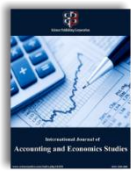
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Research paper



Harnessing e-Business Applications for Competitive Advantage: A Structural Equation Modeling Approach to Operational Excellence In Emerging Markets

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Abstract

To increase efficiency, coordination, and competitiveness in the face of rapid digital transformation, organisations in emerging economies are adopting electronic business applications more and more. However, their full impact can only be achieved when they are backed by robust interdepartmental collaboration that promotes operational excellence and long-term performance. By encouraging Departmental Collaboration, this study examines how Electronic Business Applications (EBAs) might promote operational excellence in Uzbekistan's fast-food sector. Using information gathered from 523 managerial respondents who represent the top chains, such as Evos, KFC, and Oqtepa Lavash, the study uses structural equation modelling, or SEM, to confirm the connections between EBA integration, teamwork, and operational effectiveness. The results show that through fostering greater interdepartmental cooperation, EBA integration, interaction, and coordination are the elements that directly and indirectly support operational excellence. The correlation and regression analyses showed a substantial positive association ($r = 0.831$, $p < 0.001$), and factor analysis revealed that three basic components, EBA, teamwork, and operational excellence, explain 65.99% of the total variation. The data demonstrates that the creation of an effective digital integration and cooperative practices together creates a foundation for competitive advantage in new markets. By linking the Resource-Based View (RBV) and Collaborative Technology Theory, this research gap bridges the digital transformation gap in Uzbekistan's service sector and explains how technology-mediated collaboration fosters organisational agility and excellence. To achieve sustainable competitiveness in the evolving digital economy, the report suggests investing in integrated EBAs, strengthening collaborative cultures, and improving digital skills.

Keywords: *E-Business; Structural Equation Modeling (SME); Electronic Business Application (EBA); Departmental Collaboration; Collaborative Technology; Operational Excellence.*

1. Introduction

Being competitive has become essential to an organization's success in the fiercely competitive global business world. Competitive success for fast-food businesses in developing nations like Uzbekistan requires the use of advanced technologies and close interdepartmental co-operation (Atieh et al., 2025; Carbonell & Rodríguez Escudero, 2025). This study explores how interdepartmental cooperation and EBAs work together to promote operational excellence, which is a crucial source of competitiveness in dynamic market conditions. Adaptability in technology, enhancement of internal procedures, and effective response to shifting market demands are the main sources of competitiveness in organisational settings. EBAs enable businesses to automate value chains, connect processes, and produce competitive performance. Examples of these technologies include CRM, ERP, and other collaboration tools. Such technologies allow businesses with intelligence and agility to surpass competitors by generating real-time information, improving decision-making, and streamlining operations (Sokiyna & Aqel, 2020; Al-Omoush et al., 2022; Singhal et al., 2025). However, despite the crucial role that EBAs play, not enough attention has been paid to the precise mechanisms by which EBAs, particularly operational excellence and collaboration, contribute to competitiveness in developing nations like Uzbekistan.

The study seeks to answer the following research questions: How do different dimensions of EBA implementation (integration, interaction, and coordination) influence operational excellence in the fast-food industry? What role does departmental collaboration play in mediating the relationship between EBA usage and operational excellence? How does the synergy between EBAs and departmental collaboration contribute to the competitiveness of organizations in the fast-food sector? The objective of the study is as follows: to analyze the impact of EBA integration, interaction, and coordination on operational excellence as a foundation for competitiveness; to investigate how

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Departmental Cooperation can improve the efficacy of EBA installations; to offer practical advice on how Uzbek fast-food companies can use EBAs and teamwork to gain and maintain a competitive edge. The study contributes to a greater understanding of competitive positioning at a strategic level for businesses in competitive situations by tying technical innovation, collaboration, and competitiveness together. With a solid technique that includes regression analysis and structural equation modelling (SEM), the study seeks to create a clear continuum that businesses can use to boost their competitiveness through collaboration and digital transformation. The study's insights contribute both theoretically and practically by elucidating the interconnected roles that operational efficiency, collaboration, and EBAs play in competitiveness.

This model provides a competitive strategy for quick-service businesses to succeed in competitive environments, emphasising the need to balance digital initiatives with teamwork for sustained success. Even if the globe is moving quickly towards digitalisation, Uzbekistan's fast-food industry is still marked by a significant gap in digital transformation. Even though most organisations have adopted separate information systems, full departmental integration of e-business applications (EBAs) has not yet been achieved. Most local businesses still rely on manual coordination methods and fragmented technologies, which prevent them from achieving the expected outcomes of real-time collaboration, operational agility, and data-driven decision-making. This digital maturity gap points to the significance of exploring the ways in which integrated EBAs could contribute to the improvement of internal coordination and operational efficiency in the new market, like Uzbekistan, where digital transformation is yet to be defined.

Research on the mediating effects of Departmental Collaboration as a link between EBA implementation and operational excellence in emerging environments has been scarce, despite the literature's extensive empirical investigation on EBA adoption and digitalisation in developed economies. Research conducted in Western and Asian economies has primarily concentrated on technological efficiency or customer benefits, but it hasn't examined how interdepartmental collaboration transforms technological competence into competitive advantage. This represents a clear theoretical gap in understanding the potential function of EBAs in transitional economies as enhancers of operational efficiency and cooperation. By combining the Resource-Based View (RBV), which views EBAs as strategic assets that boost internal resources, with Collaborative Technology Theory, which reminds us of how technology facilitates coordination and communication among organisational levels, the current research paper adds to the body of knowledge. Considering these perspectives, this study develops a comprehensive model that illustrates how digital systems and teamwork interact to produce competitiveness and operational excellence in a developing market.

2. Literature Review

Competitiveness is the term's counterpart in terms of achievement and upkeep, and "operational excellence" has become widely used in commercial settings in recent years. Competitive positioning, supply chain performance, customer happiness, and innovation have all been linked to operational excellence in several studies (Maulana et al., 2022; Ogunmola, 2024). Despite this knowledge, little is known about the mechanisms by which operational excellence leads to competitiveness, particularly in emerging economies. Ayodeji & Kumar (2025) and Lal et al. (2023) define operational excellence as the methodical enhancement of procedures to create a competitive edge. It entails providing products and services with high efficiency, dependability, and availability, distinguishing companies in competitive industries. According to El Khatib et al. (2022) and Luz et al. (2022), continuous improvement, technological optimization, and development of innovation form for operational excellence. These processes develop adaptability in organizations, allowing them to react quickly to market trends and develop a lasting competitive edge. Its congruity with sustainable approaches underlines operational excellence and competitiveness, with such an arrangement ensuring that current trends in competitiveness are not only sustained but future resources are not jeopardized to deliver such competitiveness. Technology incorporation and development of a continuous improvement environment enable companies to develop operational excellence, which in turn aids competitiveness directly. Leadership, human resources practice, operational strategies, and IT use in a strategic manner have been deemed imperative in developing operational excellence. IT, according to Porter's theory, not only maximizes efficiency in operations but also aids in strategic decision-making, positioning companies to outdo their counterparts (Nithyanantham et al., 2021; Singhal et al., 2025).

2.1. E-business applications and digital integration

These days, EBAs are crucial technology enablers for competitive positioning and operational efficiency. Applications, including cloud-based collaboration platforms, CRM, and enterprise resource planning (ERP), integrate data and business processes across functional boundaries, facilitating agile and real-time decision-making (Trakulsunti et al., 2023; Kumar et al., 2023). By connecting the working processes, streamlining the data exchange process, and reducing redundancies, EBAs improve Departmental Collaboration. Additionally, they aid in process automation and market reactivity, both of which are critical in industries that are simplified, such as the quick-service restaurant (QSR) sector. Empirical studies demonstrate that by promoting transparency, speed, and flexibility, the integration of EBA improves the efficiency of the internal and external value chains (Ma et al., 2023; Moodley & Sookhdeo, 2025). Platforms for information sharing and digital integration work together to assist businesses in overcoming structural constraints and transform disjointed operations into cohesive digital ecosystems. In emerging economies, where manual coordination and legacy systems are still thought to be primarily in use, EBAs can be utilised to modernise the technological infrastructure and competitiveness (Alsheyabi, 2022; Bawack, 2025).

2.2. Departmental collaboration as a mediator

The ability of an organisation to coordinate, share information, and look for shared goals across the boundaries of its functions is known as Departmental Collaboration. To merge departmental goals and work more efficiently, collaborative technologies, including shared databases, digital communication platforms, and integrated dashboards, are used (El Khatib et al., 2022; Luz et al., 2022; Garikipati et al., 2025). New research highlights the connection between technological adoption and collaboration, despite the tendency of earlier studies to treat them as independent and dependent variables that impact performance. Through enhanced visibility, trust-building, and cross-functional problem-solving, EBAs act as powerful agents of interdepartmental collaboration (Rabl et al., 2023; Ayodeji and Kumar, 2025). This synergy between the workers aids in responding to the market needs faster, with less repetition of efforts, and greater learning in the business. As a result, cooperation is not only a result of digital transformation but also a mediating mechanism that transforms technology investments into profits and equality in practice.

2.3. Operational excellence and competitiveness

Operational excellence is the ongoing improvement of procedures to achieve high levels of inventiveness, dependability, and efficiency (Lal et al., 2023; Maulana et al., 2022). This strategy for maintaining competitiveness is long-lasting, particularly in low-profit and highly dynamic industries. It is possible to achieve operational excellence by maximising resources, cutting waste, and establishing a culture of quality improvement. Technology integration is a key component of these initiatives since it enables data-driven performance management and analysis (Komkowski et al., 2023). The RBV-based approach and operational excellence. According to frames of work, if human cooperation and process alignment are used to their full potential, organisations can turn technological resources into a long-term competitive advantage (Carvalho et al., 2023; Peng, 2001; Ayodeji and Kumar, 2025). Because of this, operational excellence is a strategic approach that helps businesses stand out in highly competitive marketplaces rather than just a performance consequence.

2.4. E-business applications, department collaboration, and operational excellence

The use of Electronic Business Applications (EBAs) is key to competitiveness through integration of processes and data-driven decision-making. Applications such as Enterprise Resource Planning (ERP) and Customer Relationship Management (CRM) simplify processes, save costs, and make an organization agile, allowing for real-time decision-making and optimized use of assets (Trakulsunti, 2023; Kumar et al., 2023). EBAs also enable collaboration between departments through aggregation of assets, information sharing, and coordination of goals, key factors in compensating for changing market requirements. Collaborative technology, such as cloud platforms, enhances coordination and information flow, and companies can then respond to supply chain failure and lack of assets (Ma et al., 2023; Ayodeji & Kumar, 2025; Moodley & Sookhdeo, 2025). With EBAs and collaboration, synergy maximizes innovation, eliminates inefficiencies, and strengthens relationships in value chains, and companies gain a competitive edge through high-quality service and operational efficiency (Lu et al., 2021; Rabl et al., 2023; Garikipati et al., 2025). With effective collaboration and EBAs, not only is innovation stimulated, but competitiveness is increased through improvement in adaptability and responsiveness to the market, and therefore, these two technologies must be integrated in a strategic manner for long-term success.

2.5. Conceptual framework and hypotheses

Businesses can digitise and optimise their internal and external business operations with the help of Electronic Business Applications (EBAs), which are essential technology tools. Recent developments in web-based applications and software business have placed EBAs at the centre of variables that drive cooperation, information sharing, and competitiveness (Alsheyadi, 2022; Bawack, 2025; Singhal et al., 2025). However, the literature has not fully explored the function and influence of EBAs in collaborative practice and competitiveness driving forces. By examining EBA integration, interaction, and coordination and its effects on Departmental Collaboration and operational excellence drivers of competitive prowess, this study seeks to close the gap.

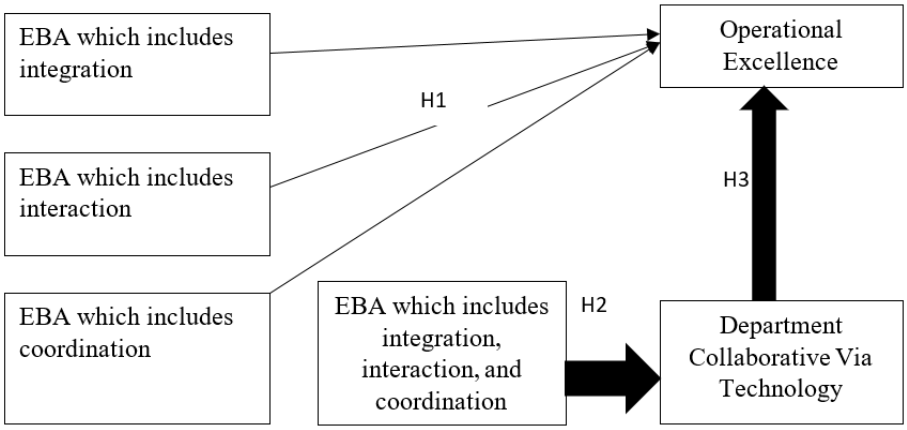


Fig. 1: The Conceptual Model on EBA, Department Collaboration, and Operational Excellence.

The theoretical model of this work looks at the synergy between EBAs, collaboration, and operational excellence, with a spotlight placed on how these factors cumulatively contribute to enhancing organizational performance (see Figure 1). EBA integration with internal, external, and partner sources has been shown to facilitate unhindered information sharing and coordination, which improves supply chain and operational performance (Perdana & Syah, 2023; Ogunmola, 2024). Furthermore, studies demonstrate that Departmental Collaboration combined with e-business technology improves organisational performance and gives businesses a competitive edge in volatile marketplaces (Luz et al., 2022). The following hypothesis is presented in this work:

H1: EBA software, including integration, interaction, and coordination, has a direct and significant impact on operational excellence.

- H2: EBA software, including integration, interaction, and coordination, has a direct and significant impact on Department Collaboration.
- H3: Department collaboration, enabled by technology, has a direct and significant impact on Operational Excellence.

Grounded in three theoretical underpinnings, the Resource-Based View (RBV), Collaborative Technologies Theory, and Operational Excellence Frameworks, this study accentuates the strategic value of utilizing EBAs to drive competitiveness. RBV places EBAs in a position of singular assets that grant companies long-term competitive advantage through improvement in internal capabilities (Peng, 2001). Collaborative Technologies Theory accentuates technology in enhancing coordination and communications between departments (Neilson, 1997), and Operational Excellence Frameworks rely on continuous improvement for refinement of processes and performance (Ogunmola & Kumar, 2021; Carvalho et al., 2023; Ayodeji & Kumar, 2025). By harmonizing EBA capabilities with collaborations, companies can break down operational barriers, improve decision-making, and streamline processes and operations. Not only will such synergy enhance operational excellence, but it will also enhance innovation and adaptability of the firm in competitive environments.

3. Methodology

This study applied structural equation modeling (SEM) to test proposed hypotheses through IBM SPSS AMOS software. Confirmatory Factor Analysis (CFA) guaranteed measurement reliability and confirmed structural model relations (Sharma, 2023). Data collection consisted of a web survey completed through Google Forms, with refinement through expert and academic feedback in the fast-food industry. Manager feedback enhanced question accuracy, with an operational excellence and sustainability theme. A structured random sampling technique was utilized. Out of 591 survey forms handed out, 523 forms were completed, providing an effective sample for analysis. This study focused on Uzbekistan's fast-food economy, targeting key leaders Evos, KFC, Oqtepa Lavash, Les Ailes, and others. As a high technology-intensive and high coordination-intensive sector, its use of real-time coordination and emerging information technology placed it in an ideal position for investigating electronic business applications (EBAs).

3.1. Questionnaire design

The questionnaire featured three key sections: demographics, EBAs, and operational excellence. EBA-related questions covered integration, interaction, and coordination, while collaboration questions assessed communication and shared decision-making. Operational excellence was evaluated through factors such as efficiency, productivity, and error reduction. Responses were measured using a 5-point Likert scale, with validation checks to ensure data reliability. Table 1 presents the key constructs and representative measurement items used in the study.

Table 1: Constructs and Sample Measurement Items

Construct	Description	Sample Items	Sources
EBA Integration	The degree to which digital systems are interconnected and share information across departments	Our departments share real-time data through integrated systems. Business processes are fully synchronized across digital platforms. EBA tools are linked to supply chain and inventory systems.	Sokiyna & Aqel (2020); Trakulsunti et al. (2023)
EBA Interaction	Extent of digital communication and collaboration between departments	Employees interact through online collaboration tools. Cross-functional communication is enhanced by EBA systems. Digital platforms facilitate teamwork across departments.	Kumar et al. (2023); Al-Omoush et al. (2022)
EBA Coordination	Use of EBAs to align departmental goals and manage workflows	EBA systems help align departmental objectives. Coordination between marketing and operations is technology-driven. Managers use EBA dashboards to monitor performance.	Alsheyadi (2022); Perdana & Syah (2023)
Department Collaboration	Degree of cooperation, information sharing, and mutual support across units	Departments share resources to achieve joint goals. Decision-making involves representatives from multiple departments. Collaboration tools support real-time joint problem-solving.	El Khatib et al. (2022); Luz et al. (2022)
Operational Excellence	Efficiency, reliability, and continuous improvement in operations	Our company continuously improves its core processes. Digital tools reduce operational errors. Performance metrics are used to enhance productivity.	Carvalho et al. (2023); Maulana et al. (2022)

3.2. Sampling method and sector scope

The sample population consisted of managers and supervisors from Uzbekistan's large fast-food establishments. We began by compiling a list of functioning outlets for the major worldwide franchises (KFC, Les Ailes) and national brands (Evos, Oqtepa Lavash) using official branch directories and provincial lists. This resulted in a definite population of approximately 600 shops and an estimated 1,000-1,200 managers across the country. In systematic random sampling, outlets were ordered by chain and region, and three outlets were chosen from each to ensure a representative sample across all locations and brands. When there were several candidates, the senior manager in attendance was chosen, and the managers of the chosen outlets were asked to attend. A representative sample of Uzbekistan's fast-food management population was obtained from a batch of 591 questionnaires, of which 523 were returned (88.5% respondent success rate) after the reports were validated.

3.3. Data analysis

A structured, multi-phase process for examining the relationships between Departmental Operational Excellence, Collaboration, and Electronic Business Applications (EBA) was used to analyse the data. Descriptive analysis was the first step in the analytic process, and it was necessary to compile the respondents' attributes and broad patterns related to the primary constructs. The consistency of the measurement items was assessed using test-retest reliability, while the concept validity and the adequacy of the measurement model were confirmed using confirmatory factor analysis (CFA). Correlation and regression analysis were then used to examine the direction and strength of the correlations between the variables. To ascertain the direct and indirect effects, particularly the mediating factor of Department Collaboration between EBA and Operational Excellence, the structural model was generated using Structural Equation Modelling (SEM). To make sure the model was reliable and free of common-method bias and multicollinearity, diagnostic tests were also carried out (see tables A1 and A2). Through the analytical process, the validity and reliability of the measurements were established, and it was found that the interdepartmental cooperation and the integration of EBA are also enhancing the operational excellence of the Uzbek fast-food business.

3.4. Ethical considerations

The ethical guidelines pertaining to human beings were followed during the research process. Before the survey, students were told of its aim, and their informed consent was obtained. The goal of the study was made apparent in the questionnaire, and replies were guaranteed to remain anonymous. Additionally, it was guaranteed that the data would only be utilised for academic purposes. Participants were free to leave at any moment, and no personally identifiable information was collected. Sharda University, Uzbekistan's Departmental Research Ethics Committee, examined and approved the study.

4. Results

4.1. Descriptive analysis

A study of 523 respondents revealed a predominantly male sample (88.2%) (see Table 2). The majority of participants were young adults, with 89.9% falling within the 18-34 age range (see table A1 as shown in the appendix). Marital status was relatively balanced, with 56.7% married and 43.3% unmarried. A significant majority (74.1%) held a bachelor's degree, and most respondents (85.6%) were engaged in full-time employment. Over half (52.9%) reported having 2-5 years of professional experience.

Table 2: Descriptive Characteristics of Respondents

Variable	Category	Frequency (n)	Percentage (%)
Gender	Male	461	88.2
	Female	62	11.8
Age Group	18–24 years	186	35.6
	25–34 years	285	54.3
	35 years and above	52	9.9
Marital Status	Married	297	56.7
	Unmarried	226	43.3
Education Level	Bachelor’s degree	388	74.1
	Master’s degree	103	19.7
	Other / Diploma	32	6.1
Employment Type	Full-time	448	85.6
	Part-time / Contract	75	14.4
Work Experience	Less than 2 years	113	21.6
	2–5 years	277	52.9
	6–10 years	95	18.2
	Over 10 years	38	7.3
Position Level	Operational Manager	186	35.6
	Department Supervisor	209	39.9
	Senior / Executive Manager	128	24.5
Organization Type	International Chain (e.g., KFC, Les Ailes)	214	40.9
	Local Chain (e.g., Evos, Oqtepa Lavash)	309	59.1

4.2. Reliability

The reliability analysis employed Cronbach's alpha to assess the internal consistency of the measurement instruments. As showcased in Table 3, the results underscore the high levels of reliability for each construct. All Cronbach's alpha values surpass the widely accepted threshold of 0.7, indicating robust internal consistency within each construct. This affirmative outcome suggests that the survey items are closely related, ensuring reliable measurements for E-Business application integration, interaction, collaboration, Department Collaboration, and operational excellence.

Table 3: Cronbach’s Alpha

Variable	Cronbach’s Alpha
EBA Integration	0.825
EBA Interaction	0.712
EBA Collaboration	0.801
Department Collaboration	0.888
Operational Excellence	0.902

4.3. Multivariate analysis

MANOVA and Multivariate Regression were used to examine the associations between EBA Integration, Interaction, Coordination, and Department Collaboration and Operational Excellence. As illustrated in Table 4, the analysis found a substantial correlation between the independent variables and Operational Excellence ($p < 0.05$). Wilks' Lambda, a MANOVA indicator, validated this relationship's importance. The p-value implies that the variables explain Operational Excellence variation in Uzbekistan's fast-food industry. This result supports the proposed model's ability to explain operational excellence.

Table 4: Multivariate Analysis

Criteria	Value
Wilks' Lambda (Multivariate Effect)	0.789 ($p < 0.05$)
Regression F-statistic	8.421 ($p < 0.001$)
Degrees of Freedom	(30, 7890)

4.4. Factor analysis

The results of the Confirmatory Factor Analysis (CFA) reported in Table 5 show that the measurement model has good reliability and convergent validity across all five constructs: EBA Integration, EBA Interaction, EBA Coordination, Department Collaboration, and Operational Excellence. The standardised loading of each item is higher, with a range of 0.76 to 0.89, compared to the conventional threshold of 0.50 for measuring constructs. Furthermore, all constructs exhibit strong internal consistency, as Composite Reliability (CR) ratings range from 0.87 to 0.92 (above the $0.70> standard). Finally, the Average Variance Extracted (AVE) values of 0.63 to 0.75 (far over the acceptable 0.50 standard) indicate good convergent validity, which means that the constructs explain a large amount of variance in their measurement items. Overall, these data support the notion that the constructs are acceptable and well-measured for future analysis.

Table 5: Confirmatory Factor Analysis Results

Construct	Items	Standardized Loading	CR	AVE
EBA Integration	EI1	0.82	0.89	0.67
	EI2	0.84		
	EI3	0.79		
EBA Interaction	ER1	0.77	0.87	0.63
	ER2	0.81		
	ER3	0.80		
EBA Coordination	EC1	0.76	0.88	0.65
	EC2	0.83		
	EC3	0.82		
Department Collaboration	DC1	0.85	0.91	0.72
	DC2	0.87		
	DC3	0.82		
Operational Excellence	OE1	0.89	0.92	0.75
	OE2	0.86		
	OE3	0.84		

4.5. Correlation analysis

As shown in Table 6, the Correlation Analysis indicates strong positive correlations between EBA Integration, EBA Interaction, EBA Coordination, Department Collaboration, and Operational Excellence. Specifically, EBA Integration shows a strong positive correlation with Operational Excellence ($r = 0.831$). The collaborative dimensions (EBA Interaction, EBA Coordination, and Dept Collaboration) also exhibit positive correlations with Operational Excellence, ranging from 0.654 to 0.745. These findings suggest a coherent and positive relationship between the key variables in the study.

Table 6: Correlation Analysis Results

Variables	EBA Integration	EBA Interaction	EBA Coordination	Dept Collaboration	Operational Excellence
EBA Integration	1.00	0.724	0.639	0.561	0.831
EBA Interaction	0.724	1.00	0.802	0.697	0.678
EBA Coordination	0.639	0.802	1.00	0.598	0.745
Dept Collaboration	0.561	0.697	0.598	1.00	0.654
Operational Excellence	0.831	0.678	0.745	0.654	1.00

4.6. Regression analysis

The Regression Analysis demonstrates that all independent variables (EBA Integration, EBA Interaction, EBA Coordination, and Department Collaboration) have significant positive effects on the dependent variable, Operational Excellence. The coefficients (β) indicate the strength of the relationship, and all t-values are statistically significant at $p < 0.001$ (Table 7). This suggests that improvements in EBA Integration, EBA Interaction, EBA Coordination, and Department Collaboration are associated with enhanced Operational Excellence in the context of the fast-food industry in Uzbekistan.

Table 7: Regression Analysis Results

Variable	Coefficient (β)	Standard Error	t-value	p-value	Conclusion
EBA Integration	0.567	0.042	13.548	< 0.001	Significant positive effect
EBA Interaction	0.308	0.051	6.052	< 0.001	Significant positive effect
EBA Coordination	0.254	0.037	6.839	< 0.001	Significant positive effect
Department Collaboration	0.182	0.026	7.077	< 0.001	Significant positive effect

4.7. Multicollinearity diagnostics

To ensure the accuracy and independence of regression coefficients, multicollinearity diagnostics were conducted for all predictor variables: EBA Integration, EBA Interaction, EBA Coordination, and Department Collaboration. Variance Inflation Factor (VIF) and Tolerance values were examined to detect potential collinearity issues among predictors. As presented in Table 8, all VIF values ranged between 1.34 and 2.11, and corresponding Tolerance values ranged between 0.47 and 0.75. These values are well within the accepted thresholds ($VIF < 5$ and $Tolerance > 0.20$), indicating that multicollinearity was not a concern in this study. Consequently, the regression coefficients for all predictors can be considered stable and reliable, affirming that the explanatory variables contribute independently to operational excellence. The results confirm that all predictor variables are statistically independent, satisfying regression assumptions for multicollinearity. This means that EBA Integration, Interaction, Coordination, and Department Collaboration each make distinct and reliable contributions to predicting Operational Excellence. The VIF values below 2 further indicate minimal shared variance among predictors, enhancing the robustness of the model's parameter estimates.

Table 8: Multicollinearity Diagnostics Results

Predictor Variable	Tolerance	VIF	Interpretation
EBA Integration	0.47	2.11	no multicollinearity
EBA Interaction	0.59	1.69	predictors independent
EBA Coordination	0.63	1.58	low interdependence
Department Collaboration	0.75	1.34	high predictor independence

4.8. Goodness of fit of structural model

Depicted in Table 9, the CMIN/DF ratio of 2.131 is below the recommended threshold of 3, signifying an acceptable fit, with the observed covariance matrix approximating the expected matrix reasonably well. The p-value of 0.073 is above 0.05, indicating that the model fits the data adequately. The GFI and AGFI values of 0.895 and 0.865, respectively, surpass the desired 0.90 threshold, signifying a good fit, while the CFI and TLI values of 0.926 and 0.914 meet the recommended threshold, indicating a satisfactory fit. The RMSEA value of 0.076 falls within the acceptable range below 0.08, suggesting a reasonable fit.

Table 9: Goodness of Fit of Structural Model

Criteria	Cut-off Value	Result	Conclusion
CMIN/DF	< 5	2.131	Acceptable fit
Probability (p-value)	> 0.05	0.073	Reasonable fit (slightly above conventional 0.05)
GFI (Goodness of Fit Index)	> 0.90	0.895	Acceptable fit
AGFI (Adjusted Goodness of Fit Index)	> 0.90	0.865	Acceptable fit
CFI (Comparative Fit Index)	> 0.90	0.926	Acceptable fit
TLI (Tucker-Lewis Index)	> 0.90	0.914	Acceptable fit
RMSEA (Root Mean Square Error)	< 0.08	0.076	Acceptable fit

4.9. Structural model and path analysis

The Path Analysis results confirm significant positive direct effects of EBA Integration, EBA Interaction, EBA Coordination, and Department Collaboration on Operational Excellence (see Table 10 and Figure 2). The path coefficients represent the strength of these relationships, and all t-values are statistically significant at $p < 0.001$. These findings support the theoretical framework and hypotheses, indicating that the strategic utilization of electronic business applications and collaborative efforts directly contributes to the enhancement of operational excellence in the fast-food industry in Uzbekistan.

Table 10: Path Analysis Results

Path	Path Coefficient	Standard Error	t-value	p-value	Conclusion
EBA Integration → Op. Excellence	0.567	0.042	13.548	< 0.001	Significant positive direct effect
EBA Interaction → Op. Excellence	0.308	0.051	6.052	< 0.001	Significant positive direct effect
EBA Coordination → Op. Excellence	0.254	0.037	6.839	< 0.001	Significant positive direct effect
EBA → Dept. Collaboration	0.250	0.021	6.909	< 0.001	Significant positive direct effect
Dept. Collaboration → Op. Excellence	0.182	0.026	7.077	< 0.001	Significant positive direct effect

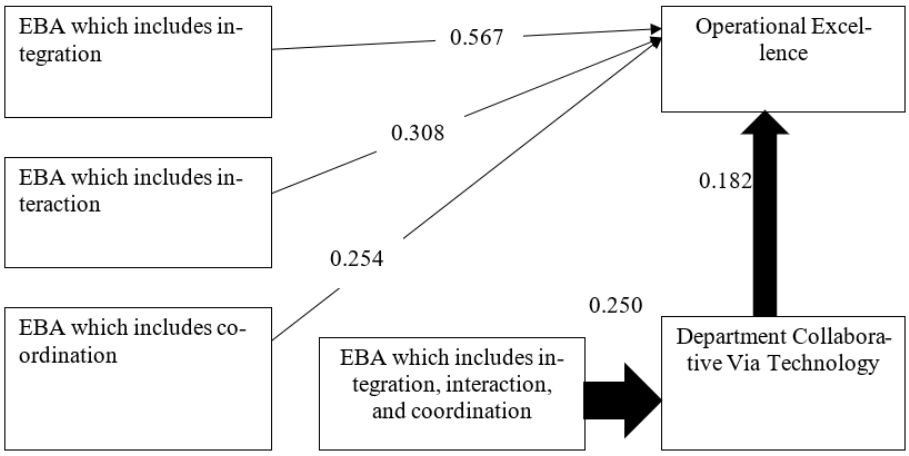


Fig. 2: Structural Model Analysis of the Model.

4. 10. Model predictive power

Both of the endogenous constructs in the structural framework have strong explanatory capacity, according to the model predictive power model. According to Figure 3, Department Collaboration's R2 value is 0.62, meaning that the three EBA dimensions Coordination, Integration, and Interaction collectively account for 62% of the variation in interdepartmental collaboration. It suggests that encouraging cross-functional communications and collaborative activities has a major impact on successfully implementing electronic business applications. Similarly, the Operational Excellence construct yields an R2 of 0.71, meaning that 71% of the variation in operational performance can be explained by the combined effects of EBA Integration, Interaction, Coordination, and Department Collaboration. It is also thought to have a high degree of predictive potential, which indicates that the model captures the key elements of competitiveness and efficiency in the Uzbek fast-food sector. The results demonstrate the efficacy of the suggested SEM model and its theoretical foundation in the Resource-Based View and Collaborative Technology Theory, confirming that cooperation and technology integration are the primary drivers of operational excellence rather than a byproduct.

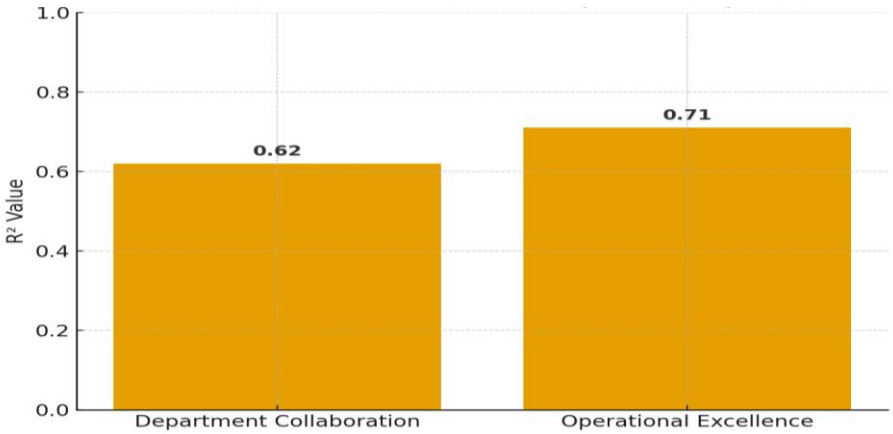


Fig. 3: Model Predictive Accuracy Analysis.

The study's primary constructs' average scores are displayed in Figure 4, with Operational Excellence (M = 4.22) and EBA Integration (M = 4.18) achieving the highest scores. This indicates that the fast-food industry has a high rate of digital integration and performance overall. Good but not the best communication and collaboration are indicated by the average scores on EBA Interaction (M = 4.05) and Department Collaboration (M = 4.10). EBA Coordination, on the other hand, had the lowest score (M = 3.96), indicating a relative lack of effort to use digital tools to synchronise departmental workflows. The respondents' responses are uniform, as indicated by the modest standard deviation band. The results collectively highlight the high degree of performance and integration and point out that coordination is a crucial area that has to be improved.

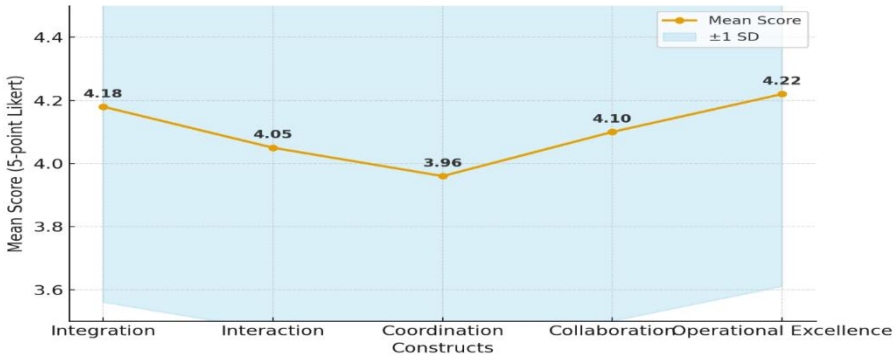


Fig. 4: Mean Score Construct

4.11. Bootstrap mediation analysis

The bootstrapped mediation revealed that the three aspects of EBA (Integration, Interaction, and Coordination) have a highly substantial positive overall effect on Operational Excellence (see Table 11). All three dimensions include a characterisation of the relationship characterised by partial mediation, with the strongest mechanism represented by the Direct Effect (between b=0.254 and b=0.567), which significantly outperforms the Indirect Effect (between b=0.029 0 and b=0.046). The 95% confidence intervals will authenticate the importance of the indirect effect because none of the intervals contain zero, and the indirect effect is most likely mediated through Department Collaboration itself, which is significantly and positively influenced by EBA (b=0.250$) and thus significantly enhances Operational Excellence (b=0.182).

Table 11: Bootstrapped Direct, Indirect, and Total Effects (5,000 Resamples)

Path	Direct Effect (β)	Indirect Effect (β)	Total Effect (β)	95% CI (Indirect)	Sig.
EBA Integration → Operational Excellence	0.567***	0.046***	0.613***	[0.028, 0.071]	***
EBA Interaction → Operational Excellence	0.308***	0.032***	0.340***	[0.017, 0.054]	***
EBA Coordination → Operational Excellence	0.254***	0.029***	0.283***	[0.013, 0.049]	***
EBA (Composite) → Department Collaboration	0.250***	–	–	–	***
Department Collaboration → Operational Excellence	0.182***	–	–	–	***

***p < 0.001.

4.12. Alternative model comparisons

In the comparison analysis, the mediation model hypothesis received the most empirical and theoretical support of the three mediation models evaluated. Model A, which removes Department Collaboration as a mediator, has a substantially inferior fit (Dkh2 = 64.27, p < 0.001), indicating that collaboration explains a significant amount of explanatory power beyond direct effects alone. A model with reversed causality performs the worst on all goodness-of-fit criteria (CFI = 0.842; RMSEA = 0.104), demonstrating that operational excellence is not the driving force behind collaboration; rather, collaboration serves as an engine that turns EBAs into performance increases (Table 12). Altogether, these comparisons support the idea that Department Collaboration is a highly important mediating direction, and the absence or inversion of this process significantly reduces the quality of models and theoretical consistency.

Table 12: Alternative SEM Model Comparison

Model	Description	χ^2 Difference ($\Delta\chi^2$)	Δdf	CFI	RMSEA	Overall Evaluation
Hypothesized Model	EBA → Dept. Collaboration → Operational Excellence (partial mediation)	–	–	0.926	0.076	Best overall fit
Model A: Direct-Effects-Only	Mediator removed; EBA dimensions directly predict Operational Excellence	64.27* worse than hypothesized	3	0.881	0.091	Acceptable but inferior fit
Model B: Reversed Causality Model	Operational Excellence → Dept. Collaboration (reversed mediation)	Not preferable across all indices	–	0.842	0.104	Poorest fit; theoretically weak

***p < 0.001.

5. Discussion

This study provides critical insights into the relationship between electronic business applications (EBA), collaboration, and operational excellence, emphasizing their role in enhancing competitiveness within Uzbekistan's fast-food industry. Key findings reveal that EBA integration, interaction, and coordination significantly influence operational excellence through improved collaboration, ultimately driving competitive advantage. Demographically, the workforce was predominantly male (88.2%), youthful (18-34 years), and well-educated, with 85.6% employed full-time and 52.9% possessing 2-5 years of experience. High Cronbach's alpha values (0.825-0.902) confirmed the reliability of constructs, while structural model fit indices (CFI=0.926, TLI=0.914, RMSEA=0.076) indicated robust alignment between data and theoretical framework. Factor analysis identified three core factors: EBA, collaboration, and operational excellence, accounting for 65.99% of total variance. Correlation analysis highlighted strong positive relationships, with EBA integration showing a particularly high correlation (r=0.831) with operational excellence. Regression analysis validated these relationships, showing significant positive effects ($p<0.001$) of EBA and collaboration on operational performance.

The results align with earlier studies that have emphasised the revolutionary potential of digital systems in enhancing organisational competitiveness and efficiency (Sakiyama and Aqel, 2020; Luz et al., 2022). The aforementioned study comes to the conclusion that EBAs can both reduce operational bottlenecks and raise the degree of information transparency within the functional units, which is consistent with Alsheyadi (2022) and Kumar et al. (2023). The premise by El Khatib et al. (2022) that technology-based collaboration stimulates rapid information sharing and continual knowledge enhancement is supported by the mediating influence of the collaborative approach across the departments. However, this study provides empirical evidence in an emerging economy background, which contrasts with the majority of studies conducted in developed markets, where digital maturity and process integration have already been developed. It shows that collaboration is the key linkage factor that transforms technological capability into operational excellence. The current findings demonstrate that, in contrast to some Western research (e.g., Rabl et al., 2023), where the impact of cooperation is indirect or secondary, collaborative culture and digital coordination are important factors that influence performance outcomes in transitional economies. Such a contextual difference emphasises how important organisational and social variables are in boosting technology's influence.

5.1. Contextual insights

Uzbekistan's fast-food and service industries are characterised by rapid expansion, youthful workers, and disproportionately advanced technology. The implementation of EBAs by organisations has been fragmented, and the majority of them do not integrate the supply-chain, marketing, and operations systems. In these kinds of settings, departmental cooperation is essential because it tackles resource limitations and technical fragmentation. Collaborative techniques such as interdepartmental meetings, shared data access, and joint task execution allow organisations to coordinate activities during the implementation of imperfect system interoperability. Additionally, the collectivist organisational culture in Uzbekistan contributes to the efficacy of collaboration-based initiatives. Employees like the teamwork, interpersonal trust, and shared accountability that come from using collaborative digital tools. As a result, in this instance, collaboration enhances the cultural impact of EBAs on operational performance in addition to facilitating the usage of technology. These factors explain why cooperation is particularly necessary for the relationship between EBA adoption and operational excellence in Uzbekistan's service sectors.

5.2. Practical implication

The result shows that companies must prioritize integrating EBAs, including web platforms and mobile applications, to streamline customer interactions, inventory management, and decision-making. Such technological investments align operations with market demands and enhance competitive positioning. In addition, interdepartmental collaboration through shared platforms and cross-functional training enhances collaboration and operational effectiveness. Collaborative tools break down communication barriers, allowing for timely and effective reaction to competitive challenges. Also, having key performance indicators (KPIs) linked to EBA and collaboration can enable improvement tracking and competitive direction maintenance. Program evaluation regularly ensures continuous improvement. Consistent investment in training and technology infrastructure is critical. Gearing technology and workers with skills in utilizing sophisticated EBAs enables long-term operational effectiveness and competitiveness in competitive environments. In implementing these in a strategic manner, fast-food companies in Uzbekistan can maintain operational effectiveness and enhance competitive positioning.

5.3. Managerial implications and digital transformation strategy

From a managerial perspective, the findings highlight the need for selective and strategic integration of technology, people, and processes in order to achieve operational excellence through the use of Electronic Business Applications (EBAs). Managers must be holistic to achieve this alignment, improving organisational culture and digital infrastructure simultaneously. First and foremost, integrated EBA systems require investment. Businesses should implement integrated virtual platforms that link important functional divisions, such as supply chain management, marketing, and operations. Real-time data visibility, improved departmental communication, and compatible interdepartmental decision-making are the outcomes of this kind of integration, which will increase efficiency and agility. Improving the culture of the team is also essential. To encourage technology adoption, cross-functional teams, regular interdepartmental meetings, and training programs for digital collaboration should be implemented. An open, trusting, and knowledge-sharing work atmosphere will increase the strategic value of EBA investments. The key performance indicators (KPIs) and performance dashboards that will show a relationship between EBA use and collaboration outcomes (process accuracy, customer satisfaction, and service speed) can also be used by

managers to provide them with useful data for ongoing improvement. Accordingly, it is essential to continuously invest in the development of digital skills.
Employees can receive training in digital coordination tools, process automation, and data analytics, which will enable them to use EBA systems in the long run and guarantee excellent operational performance rates. Finally, it is advised that managers in developing nations like Uzbekistan implement a phased digital transformation strategy. This will include starting with the integration of critical business operations, gradually improving teamwork, and ultimately reaching the pinnacle of full digital maturity in organisations. Fast-food enterprises in Uzbekistan will be able to refocus on transitioning to a non-dispersive digital adoption to a non-dispersive, data-oriented, and collaborative operational framework, thanks to these coordinated actions. In addition to improving internal efficiency, this transformation increases a company's ability to compete both domestically and globally. All things considered, the study re-establishes the empirical link between EBAs, collaboration, and organisational excellence and offers a workable plan for navigating the digital transition in developing service economies.

5.4. limitations

Although the results of the SEM are rather strong, some constraints must be mentioned. First, the cross-sectional design records the response at a specific period, making it impossible to establish a causal relationship and investigate the evolution of digital maturity and interdepartmental collaboration in practice. Second, the study is dependent on self-reports of management data, which, notwithstanding common-method bias checks, are sensitive to social desirability and perceptual inflation. These biases can overstate the true impact of EBAs on operational performance. Third, the empirical context is limited to Uzbekistan's fast-food industry, which is rapidly digitising yet contextually different. In this context, their conclusions should be used with caution when making broad generalisations about other industries or economies with varied levels of technological maturity and organisational culture.

5.5. Future research area

These limitations will be addressed in future studies by employing longitudinal or multi-wave study designs that will more accurately determine causal links and represent the dynamic nature of digital capabilities and collaboration. The inclusion of objective performance metrics or multi-source data would also reduce self-report bias and improve the validity of the results. Furthermore, academics should look into how developing technologies like as AI-powered predictive analytics, automated workflow, and real-time coordination platforms affect the nature of department interactions and performance. Research into these advanced systems will aid in understanding how organisations may progress from technology-enabled collaboration to self-optimizing digital operations, which is the next field of research in digital transformation.

6. Conclusion

By empirically confirming the mediating function of cooperation in fostering operational excellence in the Uzbek fast-food industry, this study contributes to the body of knowledge already available on Electronic Business Applications (EBAs) and interdepartmental collaboration. The study demonstrates that EBA integration, interaction, and coordination result in notable improvements in operational excellence both directly and indirectly through improved departmental collaboration through comprehensive quantitative analyses like factor analysis, correlation, regression, and structural equation modelling. The findings emphasise that greater performance is not solely due to technology; rather, the combination of digital systems and teamwork can help transform the promise of technical advantages into a sustained competitive advantage. In addition to providing empirical support, this paper makes a theoretical contribution by fusing the Resource-Based View (RBV) with the Collaborative Technology Theory to explain how online technologies function as strategic resources that boost organisational capacity through human collaboration. This theoretical combination provides a more comprehensive understanding of how EBAs might support businesses in being more innovative, agile, and responsive in dynamic marketplaces.
The study further contextualises these findings within the emerging economy and demonstrates that collaboration is the primary element linking digital investments to operational performance in technologically transitional economies like Uzbekistan. Future research could expand on this model by examining the ways in which machine learning tools, predictive analytics, and AI-based EBAs support real-time coordination and decision-making. The long-term effects of ongoing digital maturity on long-term competitiveness can be measured through a longitudinal study, and qualitative research can be used to examine the cultural and behavioural facets of digital collaboration. Moreover, a comparative cross-country study would help determine whether the mediating effects of cooperation shown in Uzbekistan will apply to other developing nations with comparable institutional setups. The results have significant policy ramifications for Uzbekistan's national digital economy goal. Policymakers need to invest in workforce digital literacy programs, promote cross-departmental collaboration using digital platforms, and concentrate on projects that will improve digital integration among Small and Medium Enterprises (SMEs). By encouraging a collaborative environment with the aid of technology, Uzbekistan can accelerate its transition into a data-driven economy and an innovation hub. The research study provides both theoretical and practical guidance on how emerging market organisations can achieve operational excellence and sustainable competitiveness through EBA integration and collaborative culture. It lays the foundation for the contributions that the next generation of digital systems made feasible by analytics and artificial intelligence will make to further revolutionise strategic performance, efficiency, and organisational coordination.

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Appendix

Table A1: Common-Method Bias Assessment (Harman's Single-Factor Test)

Test	Total Variance Explained by First Factor	Threshold	Result
Harman's Single-Factor Test	28.4%	< 50%	No common-method bias detected

Table A2: Marker Variable Test

Path	Original β	β After Marker-Control	Change	Interpretation
EBA Integration → Operational Excellence	0.567	0.553	-0.014	Effect remains strong and significant
EBA Interaction → Operational Excellence	0.308	0.295	-0.013	Minimal change
EBA Coordination → Operational Excellence	0.254	0.247	-0.007	Minimal change
Department Collaboration → Operational Excellence	0.182	0.175	-0.007	Minimal change

Marker variable used: Unrelated attitude scale item set (low correlation with all constructs; $r < 0.12$).