





# “The impact of digital banking channels and organizational culture on operational excellence in Jordanian banking”

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# THE IMPACT OF DIGITAL BANKING CHANNELS AND ORGANIZATIONAL CULTURE ON OPERATIONAL EXCELLENCE IN JORDANIAN BANKING

## Abstract

This study explores the impact of digital banking channels on the operational excellence of Jordanian banks. It investigates the impact of social media, chatbots, digital wallets, and mobile applications on operational excellence in Jordanian banks, focusing on the moderating role of organizational culture. The study used a quantitative research method and a stratified random sampling technique to ensure a diverse sample of the five largest banks in Jordan, including managers and IT professionals responsible for managing digital banking operations. A total of 276 completed questionnaires were analyzed using structural equation modeling. The findings show that digital banking channels significantly contribute to operational excellence. Social media banking ( $\beta = 0.155$ ,  $p < 0.05$ ) and chatbots ( $\beta = 0.212$ ,  $p < 0.01$ ) positively impact operational excellence, while digital wallets ( $\beta = 0.301$ ,  $p < 0.001$ ) and mobile banking applications ( $\beta = 0.22$ ,  $p < 0.01$ ) also exhibit significant positive effects. The structural model explained 63% of the variance in operational excellence. Additionally, organizational culture was found to positively moderate the impact of social media banking ( $\beta = 0.20$ ,  $p < 0.01$ ), chatbots ( $\beta = 0.10$ ,  $p < 0.05$ ), and digital wallets ( $\beta = 0.16$ ,  $p < 0.01$ ) on operational excellence. However, the interaction between mobile applications and organizational culture was not significant ( $\beta = 0.078$ ,  $p = 0.065$ ).

## Keywords

digital channels, customer experience, operational efficiency, organizational culture, digital transformation, competitive advantage, Jordanian banks

## JEL Classification

E58, G21, O33

## INTRODUCTION

In an increasingly digital world, the banking industry faces a lot of pressure to embrace technological progress to stay ahead in a severe competitive environment. Digital channels have become essential instruments for banks to enhance their operations and strengthen their competitive position. The utilization of digital channels in banking consists of various technologies like social media banking, mobile banking applications (apps), virtual assistance like chatbots, and electronic wallets. These channels provide not just convenience and better service delivery but also result in notable cost savings and operational efficiencies (Chaffey & Ellis-Chadwick, 2019). Moreover, digital channels allow banks to connect with a wider range of customers, interact more professionally, and customize their services to enhance customer experience and stand out from competitors (Bataineh, 2022). Operational excellence in the banking industry means consistently and efficiently implementing business strategies while minimizing waste and maximizing resource usage. Jordanian banks can optimize processes, cut costs, and boost customer satisfaction by incorporating digital channels into their operational strategies. For example, mobile

banking apps can decrease the necessity for in-person branch visits, leading to reduced expenses and enhanced convenience for customers. Furthermore, digital platforms with embedded data analytics tools can offer important information about customer behavior, allowing banks to customize their services to meet customer expectations.

The Jordanian banking sector plays a crucial role in the country's economy. According to the annual report of the Central Bank of Jordan (2023), the banking industry represents more than 94% of the financial sector. In 2023, it made up about 20% of the gross domestic product (GDP) and had a workforce of about 25,000 individuals. Exceeding regional averages, the industry has strong capital adequacy ratios and liquidity levels with assets totaling over \$85 billion. Moreover, banks in Jordan play a crucial part in supporting \$30 billion in yearly trade, highlighting their significance in domestic economic stability and global trade. However, the banking industry in Jordan is quickly changing, facing more competition from both local and foreign firms. Jordanian banks are starting to understand the significance of digital transformation to stay competitive. A recent study from the Central Bank of Jordan (2023) shows a growing usage of digital banking services by Jordanian customers, influenced by the rapid penetration of smartphones and internet availability. Nevertheless, banks' organizational culture might be a supportive barrier to adopting these digital channels. This highlights the need for a deeper exploration of how organizational culture can either facilitate or hinder the effective adoption and utilization of digital banking channels in Jordan.

## 1. LITERATURE REVIEW

Understanding the role of digital banking channels in enhancing operational excellence is crucial for the banking sector in Jordan, particularly as it navigates the challenges posed by digitalization and evolving customer expectations. The literature indicates that Jordanian banks must adopt and optimize various digital banking platforms to improve efficiency and maintain competitiveness in a rapidly changing environment. This study will explore how these digital channels not only meet customer demands but also contribute to the operational excellence of banks in Jordan. The focus will be on understanding how the effective utilization of these channels can lead to significant improvements in service delivery and customer satisfaction. In addition, the study examines the interrelationship between digital banking channels and operational excellence, drawing on current research and scholarly perspectives. Digital banking channels, including social media banking, chatbots, e-wallets, and mobile banking applications, are pivotal in transforming traditional banking practices into more agile and customer-centric operations (Singhal et al., 2024). The integration of these technologies is not merely a trend but a strategic necessity for banks aiming to enhance their operational performance (Shukla & Shamurailatpam, 2022). Research suggests that adopting electronic banking channels signifi-

cantly correlates with improved operational efficiency and profitability in the banking sector. For instance, Halima (2023) highlighted the positive impact of automated teller machines and Internet banking on operational performance, emphasizing that these channels facilitate better customer engagement and streamline banking processes.

Furthermore, there is a growing intention among Jordanian commercial bank customers to utilize digital banking services (Yaseen & El Qirem, 2018). As customer preferences shift towards more convenient and personalized banking experiences, the importance of digital banking channels becomes even more pronounced. The strategic shift towards customer-centricity is essential for banks to remain relevant. The literature also emphasizes that digital transformation is critical for achieving operational excellence in the banking sector (Tsindeliani et al., 2022). By leveraging digital banking channels, banks can enhance their operational processes, reduce costs, and improve service quality (Hakizimana et al., 2023).

Jordanian banks need to implement and utilize digital banking channels to improve efficiency and remain competitive. Understanding the impact of digital banking channels on operational excellence is crucial as Jordan's banking sector undergoes digitalization and changes in customer preferences. These variables have been chosen because

of their relevance and importance to the strategic shift of banking practices, in terms of technology adoption, moving toward customer-centricity, and the ability to improve operational efficiency. Moreover, these variables are critical elements of the global banking sector's digital transformation, intending to offer customers convenient, easily accessible, and personalized banking services. Accordingly, this literature review will provide a more comprehensive insight into how the implementation of digital banking channels can facilitate operational excellence in Jordan's banking sector. By examining the relevant variables and their strategic implications, this research seeks to enhance the knowledge of how digital transformation improves bank efficiency and competitiveness.

Jordanian banks are paying more attention to operational excellence as a key strategy to stay competitive and meet customer expectations in the digital age. The success of Jordanian banks is strongly associated with the utilization of digital technologies and platforms such as social media banking, mobile banking apps, virtual assistant tools, and digital wallets, which improve efficiency, decrease expenses, and achieve customer satisfaction (Shehadeh et al., 2024). Severe competition by local and international banks imposed a radical shift to digital innovation to maintain competitiveness (Bataineh, 2022). Jordanian banks must consistently innovate and invest in digital solutions to attain operational excellence while also facing hard challenges concerning privacy and security, infrastructure, and customer engagement (Almaiah et al., 2022; Bataineh et al., 2023). This involves using digital platforms and technologies to gain customer insights and achieve a growth rate in revenues and market share. Achieving operational excellence in Jordanian banks means maximizing efficiency in creating and delivering services, utilizing advanced technology, empowering staff, and providing outstanding customer experience.

Social media marketing is vital for organizations to engage with customers, increase brand awareness, and enhance personalized communications (Al-Soluiman et al., 2020; Nalluri et al., 2023). Jordanian banks have the potential to use social media platforms to offer customized customer service, enhance financial education, and build stronger connections with customers (Alalwan

et al., 2017). Moreover, customers predominantly use social media platforms and smart devices to communicate with companies, as it is an effective tool for enhancing brand engagement and promoting customer loyalty (Aljuhmani et al., 2023; Bataineh et al., 2023). Nevertheless, Jordanian banks need to address challenges related to social media banking regulations, privacy issues, and managing cybersecurity threats. Using social media platforms, Jordanian banks can improve their competitiveness, promote business growth, and achieve excellence in their operations in the digital era. The growing integration of chatbot use into the banking sector has shown a promising influence by enabling banks to effectively manage complex customer queries and high transaction volumes. Supporting customers 24/7 can enhance customer satisfaction by decreasing waiting times and providing prompt assistance (Shankar et al., 2020; Bataineh et al., 2023). Enabling automation of everyday tasks helps banks reduce operational expenses and redirect resources toward strategic tasks (Shehadeh et al., 2024). Chatbots can manage multiple interactions at once, minimizing mistakes made by humans and speeding up the delivery of services (Adam et al., 2021). Furthermore, they gather vital information on customer preferences, allowing for more individualized services that improve customer loyalty (Rossmann et al., 2020). Investing in AI and machine learning technologies is essential for improved abilities and efficiency of chatbots (Bataineh et al., 2024). For Jordanian banks, this means they can offer high-quality service to their customers, which is particularly valuable in a rival banking environment where customer experience is the ultimate competitive advantage (Bataineh & Qasim, 2023). Digital wallets are probably one of the most prominent innovations in the Jordanian banking sector, bringing important implications for operational excellence in local banks. These dynamic platforms make transactions secure and suitable, resulting in cost reduction, improved efficiency, and better customer experiences. Research suggests that digital wallets are becoming more popular as a result of rising smartphone usage and evolving customer choices (Christian et al., 2024). Jordanian banks can enhance operational efficiency by utilizing digital wallets (eFAWATEERcom, CliQ, and Zain Cash) that help customers pay their bills, and credit card payments, and easily transfer

money for other customers, which reduces dependence on physical branches and decrease transactional costs (Al-Obaidi et al., 2020; Hazar & Babuscu, 2023). However, digital wallets are essential for improving operational efficiency by providing effective, secure, and convenient, payment options customized to customer preferences.

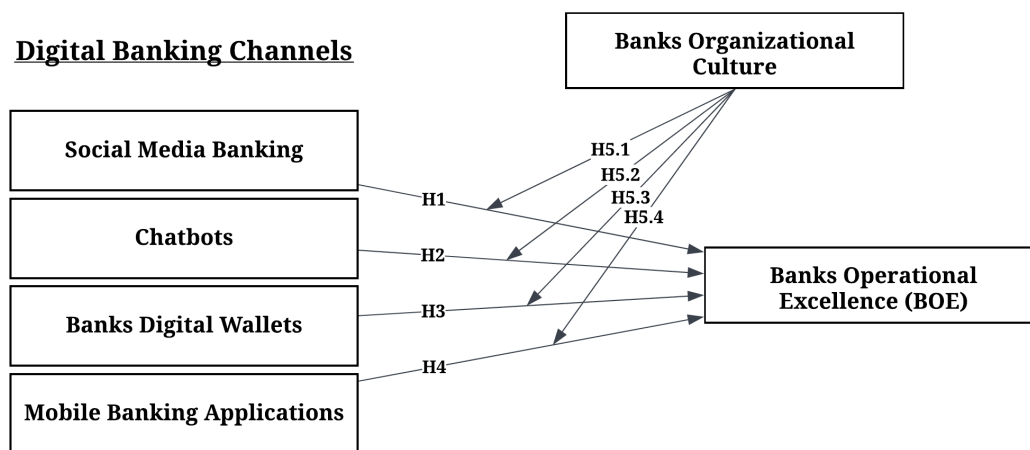
Mobile banking apps have significantly improved operational efficiency in Jordanian banks by simplifying processes, cutting expenses, and enhancing customer journeys. These apps streamline regular tasks, decreasing the necessity for in-person visits to branches and lowering operational costs (Almaiah et al., 2022). Accessing banking services 24/7 via mobile devices is consistent with customers' modern preferences, and increases customer engagement and satisfaction rates (Shankar & Rishi 2020). Additionally, mobile banking apps provide important information about customers' interests and behaviors, allowing banks to make significant changes in creating data-driven and personalized offerings (Esmaeili et al., 2021). Trust can differ depending on who or what is being trusted - whether it's a product, a person, or a system (Bataineh, 2017). Nevertheless, having a robust cybersecurity system is crucial to protect customer privacy and enhance trust (Bashir & Madhavaiah, 2015). Regular upgrading of technological infrastructure is a necessity to meet the increasing need for mobile banking apps, Jordanian banks can improve efficiency, competitiveness, and customer experience by addressing all these challenges. The concept of organizational culture describes the relationships and behaviors among members of an organization, which is derived from a set of shared values and beliefs. For instance, customer-centricity is considered a cornerstone in the banking culture, it can enhance digital banking channels' effectiveness and their effect on banks' operational success (Wintarto et al., 2024). Similarly, the creative atmosphere in Jordanian banks has a beneficial impact on adopting digital platforms, leading to improved operational effectiveness. Shehadeh et al. (2024) proposed that a supportive organizational culture in banks motivates staff to adopt and make good use of digital channels, resulting in enhanced operational effectiveness. On the other hand, Saleem et al. (2019) emphasized the importance of organizational openness and a supportive leadership style in achieving operational excellence in banks.

These results emphasize the vital role of banks' organizational culture as a moderator in adopting and developing digital banking channels and their impact on operational excellence in Jordanian banks. This literature review provides a comprehensive insight into how the implementation of digital banking channels facilitates operational excellence in Jordan's banking sector. By focusing on the strategic implications of digital tools and their interplay with organizational culture, this study aims to contribute to a deeper understanding of digital transformation's role in enhancing efficiency, customer journey, and overall competitiveness.

## 2. RESEARCH OBJECTIVE & HYPOTHESES

The key objective of this study is to explore how digital banking channels impact operational excellence in Jordanian banks, focusing specifically on how organizational culture can influence outcomes. The research will investigate the impact of digital channels like social media banking, chatbots, digital wallets, and mobile banking apps on operational efficiency, cost reduction, and customer satisfaction. Moreover, the study will explore how organizational culture impacts the effective implementation and improvement of digital banking solutions, resulting in operational excellence within Jordan's competitive banking industry. This study aims to offer useful guidance for banks in Jordan to improve their digital transformation plans and boost their competitive advantage. Accordingly, the following hypotheses are created:

- H1: *There is a significant positive impact of social media banking on banks' operational excellence.*
- H2: *There is a significant positive impact of chatbots on banks' operational excellence*
- H3: *There is a significant positive impact of banks' digital wallets on banks' operational excellence.*
- H4: *There is a significant positive impact of mobile banking applications on banks' operational excellence.*



**Figure 1.** Proposed conceptual framework

*H5: The impact of digital banking channels on banks' operational excellence can be moderated by banks' organizational culture.*

*H5.1: Banks' organizational culture moderates the relationship between social media banking and banks' operational excellence.*

*H5.2: Banks' organizational culture moderates the relationship between chatbots and banks' operational excellence.*

*H5.3: Banks' organizational culture moderates the relationship between bank's digital wallets and banks' operational excellence.*

*H5.4: Banks' organizational culture moderates the relationship between mobile banking applications and banks' operational excellence.*

After conducting an in-depth literature review, a conceptual framework is developed to demonstrate the relationships between the variables being researched (Figure. 1). This framework can offer real-world observations on sophisticated digital banking channels and their anticipated impact on banks' operational excellence.

### 3. METHOD

This study applied a quantitative design to examine the impact of digital banking channels – social media banking, mobile banking apps, chatbots, and digital wallets – on banks' operational excellence, with banks' organizational

culture as a moderating variable. According to the latest annual report provided by the Association of Banks in Jordan (2023), the total number of bank employees was 22,407 distributed in 20 banks operating in Jordan; 15 banks are Jordanian banks and the other are foreign banks. Because of time and accessibility limitations, the study focused on staff members from the five largest Jordanian banks, including managers and IT professionals responsible for managing digital banking operations. Stratified random sampling was implemented to guarantee a diverse sample from the selected Jordanian banks. As shown in Table 1, a stratified sample was determined by the total number of employees in each bank. This technique is suitable to gather a wide range of experiences related to the research variables. Based on recommendations for structural equation modeling (SEM) provided by Kline (2011), a sample size of more than 200 is considered adequate for achieving generalizable results.

Participated banks provided e-mail lists of the targeted employees and approved some physical visits to their branches for more clarification about survey filling. Research primary data were gathered using a formal survey that contained adapted and valid measures for measuring digital banking channels (Venkatesh & Bala, 2008; Arora et al., 2021; Ben Abdennebi, 2023), operational excellence (Nadkarni & Haider, 2022; Akhtar et al., 2023), and organizational culture (Koranteng et al, 2022). For confidentiality issues and to reach the planned number

**Table 1.** Sample response rate

| Bank Name                          | Number of Employees | Number of Surveys sent | Number of Returned Surveys | Response Rate |
|------------------------------------|---------------------|------------------------|----------------------------|---------------|
| Arab Bank                          | 3492                | 97                     | 88                         | 91%           |
| Housing Bank for Trade and Finance | 2875                | 79                     | 74                         | 94%           |
| Cairo Amman Bank                   | 1544                | 43                     | 41                         | 95%           |
| Bank of Jordan                     | 1484                | 41                     | 37                         | 90%           |
| Jordan Kuwait Bank                 | 1455                | 40                     | 36                         | 90%           |
| Total                              | 10850               | 300                    | 276                        | <b>92%</b>    |

of participants, the survey was distributed via email, with additional reminders sent to maintain a good response rate. The researchers used structural equation modeling (SEM) to investigate the suggested conceptual framework (Kline, 2011). The researchers used face validity and construct validity for the research instrument. For the pilot study, both academic members and practitioners from well-known universities and banks in Jordan provided scientific and practical recommendations that significantly improved the research instrument. For construct validity, exploratory factor analysis EFA and confirmatory factor analysis CFA have been applied. The researchers thoroughly reviewed existing work and literature to establish a solid foundation for the research conceptual framework, measurements, and hypotheses.

Table 2 showcases the demographic breakdown of the research participants. It reveals a well-balanced gender distribution, with 48.2% males and 51.8% females. In terms of age, the majority of respondents, 38.8%, fall within the 25-35 age bracket, followed by 29.3% in the 36-46 age group. 18.8% of the sample consists of participants aged 46-55 years, while those above 55 years old make up 13.0%, demonstrating a diverse age range. As for their professional roles, the largest group consists of Digital Marketing Officers, accounting for 35.5% of the participants. Moreover, concerning professional experience, over half of the participants (55.8%) have 6-11 years of experience. Those with 1-5 years and 11-15 years of experience each constitute 16.7% of the sample, while participants with more than 15 years of experience make up 10.9%. This diverse distribution of positions and experience levels underscores the wide-ranging expertise and backgrounds of the research's respondents.

**Table 2.** Sample demographic profile

| Demographic data | Category                  | Count  | N %    |
|------------------|---------------------------|--------|--------|
| Gender           | Male                      | 133    | 48.2%  |
|                  | Female                    | 143    | 51.8%  |
|                  | Total                     | 276    | 100.0% |
| Age              | 36-46 years               | 81     | 29.3%  |
|                  | 25-35 years               | 107    | 38.8%  |
|                  | 46-55 years               | 52     | 18.8%  |
|                  | Above 55                  | 36     | 13.0%  |
|                  | Total                     | 276    | 100.0% |
| Position         | IT Manager                | 9      | 3.3%   |
|                  | Network Administrator     | 28     | 10.1%  |
|                  | Developer                 | 79     | 28.6%  |
|                  | Database Administrator    | 26     | 9.4%   |
|                  | Digital Marketing officer | 98     | 35.5%  |
|                  | Cybersecurity Analyst     | 36     | 13.0%  |
|                  | Total                     | 276    | 100.0% |
| Experience       | 1-5 years                 | 46     | 16.7%  |
|                  | 6-11 years                | 154    | 55.8%  |
|                  | 11-15 years               | 46     | 16.7%  |
|                  | Above 15                  | 30     | 10.9%  |
| Total            | 276                       | 100.0% |        |

## 4. RESULTS

The main focus was on evaluating the factorability of the research model with 30 items through IBM-SPSS v28. The overall 30 items showed a positive correlation with at least one other item. The Kaiser-Meyer-Olkin measures the adequacy of the sampling technique computed at 0.927, which exceeds the recommended value of 0.6 (Hair et al., 2021). Bartlett's test of sphericity also yielded a significant result  $\chi^2(435) = 7239.799$ ,  $p < .001$ , indicating that the correlation structure is considered suitable for factor analysis (Field, 2013). Additionally, all anti-image correlation matrix diagonals exceeded 0.5, and all communalities were above 0.30, suggesting that each item shares variance with other items. Based on these indicators, 30 items were suitable for exploratory factor analysis.

sis (Hair et al., 2021). Afterward, the 30 items were analyzed through EFA, with a cutoff point of 0.40 and using Kaiser's criterion of eigenvalues greater than 1. This analysis resulted in a six-factor solution that explained 76.01 % of the variance, which was considered the optimal fit for the data (Hooper, 2012). The six-factor solution was favored due to its alignment with the theoretical framework and the plateauing of eigenvalues on the screen plot after the sixth factor. The SEM procedure was then undertaken in two steps using AMOS 27 (Hair et al., 2021). The initial step involved assessing the measurement model, revealing that all goodness-of-fit indices for the model constructs met the recommended thresholds, as indicated by  $\chi^2$  (384) = 965.721, chi-squared degree of freedom ratio ( $\chi^2/df$ ) = 2.515, comparative fitness index (CFI) = 0.918, standardized root mean square residual (SRMR) = 0.049, and root mean square error of approximation RMSEA = 0.074, and P value > 0.05 (Crawford & Kelder, 2019). The subsequent step included the analysis of the structural model, the findings of which are discussed in the model's results section. The confirmatory factor analysis (CFA) presented descriptive statistics for the six constructs in Table 3. The skewness and kurtosis values were in an acceptable range to assume a normal distribution, with the highest mean being 3.87 for the bank's digital wallets (Hair et al., 2021). Additionally, the CFA test was conducted to assess the constructs' reliability and validity (refer to Tables 3 and 4), with all factor loadings surpassing the 0.50 threshold (0.702-0.912) (Hair et al., 2021). The reliability of the constructs was gauged using Cronbach's alpha, with the data exhibiting internal reliability exceeding the recommended threshold of 0.70 (Hayes & Coutts, 2020).

**Table 3.** Confirmatory factor analysis and descriptive statistics

| Items | Factor Loadings | $\alpha^*$ | M(SD)           | Skewness | Kurtosis |
|-------|-----------------|------------|-----------------|----------|----------|
| SMB5  | 0.908           | 0.914      | 3.76<br>(0.882) | -0.606   | -0.170   |
| SMB1  | 0.855           |            |                 |          |          |
| SMB2  | 0.756           |            |                 |          |          |
| SMB3  | 0.837           |            |                 |          |          |
| SMB4  | 0.799           |            |                 |          |          |
| CH2   | 0.912           | 0.920      | 3.57<br>(.989)  | -0.574   | -0.450   |
| CH1   | 0.819           |            |                 |          |          |
| CH5   | 0.897           |            |                 |          |          |
| CH3   | 0.812           |            |                 |          |          |
| CH4   | 0.749           |            |                 |          |          |

| Items | Factor Loadings | $\alpha^*$ | M(SD)           | Skewness | Kurtosis |
|-------|-----------------|------------|-----------------|----------|----------|
| BOE3  | 0.764           | 0.922      | 3.72<br>(0.960) | -0.743   | -0.096   |
| BOE4  | 0.909           |            |                 |          |          |
| BOE1  | 0.856           |            |                 |          |          |
| BOE5  | 0.897           |            |                 |          |          |
| BOE2  | 0.801           |            |                 |          |          |
| BDW1  | 0.709           | 0.912      | 3.87<br>(0.799) | -0.574   | -0.134   |
| BDW5  | 0.854           |            |                 |          |          |
| BDW4  | 0.900           |            |                 |          |          |
| BDW3  | 0.817           |            |                 |          |          |
| BDW2  | 0.835           |            |                 |          |          |
| MBA3  | 0.843           | 0.901      | 3.66<br>(0.929) | -0.590   | -0.318   |
| MBA4  | 0.887           |            |                 |          |          |
| MBA5  | 0.800           |            |                 |          |          |
| MBA2  | 0.825           |            |                 |          |          |
| MBA1  | 0.702           |            |                 |          |          |
| BOC3  | 0.796           | 0.902      | 3.78<br>(0.926) | -0.827   | 0.011    |
| BOC2  | 0.8             |            |                 |          |          |
| BOC1  | 0.824           |            |                 |          |          |
| BOC4  | 0.814           |            |                 |          |          |
| BOC5  | 0.801           |            |                 |          |          |

Note: SMB: Social Media Banking; MBA: Mobile Banking Applications; CH: Chatbots; BDW: Banks Digital Wallets; BOE: Banks Operational Excellence; BOC: Banks Organizational Culture. \*  $\alpha$  = Cronbach's Alpha coefficient; M(SD) = Mean & Standard deviation.

In addition, the instrument's validity and reliability were assessed, with the results provided in Tables 4 and 5. To evaluate the convergent validity of the confirmatory factor analysis, composite reliability (CR) and average variance extracted (AVE) were utilized, in line with the recommendations by Hair et al. (2021). A model's convergent validity can be confirmed when composite reliability values exceed 0.70 and AVE values surpass 0.50, and when AVE values exceed the average shared variance (ASV) and their corresponding maximum shared variance (MSV). The study revealed that all composite reliability values exceeded 0.70, and all AVE values were above 0.50, confirming the model's convergent validity as shown in Table 4 (Almén et al., 2018). Discriminant validity was assessed using the methods suggested by Fornell and Larcker (1981) and the heterotrait-monotrait (HTMT) ratio of correlations as stated by Henseler et al. (2015). In Fornell and Larcker's method, discriminant validity can be confirmed when the square roots of the AVE values on the diagonal of Table 3 are greater than the inter-construct correlation coefficients. Therefore, the lowest square root of AVE was 0.807, exceeding the maximum correlation coefficient value of 0.770, thereby validating the discriminant validity of the



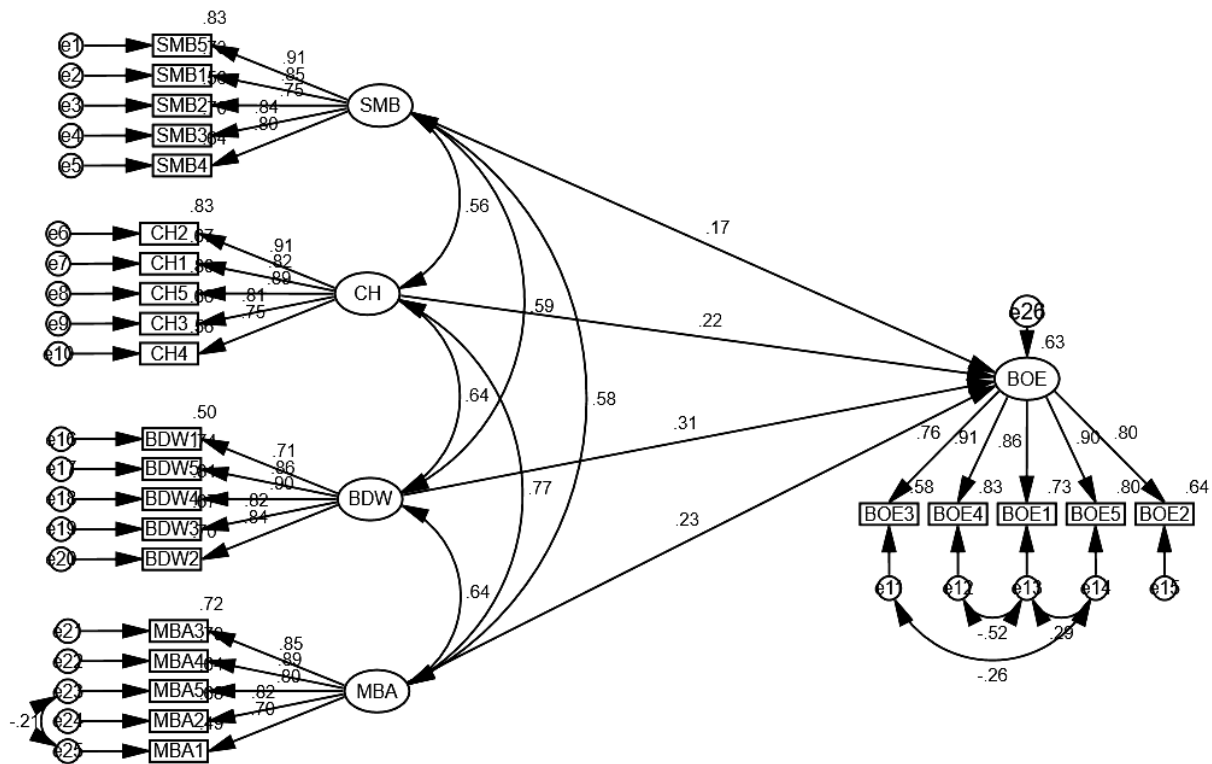


Figure 2. Structural model

Table 4. Discriminant, convergent validity, and composite reliability

| Factors | CR    | AVE   | MSV   | MaxR (H) | SMB      | CH       | BOE      | BDW      | MBA      | BOC   |
|---------|-------|-------|-------|----------|----------|----------|----------|----------|----------|-------|
| SMB     | 0.918 | 0.693 | 0.366 | 0.928    | 0.833    | –        | –        | –        | –        | –     |
| CH      | 0.923 | 0.706 | 0.593 | 0.935    | 0.559*** | 0.840    | –        | –        | –        | –     |
| BOE     | 0.927 | 0.718 | 0.485 | 0.937    | 0.605*** | 0.689*** | 0.847    | –        | –        | –     |
| BDW     | 0.914 | 0.682 | 0.484 | 0.925    | 0.588*** | 0.637*** | 0.696*** | 0.826    | –        | –     |
| MBA     | 0.907 | 0.662 | 0.593 | 0.917    | 0.582*** | 0.770*** | 0.697*** | 0.642*** | 0.814    | –     |
| BOC     | 0.903 | 0.651 | 0.330 | 0.903    | 0.561*** | 0.575*** | 0.553*** | 0.565*** | 0.574*** | 0.807 |

Note: SMB: Social Media Banking; MBA: Mobile Banking Applications; CH: Chatbots; BDW: Banks Digital Wallets; BOE: Banks Operational Excellence; BOC: Banks' Organizational Culture. Composite Reliability = (CR) > 0.70, Average Variance Extracted = AVE > 0.50, Maximum Shared Variance = AVE > MSV and McDonald Construct Reliability = MaxR(H) > 0.7. The square root of the AVE is displayed as diagonal boldface values.

Table 5. Heterotrait-Monotrait Ratio (HTMT) result

| Factors | SMB   | CH    | BOE   | BDW   | MBA   | BOC |
|---------|-------|-------|-------|-------|-------|-----|
| SMB     | –     | –     | –     | –     | –     | –   |
| CH      | 0.552 | –     | –     | –     | –     | –   |
| BOE     | 0.613 | 0.713 | –     | –     | –     | –   |
| BDW     | 0.574 | 0.652 | 0.708 | –     | –     | –   |
| MBA     | 0.586 | 0.777 | 0.708 | 0.647 | –     | –   |
| BOC     | 0.557 | 0.576 | 0.550 | 0.586 | 0.580 | –   |

Note: SMB: Social Media Banking; MBA: Mobile Banking Applications; CH: Chatbots; BDW: Banks Digital Wallets; BOE: Banks Operational Excellence; BOC: Banks' Organizational Culture. Thresholds are 0.850 for strict and 0.900 for liberal discriminant validity (Gaskin & Lim, 2017; Henseler et al., 2015).

model. Furthermore, the HTMT values in Table 4 were also lower than 0.90, which further confirms the discriminant validity of the measures as per

the guidelines set by Henseler et al. (2015). Hence, convergent and discriminant validity have been met, leading to the conclusion that the measure-

**Table 6.** Hypotheses testing

|    | Hypothesis path             |                                | Beta  | S.E.* | t-value | P       |
|----|-----------------------------|--------------------------------|-------|-------|---------|---------|
| H1 | Social Media Banking        | → Banks Operational Excellence | 0.155 | 0.057 | 2.581   | 0.01*   |
| H2 | Chatbots                    | → Banks Operational Excellence | 0.212 | 0.071 | 2.755   | 0.006** |
| H3 | Banks Digital Wallets       | → Banks Operational Excellence | 0.301 | 0.075 | 4.638   | ***     |
| H4 | Mobile Banking Applications | → Banks Operational Excellence | 0.22  | 0.081 | 2.81    | 0.005** |

Note: S.E. = Standard Error,  $p < 0.05^*$ ,  $p < 0.01^{**}$ ,  $*** p < 0.001$ .

**Table 7.** Interaction between moderator and independent factors

| Interaction | Beta  | SE    | P value |
|-------------|-------|-------|---------|
| SMB_X_BOE   | 0.204 | 0.040 | ***     |
| CH_X_BOE    | 0.102 | 0.043 | 0.019*  |
| BDW_X_BOE   | 0.156 | 0.040 | ***     |
| MBA_X_BOE   | 0.078 | 0.042 | 0.065   |

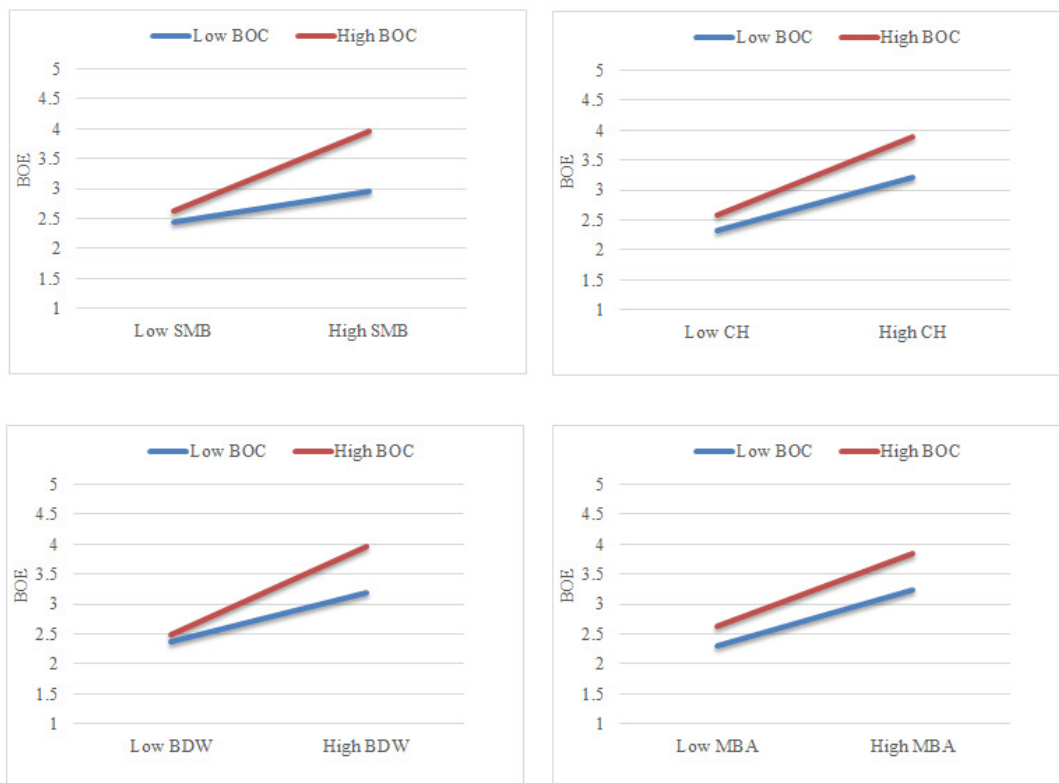
Note: SMB: Social Media Banking; MBA: Mobile Banking Applications; CH: Chatbots; BDW: Banks Digital Wallets; BOE: Banks Operational Excellence; BOC: Banks Organizational Culture., S.E. = Standard Error,  $p < 0.05^*$ ,  $p < 0.01^{**}$ ,  $*** p < 0.001$ .

ment items used in this study demonstrate suitable construct validity.

Consequently, the last stage of SEM included transforming the measurement model into a structural model. The findings indicated that the model met the requirements outlined by Crawford and Kelder (2019). The chi-square value was 995.172, with a  $\chi^2/df$  of 2.578, a Comparative Fit Index (CFI) of

0.914, a Standardized Root Mean Square Residual (SRMR) of 0.050, a Root Mean Square Error of Approximation (RMSEA) of 0.076, and  $p > 0.05$ . As shown in Figure 2 and Table 7, no additional modifications or improvements were required.

Hypotheses H1 ( $\beta = 0.155$ ,  $p < 0.05$ ) and H2 ( $\beta = 0.212$ ,  $p < 0.01$ ) were supported, indicating that social media banking and chatbots had a signifi-



**Figure 3.** Moderating effect of a bank's organizational culture

cantly positive impact on the Bank's Operational Excellence, respectively. Similarly,  $H3$  ( $\beta = 0.301$ ,  $p < 0.001$ ) and  $H4$  ( $\beta = 0.22$ ,  $p < 0.01$ ) were confirmed, showing the significant impact of the bank's digital wallets and mobile banking applications on the bank's operational excellence (see Table 6). Additionally, the structural model explained 63% of the variance in a bank's operational excellence (Figure 2).

Following the recommended procedures by Cohen et al. (2013) to test moderating impact, the results in Table 5 show that the interaction between social media banking, chatbots, and bank digital wallets with a bank's organizational culture had a positive and significant impact on the bank's operational excellence, with beta coefficients of 0.20 ( $p < 0.01$ ), 0.10 ( $p < 0.05$ ), and 0.16 ( $p < 0.01$ ), respectively. However, the interaction term between mobile banking applications and a bank's organizational culture was not significantly related to the bank's operational excellence ( $\beta = 0.078$ ,  $p = 0.065$ ). The graph of the moderating effects, depicted in Figure 3, provides partial support for the moderation hypothesis.

## 5. DISCUSSION

The study delved into the impact of digital channels, including social media banking, chatbots, digital wallets, and mobile banking apps, on the operational efficiency of banks. Using confirmatory factor analysis (CFA) to ensure reliability and validity, and structural equation modeling (SEM) to analyze data, the research found that these digital channels significantly enhance operational efficiency in Jordanian banks, accounting for 63% of the variance. Specifically, the study revealed that social media banking, chatbots, digital wallets, and mobile banking apps positively influence operational excellence. The research also hinted at the moderating impact of a bank's organizational culture. The findings are consistent with previous research emphasizing the pivotal role of digital transformation in boosting operational efficiency in the banking sector. For instance, Bueno et al. (2024) and Ogundipe et al. (2024) underscored how digital channels streamline banking operations and enhance customer service. Additionally, Omarini (2018) and Sambrani and Jayadatta (2020)

highlighted how digital wallets enable banks to facilitate payment processing, improving the overall customer experience and reducing the workload on employees. Likewise, studies by Dogra and Kumar (2024), Muriithi (2014), Malhotra (2017), and Eren (2021) supported the significant positive impact of social media and chatbots on operational metrics and customer engagement. The positive effect of mobile banking apps is consistent with the findings of Musa and Abubakar (2022) and Shaikh et al. (2023), who documented their role in enhancing customer experience and streamlining operations. This study also presents unique insights. Previous studies suggested that fostering a digital organizational culture, emphasizing digital skills development, IT infrastructure improvement, and adaptability to change are essential for successful digital transformation in banking and contribute to the sustained benefits of mobile banking applications (Koranteng et al., 2022; Wintarto et al., 2023). The research revealed that the moderating effect of organizational culture on mobile banking applications was not significant ( $\beta = 0.078$ ,  $p = 0.065$ ). This difference is due to varying cultural and technological adoption patterns in Jordanian banking compared to other regions examined in the literature. Additionally, while prior research conducted by Dogra and Kumar (2024), Mbama (2018), Rusdianti and Fajar (2023), Tran et al. (2023), and Aldaihani and Ali (2018) emphasized a direct influence of chatbots, digital wallet, and social media on bank operational efficiency, the research findings suggest that bank culture plays a moderately influential role in this relationship, with impacts of 20%, 10%, and 16%, respectively. This implies that integrating these factors into a bank's organizational culture could potentially enhance their effects on operational efficiency. These results help establish the critical role of digital channels in driving operational excellence in the banking sector. These channels not only optimize processes but also elevate customer engagement and contentment. Moreover, the research underscores the importance of customized digital channel integration, considering unique cultural nuances to leverage the advantages of digital transformation fully.

The findings of this study make a substantial contribution to the theoretical understanding of digital banking channels and their influence

on operational efficiency. By utilizing confirmatory factor analysis (CFA) and structural equation modeling (SEM), the study establishes a robust framework for assessing the relationships between digital channels and operational excellence. The research underscores the significance of integrating theories of digital transformation with organizational culture. It suggests that while digital channels such as social media banking, chatbots, digital wallets, and mobile banking apps enhance operational efficiency, their effectiveness is contingent upon the bank's organizational culture. This nuanced perspective aligns with the existing literature that emphasizes the pivotal role of organizational culture in enabling successful digital transformation (Koranteng et al., 2022; Wintarto et al., 2023). Furthermore, the study highlights the distinct context of Jordanian banks, indicating that cultural and technological

adoption patterns differ from those observed in other regions. This insight necessitates further exploration of how contextual factors influence the adoption and effectiveness of digital banking channels, thereby contributing to the broader discourse on digital transformation in emerging markets. To address these limitations, future research could include comparative studies across different countries, implement longitudinal research designs, explore a broader range of organizational culture dimensions, focus on the impact of emerging technologies, and delve into the relationship between digital banking channels and customer experience and satisfaction. By considering these future research directions, scholars can contribute to a more comprehensive understanding of the dynamics of digital banking and its implications for operational excellence in the banking sector.

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## CONCLUSION

The findings indicate that organizational culture moderately influences the relationship between chatbots, digital wallets, social media, and operational excellence. In conclusion, this study underscores the critical significance of digital banking channels in driving operational excellence within the banking sector. Through process optimization, elevated customer engagement, and enhanced overall efficiency, these channels are indispensable for banks aiming to maintain competitiveness within the swiftly evolving digital landscape. Nevertheless, the research emphasizes the necessity of tailoring digital channel integration to suit unique cultural and contextual factors to fully leverage the benefits of digital transformation. The study provides valuable insights into the effects of digital banking channels on operational efficiency in Jordanian banks. However, certain limitations should be considered. Firstly, the research is geographically limited to Jordan, which may limit the generalizability of the findings to other banking sectors. Secondly, the study's sample may not fully represent the diversity of banking institutions in Jordan. Additionally, the measurement of organizational culture may not capture all relevant dimensions. Furthermore, the research design employed a cross-sectional approach, limiting the ability to observe changes over time. Finally, there may be other variables not considered in the analysis that influence operational efficiency.

## AUTHOR CONTRIBUTIONS

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