500 to 2,000 employees. Based on Krejcie and Morgan's (1970) table, a sample size of at least 395 respondents was determined as sufficient.

Table 1: (summary Research Methodology)

Research design	Cross-sectional quantitative design
Population of interest	Jordanian local banks
Sampling list	Population of 15,00-20,00, respectively
Determination of sample size	▪ According to Krejcie and Morgan (1970): ▪ Minimum sample needed:395
Sampling technique	Simple random sampling
Data collection tool	Researcher-administered questionnaire
Data analysis tool	SPSS, Smart PLS version 3.0
Reliability & validity	Tested in pilot study and measurement model
Hypotheses testing	Assessment of structural model

4. Results and discussion

4.1 Analysis of Study Questions

The study looked at the variables using basic stats, like averages and standard deviation, to see how people answered the different questions in the survey.

Table 2: Mean and Standard Deviation of Data Mining Variable

#	Dimensions	Mean	Std. Dev.	Rank	Importance
1	classification techniques	4.12	.618	1	High
2	regression techniques	3.86	.511	3	High
	Average	**3.77**	**.540**		**High**

The previous table shows the means and standard deviations for the Data Mining variable, the overall mean reached (3.77) with a high degree of importance, and the standard deviation (.559), which indicates the importance of implementing Data Mining in Jordanian local banks. The highest mean for the dimension "Digital Business Environment" (4.12) with a high degree of importance, in second is "Entrepreneurship Culture" (3.98) with a high degree of importance, and in third and final is "Digital Finance" (3.86) with a high degree of importance.

Table 3: Mean and Standard Deviation of strategic decisions Variable

#	Dimensions	Mean	Std. Dev	Rank	Importance
1	strategic decisions	4.16	.521	1	High
	Average	**4.16**	**.521**		**High**

The table shows the means and standard deviation of the " strategic decisions " variable. It was found that the mean (4.16) with a large percentage of importance, and standard deviation (0.521), which reflects the extent of the importance of "strategic decisions" and its application in Jordanian banks.

4.2 Multicollinearity Test

It indicates that there is a linear correlation between several variables, and the coefficient of determination (R^2) appears to be higher than it actually is. To investigate this, the correlation between the independent variables in the model was calculated. The results are as follows:

Table 4: Correlation Level between Variables

Variables	classification techniques	regression techniques
classification techniques	1	
regression techniques	.543**	1

(**) At the significance level (0.01).

The table shows the correlation coefficient between the variables (classification techniques and the digital business environment), and it was (0.646) at the significance level (0.01). This value is less than (0.80), which means there is no strong multiple linear correlation between the variables. According to Guajarati (2009), when the correlation coefficient reaches (0.80) or more, it shows a problem of high multicollinearity. To make sure of this result, the variance inflation factor (VIF) was also calculated to test the independent variables and check if there is any multicollinearity issue. The results came as follows:

Table 5: Multiple correlations for independent variables

Variables	Tolerance	VIF
classification techniques	.536	1.867
regression techniques	.629	1.591

The table shows the value of the variance inflation coefficient, showing that all of them are higher than 1 and less than 10. The value of (tolerance) varies between the numbers (1-0.1), and this shows that there are no problems in the correlations between all the variables of the study.

Table 6: Regression test for hypothesis analysis

Dependent variable	Model Summary		ANOVA		Coefficients					
	R	R2	F	Df	Sig	Item	B	Std. Error	t	Sig
strategic decisions	.841	.707	97.46	3	.000*	C T	.650	.128	5.088	.000*
						R T	.598	.162	3.691	.000*

* Statistically significant at the significance level (0.05).

The table shows that the correlation coefficient is (R=.841), and shows that there are statistically significant effects between Data Mining and the strategic decisions and that the value of F is equal to (97.462), with a significance level of (.000), which is less than (0.05), and we note that the value of the coefficient is (R2 = .707).

4.3 Hypotheses Test

Table 7: Simple Regression to Sub-First Hypothesis Test

Dependent variable	Model Summary		ANOVA			Coefficients				
	R	R2	F	Df	Sig	Item	B	Std.Error	t	Sig
strategic decisions	.730	.533	140.502	1	.000*	D.B	1.388	.117	11.853	.000*

Table 8: Simple Regression to Sub-Second Hypothesis Test

Dependent variable	Model Sumary		ANOVA			Coefficients				
	R	R2	F	f	Sig	Item	B	Std. Error	t	Sig
Agility of Supply Chains	.644	.415	87.319	1	.000*	D.F	1.683	.180	9.344	.000 *

Table 9: Simple Regression to Sub-Second Hypothesis Test

Dependent variable	Model Summary		ANOVA			Coefficients				
	R	R^2	F	Df	Sig	Item	B	SE	t	Sig
Agility of SupplyChains	.758	.575	166.52	1	.000*	E.C	1.581	.123	12.904	.000*

The descriptive analysis revealed a high level of perceived importance for data mining, with classification techniques rated highest (mean = 4.12), followed by regression techniques (mean = 3.86). Strategic decision-making also received a high rating (mean = 4.16), suggesting its strong relevance in banking operations. Correlation and multicollinearity diagnostics indicated acceptable tolerance and VIF levels, affirming the absence of significant multicollinearity issues. Regression analysis confirmed statistically significant relationships between data mining dimensions and strategic decisions. The overall model yielded an R^2 of 0.707, indicating that approximately 71% of the variance in strategic decision-making can be explained by the independent variables. Further analysis showed that both classification and regression techniques had significant positive effects, with standardized coefficients (β) of 0.650 and 0.598, respectively.

5. Conclusion

To sum up, the study shows that data mining is really important for helping banks in Jordan make better strategic decisions. By using things like classification and regression methods, banks can get useful insights, predict what might happen next, and support managers in making smarter choices based on data. The results also show that Jordanian banks really need to put more effort into building better data systems and giving employees the right training. If they do that, they'll be more efficient, lower the chances of mistakes or risks, and stay ahead of the competition. However, the study also shows some problems that banks in Jordan still face. Many of them don't have strong IT infrastructure or enough expert people who understand data mining well. Also, some bank workers don't trust new

systems or feel afraid to change the old ways. This slow down the use of data mining in daily work. Because of that, it is recommended that banks should work more on changing the culture inside, give more workshops and motivate staff to accept new technology. Also, the government and financial organizations can support by giving help or programs that improve tech in the banking sector. In the future, it would be good to see more research on how newer tech like AI and deep learning can be used in banking data systems. This could help improve the way banks respond to changes and make stronger, more accurate decisions in today's fast-changing world.

References

Abu Ghanem, K. (2020). *Business intelligence implementation challenges in Jordanian banks*. Arab Journal of Administration.

Ahmed Said, A. (2016). Evaluation of open-source data mining tools: Analytical study (In Arabic). *Journal of Taibah University Arts & Humanities*. 5(10), 792-865.

Ahmed, M. (2018). Business intelligence and data utilization in Jordanian banks. *Arab Journal of Administration*.

Al-Najjar, F. J., Al-Najjar, N. J., & Al-Zoubi, M. R. (2013). Methods of scientific research: an applied perspective. *Al-Hamid Publishing and Distribution Bureau, Amman*, 63.

Al-Saadi, M., & Zabar, A. (2013). Information quality and its impact on strategic decisions in Iraqi banks (In Arabic). *Al-Qadisiyah Journal of Administrative and Economic Sciences*. 15(3), 7-41.

Arouf, A. (2018). *The role of business intelligence systems in achieving competitive advantage: A case study on banks in Constantine* (In Arabic). (PhD dissertation), Université Larbi Ben M'hidi Oum El Bouaghi, Algeria

Balan, V. J. R. V. S. (2013). A review on data mining in banking sector. American Journal of Applied Sciences, 10(10), 1160–1165.

Cai, J., & Durkin, J. (2005). Use of expert knowledge for decision tree pruning. In Proceedings of the 20th National Conference on Artificial Intelligence (AAAI-05) (pp. 1600–1601)

Gujarati, D. N. (2004). Basic econometrics (4th ed.). McGraw-Hill Education.

Gujarati, D. N. (2004). *Basic econometrics* (4th ed.). Tata McGraw-Hill Publishing Company Limited.

Gujarati, D. N., & Porter, D. C. (2009). *Basic econometrics*. McGraw-hill.

Hamid, A. J., & Ahmed, T. M. (2016). Developing prediction model of loan risk in banks using data mining. Machine Learning and Applications: An International Journal, 3(1), 1–9.

Hassani, H., Huang, X., & Silva, E. (2018). Digitalisation and big data mining in banking. Big Data and Cognitive Computing, 2(3), 18.

Krejcie, R. V., & Morgan, D. W. (1970). Determining sample size for research activities. *Educational and Psychological Measurement*, 30(3), 607–610.

Ledhem, M. A. (2021). Data mining techniques for predicting the financial performance of Islamic banking in Indonesia. Journal of Modelling in Management, 3, 896–915.

Md Abu Sufian Mozumder et al. (2024). Optimizing customer segmentation in the banking sector: A comparative analysis of machine learning algorithms. Journal of Computer Science and Technology Studies, 6(4), 01–07.

Mousa, M. E.-S., & Kamel, M. A. (2022). An integrated framework for predicting the best financial performance of banks: Evidence from Egypt. Journal of Modelling in Management, 17(3), 964–986.

Ngai, E. W., Hu, Y., Wong, Y. H., Chen, Y., & Sun, X. (2011). The application of data mining techniques in financial fraud detection: A classification framework and an academic review of literature. *Decision support systems*, *50*(3), 559-569.

Rupnik, R., Kukar, M., & Krisper, M. (2016). Integrating data mining and decision support through data mining-based decision support system. Journal of Computer Information Systems, 47(3), 89–104.