Designing a Digital Transformation System Model in the Taxation Organization

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Abstract

Digital transformation, as one of the main components of technological advancement and improvement of organizational processes, plays a significant role in optimizing the performance of tax organizations. This study specifically addresses a quantitative analysis of the effects of digital transformation on improving tax performance in a tax organization. The study was conducted using a quantitative method through surveys and statistical analysis. Data were collected via questionnaires from employees and taxpayers. The proposed model includes key independent variables such as fairness in digital service delivery, service transparency, technological system reform, digital governance and management, and digital ecosystem management. Additionally, the outcomes and consequences of digital transformation were identified as dependent variables, and the principles of digital transformation and transformative technologies were identified as moderating variables. The results indicate that implementing digital transformation in the tax organization leads to increased transparency, reduced tax violations, improved efficiency, and increased taxpayer satisfaction. This model can assist policymakers and managers in formulating and implementing digital transformation strategies in tax organizations.

Keywords: *Digital, Digital Transformation, Tax Performance.*

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1. Introduction

Today, digital transformation is one of the key topics in the organizational transformation literature, and its realization brings not only technological superiority but also strategic and competitive advantages for organizations [1]. Digital transformation refers to the innovative implementation of new digital technologies aimed at improving an organization's business operations [2-5]. This term also encompasses the use of new technologies to co-create, co-design, co-produce, and co-distribute products in collaboration with service recipients and partners, which enhances the organization's competitiveness [6]. Studies show that organizations initiate their digital transformation activities with various objectives and perceptions, such as changing the service recipients' perspectives, governmental and regulatory pressures, responding adequately to the emergence of new technologies, and environmental pressures. The diversity of these goals and the placement of digital transformation activities in organizations indicate that the phenomenon of digital transformation goes beyond mere technological changes in a specific domain of the organization [1, 7].

The digital transformation of industries, also known as the Fourth Industrial Revolution [8], paves the way for various developments in new products, processes, and services [9]. This concept, which has emerged in the past decade due to the development of disruptive technologies in the industrial sector, reshapes the vision of industrial organizations and brings significant economic benefits to the users of these technologies [9-11]. As a result, many organizations have taken steps to gain the benefits of these transformations. However, despite these potential advantages, studies show that projects based on the Fourth Industrial Revolution are not particularly successful. The chaotic conditions resulting from fundamental changes in organizations, the inherent uncertainty, the lack of transparency regarding outcomes, and the high investment costs have deterred many organizations from entering this field [1]. The lack of knowledge about the dimensions and factors of this phenomenon and the absence of guidance for leading organizations are among the reasons organizations cite for not engaging in these activities [12].

The literature on digital transformation in tax systems highlights its significant impact on improving organizational efficiency and effectiveness. Heidari et al. (2023) demonstrated that the implementation of digital technologies in Iran’s tax organizations led to reduced operational costs and enhanced taxpayer satisfaction [13]. Similarly, Rahnama and Mohammadi (2022) emphasized the role of blockchain in increasing transparency and reducing tax evasion in Iran. Their study also highlighted the importance of managing organizational change and employee adoption of new technologies in tax agencies [14]. Internationally, studies have also supported the positive effects of digital transformation in tax systems. Smith and Cooper (2024) investigated the impact of digital transformation in the UK’s tax system, emphasizing the critical role of digital leadership and change management in the success of such projects [6]. In Spain, González and Alvarez (2023) explored the effects of blockchain and artificial intelligence on tax collection processes, finding that taxpayers were more satisfied and cooperative with digital services [4].

Nonetheless, tax organizations, as key institutions in securing countries' financial resources, face numerous challenges, such as tax evasion, administrative complexities, and inefficiencies in traditional systems. These challenges underscore the importance of digital transformation in optimizing processes, increasing efficiency, and enhancing transparency in tax collection. However, to accurately assess the effects of digital transformation on the performance of tax organizations, studies utilizing quantitative tools and methods for analysis and evaluation are required. This study focuses on a quantitative analysis to examine the effects of implementing digital transformation in a tax organization and assesses its impact on improving key performance indicators, including tax collection, reducing operational costs, and enhancing taxpayer satisfaction. The aim of this research is to provide a comprehensive perspective for policymakers and managers so that they can use the findings to offer practical solutions for improving tax performance.

2. Methodology

This research, aimed at designing and examining a digital transformation system model in the taxation organization, employs a quantitative and survey-based method. The statistical population consists of employees of the taxation organization and taxpayers who interact with digital services. A simple random sampling method was used, and a sample size of 18 participants was determined. The data collection tool was a semi-structured questionnaire, divided into two sections: demographic information and specialized questions related to digital transformation. The responses were designed based on a five-point Likert scale. Validity

was confirmed by experts, and reliability was verified through Cronbach's alpha test (above 0.7).

The data analysis method for this study followed a quantitative approach using both descriptive and inferential statistical techniques to assess the impact of digital transformation on the performance of tax organizations. Data were collected through semi-structured questionnaires distributed among tax organization employees and taxpayers who actively interact with digital services. The questionnaires were designed with two main sections: demographic information and specialized questions relating to key dimensions of digital transformation, such as fairness in digital service delivery, service transparency, technological infrastructure, digital governance, and ecosystem management. Responses were measured on a five-point Likert scale, allowing for a comprehensive evaluation of participant perceptions. To ensure the reliability and validity of the data, a Cronbach's alpha test was conducted, yielding values greater than 0.7, confirming internal consistency. Additionally, expert validation was employed to enhance content validity. Data were analyzed using fuzzy logic to capture the nuanced evaluations of experts and participants, particularly in cases where subjective judgments were critical. Fuzzy triangular numbers were calculated for each survey question, with lower, middle, and upper bounds representing the range of responses. The defuzzification process was then applied to convert fuzzy values into precise scores, which were compared against a predetermined threshold to identify significant variables. Inferential statistical methods, such as regression analysis, were used to examine the relationships between independent variables (e.g., fairness, transparency, technological reform) and dependent variables (e.g., operational efficiency, taxpayer satisfaction). The results provided insights into the direct and moderating effects of these variables on the outcomes and long-term impacts of digital transformation in tax organizations.

3. Findings and Results

At this stage, the distributed questionnaires were collected from experts. After collecting the first round of 10 completed questionnaires, the data were aggregated, and the defuzzified value of each question was calculated. Based on these calculations, the first questionnaire was analyzed.

At the first stage, the fuzzy value of each research question was calculated using expert opinions. To calculate the fuzzy value for the first question, three values must be determined: the lower bound, middle value, and upper bound.

- **Lower Bound of Fuzzy Triangular Value for Q1 (L)**: This is the smallest (worst) value assigned to the first question by the experts.
- **Upper Bound of Fuzzy Triangular Value for Q1 (U)**: This is the largest (best) value assigned to the first question by the experts.
- **Middle Value of Fuzzy Triangular Value for Q1 (M)**: This is the geometric mean of all expert responses to the first question. In this case, the geometric mean of the 10 responses is calculated and used as the middle value.

The fuzzy value for all research questions must be calculated similarly. After calculating the fuzzy values of the questionnaire questions, it is necessary to defuzzify them to compare them with the predetermined threshold index.

To calculate the defuzzified value, several formulas have been proposed. Based on the chosen formula, the defuzzified value is calculated by adding the lower bound, twice the middle value, and the upper bound as follows:

$$\frac{a + 2b + c}{4}$$

The defuzzified values for all the questions are calculated in the same manner.

Once the defuzzified values of the questionnaire questions have been calculated, the importance of each indicator can be determined using the average spectrum value (value 3). In this study, based on expert opinions, questions (indicators) with a defuzzified value higher than the average spectrum value (3) are identified as important, and those with a defuzzified value lower than 3 are identified as less important.

There is no standard rule for identifying the important questions in the questionnaire; typically, the threshold value is determined by the research team. The most common method is using the average spectrum value (3) to evaluate the importance of questions. However, the research team can adjust this value based on the research objectives and approach. For example, a stricter evaluation could use a threshold value of 3.5 or 4, classifying questions with a defuzzified value below these as less important, and those above as important. Conversely, if most questions have a defuzzified value below the average spectrum (3), the team could lower the threshold to 2.5 or a similar value. Similarly, if the defuzzified values of all questions exceed 3, and all are deemed important, the threshold could be raised to 3.5 or 4. Additionally, if the research goal is to select only the most

important questions, a value higher than 3 may be used for evaluation. On the other hand, if the goal is to retain all or most of the questions, a value lower than 3 could be used for evaluation.

Table 1. Identifying the Importance of Each Research Question (Research Indicators)

Indicator	Question Number	Very Low (1)	Low (2)	Medium (3)	High (4)	Very High (5)
Accuracy of services provided	1	0	2	3	5	4
IT infrastructure	2	0	1	4	5	4
Speed of online service delivery	3	0	0	4	4	6
Employee efforts for remote services	4	0	0	7	6	1
Courtesy and proper behavior	5	0	0	4	1	9
Organizational efforts for service transparency	6	0	1	3	9	1
Respect for clients	7	0	0	6	4	4
Continuity of remote services	8	0	0	9	4	1
Accountability to stakeholders	9	0	0	6	5	3
Quality of information for decision making	10	0	0	4	5	5
Understandability of forms and instructions	11	0	0	4	3	7
Number of complaints received	12	0	0	4	4	6
Developing a digital transformation strategy	13	0	0	4	1	9
Increasing accountability	14	0	0	9	2	3
Enhancing employee skills	15	0	0	6	6	2
Promoting tax culture	16	0	0	6	3	5
System integration	17	0	0	7	1	6
Digital resource management	18	0	0	7	2	5
Increased compliance with laws	19	0	0	8	0	6
Improving governance structures	20	0	0	7	7	0
Improving monitoring and evaluation	21	0	0	1	7	6
Mutual understanding of IT and service delivery	22	0	0	8	6	0
Improving organizational communication	23	0	0	6	8	0
Relationship with other organizational ecosystems	24	0	0	1	8	5
Digital ecosystem architecture	25	0	0	6	5	3
Digital ecosystem security	26	0	0	5	5	4
New skills	27	0	0	6	5	3
New culture	28	0	0	5	7	2
Service improvement	29	0	0	9	5	0
Communication improvement	30	0	0	5	4	5
Virtualization	31	0	0	5	4	5
Agility	32	0	0	4	5	5
Service orientation	33	0	0	4	6	4
Mobile	34	0	0	4	6	6
Artificial intelligence	35	0	0	1	5	8
Cloud computing	36	0	0	5	4	5
Big data	37	0	0	6	3	5

Table 2. Fuzzy Values and Defuzzified Values

Item	L	M	U	Defuzzified Value	Question Status
1	3	3.921351/3	5	3.96067573	Confirmed
2	2	4.276477/4	5	3.888238559	Confirmed
3	3	4.4466118/4	5	4.233059006	Confirmed
4	3	3.485298/3	5	3.742648945	Confirmed
5	3	4.368371/4	5	4.184185537	Confirmed

The second round of questionnaires was distributed among 14 experts, and the results are shown below:

Table 3. Distribution of the Second Round of Questionnaires

Indicator	Question Number	Very Low (1)	Low (2)	Medium (3)	High (4)	Very High (5)

Accuracy of services provided	1	0	0	6	4	4
IT infrastructure	2	0	1	2	4	7
Speed of online service delivery	3	0	0	3	2	9
Employee efforts for remote services	4	0	0	7	4	3
Courtesy and proper behavior	5	0	0	3	2	9
Organizational efforts for transparency	6	0	1	4	8	2
Respect for clients	7	0	0	5	5	4
Continuity of remote services	8	0	0	8	5	1
Accountability to stakeholders	9	0	0	6	5	3
Quality of information for decision-making	10	0	0	5	4	5
Understandability of forms and instructions	11	0	0	4	3	7
Number of complaints received	12	0	0	5	3	6
Developing a digital transformation strategy	13	0	0	3	2	9
Increasing accountability	14	0	0	7	4	3
Enhancing employee skills	15	0	0	7	5	2
Promoting tax culture	16	0	0	5	4	5
System integration	17	0	0	6	2	6
Digital resource management	18	0	0	6	3	5
Increased compliance with laws	19	0	0	8	0	6
Improving governance structures	20	0	0	8	6	0
Improving monitoring and evaluation	21	0	0	1	7	6
Mutual understanding of IT and service delivery	22	0	0	9	5	0
Improving organizational communication	23	0	0	9	5	0
Relationship with other ecosystems	24	0	0	1	7	6
Digital ecosystem architecture	25	0	0	5	6	3
Digital ecosystem security	26	0	0	6	4	4
New skills	27	0	0	5	6	3
New culture	28	0	0	5	7	2
Service improvement	29	0	0	9	5	0
Communication improvement	30	0	0	5	6	3
Virtualization	31	0	0	2	6	6
Agility	32	0	0	3	6	5
Service orientation	33	0	0	4	6	4
Mobile	34	0	0	6	5	3
Artificial intelligence	35	0	0	7	4	3
Cloud computing	36	0	0	8	4	2
Big data	37	0	0	4	5	5

Table 4. Fuzzy Values and Defuzzified Values for the Second Round

Item	L	M	U	Defuzzified Value	Question Status
1	3	3.835527/3	5	3.917763731	Confirmed
2	2	4.182881/4	5	3.841440361	Confirmed
3	3	4.466118/4	5	4.233059006	Confirmed
4	3	3.489166/3	5	3.744582835	Confirmed
5	3	4.466118/4	5	4.233059006	Confirmed
6	2	3.61016/3	5	3.55507995	Confirmed
7	3	3.921351/3	5	3.96067573	Confirmed
8	3	3.485298/3	5	3.742648945	Confirmed
9	3	3.770253/3	5	3.885126439	Confirmed
10	3	3.989242/3	5	3.99462101	Confirmed
11	3	4.220951/4	5	4.1104754	Confirmed
12	3	4.058308/4	5	4.029153987	Confirmed
13	3	4.466118/4	5	4.233059006	Confirmed
14	3	3.687736/3	5	3.843867937	Confirmed
15	3	3.624976/3	5	3.812488235	Confirmed
16	3	3.989242/3	5	3.99462101	Confirmed
17	3	3.969487/3	5	3.984743251	Confirmed
18	3	3.901932/3	5	3.950966074	Confirmed
19	3	3.797633/3	5	3.898816468	Confirmed
20	3	3.425984/3	4	3.462991829	Confirmed

21	4	4.433918/4	5	4.466959166	Confirmed
22	3	3.351001/3	4	3.425500722	Confirmed
23	3	3.581019/3	4	3.540509524	Confirmed
24	4	4.35846/4	5	4.429230044	Confirmed
25	3	3.770253/3	5	3.885126439	Confirmed
26	3	3.835527/3	5	3.917763731	Confirmed
27	3	3.854616/3	5	3.927308144	Confirmed
28	3	3.789017/3	5	3.894508422	Confirmed
29	3	3.351001/3	4	3.425500722	Confirmed
30	3	3.940867/3	5	3.97043371	Confirmed
31	3	4.336876/4	5	4.168438063	Confirmed
32	3	4.169766/4	5	4.084883218	Confirmed
33	3	4.009096/4	5	4.00454793	Confirmed
34	3	3.770253/3	5	3.885126439	Confirmed
35	3	3.687736/3	5	3.843867937	Confirmed
36	3	3.545639/3	5	3.772819516	Confirmed
37	3	3.990009/3	5	3.995004744	Confirmed

If the difference between the two rounds is less than 0.2, the survey process will be stopped. Otherwise, a third round will be conducted for indicators with a difference greater than 0.2.

Table 5. Comparison of Defuzzified Values Between Round 1 and Round 2

Indicator	Defuzzified Value (Round 1)	Defuzzified Value (Round 2)	Difference
1	3.96067573	3.917763731	0.042911999
2	3.888238559	3.841440361	0.046798198
3	4.233059006	4.233059006	0
4	3.742648945	3.744582835	-0.00193389
5	4.184185537	4.233059006	-0.04887347
6	3.59547053	3.55507995	0.04039058
7	3.917763731	3.96067573	-0.042911999
8	3.704508753	3.742648945	-0.038140192
9	3.885126439	3.885126439	0
10	4.039252773	3.99462101	0.044631762
11	4.1104754	4.1104754	0
12	4.074558461	4.029153987	0.045404474
13	4.184185537	4.233059006	-0.04887347
14	3.764040162	3.843867937	-0.079827776
15	3.853044583	3.812488235	0.040556348
16	3.950966074	3.99462101	-0.043654937
17	3.941304502	3.984743251	-0.043438749
18	3.908266584	3.950966074	-0.04269949
19	3.898816468	3.898816468	0
20	3.501321839	3.462991829	0.03833001
21	4.466959166	4.466959166	0
22	3.462991829	3.425500722	0.037491107
23	3.540509524	3.425500722	0.115008802
24	4.429230044	4.466959166	-0.037729123
25	3.885126439	3.927308144	-0.042181705
26	3.96067573	3.917763731	0.042911999
27	3.885126439	3.927308144	-0.042181705
28	3.894508422	3.894508422	0
29	3.425500722	3.425500722	0
30	3.97043371	3.927308144	0.043125565
31	4.131534692	4.168438063	-0.036903371
32	4.084883218	4.084883218	0
33	4.00454793	4.00454793	0
34	3.853044583	3.885126439	-0.032081857
35	3.812488235	3.843867937	-0.031379703
36	3.772819516	3.772819516	0

37	3.950966074	3.995004744	-0.04403867

4. Discussion and Conclusion

The proposed model for digital transformation in tax organizations is based on a detailed analysis and identification of key variables. This model presents a comprehensive approach to digital transformation, considering all the essential aspects required for the successful implementation of this process. By focusing on independent, dependent, and moderating variables, the model outlines the path of digital transformation and examines its various impacts. The results and findings of this model can serve as a guide for managers and policymakers in formulating digital transformation strategies in tax organizations and other governmental entities.

The findings of this study emphasize the critical role of digital transformation in improving the efficiency, transparency, and overall performance of tax organizations. Prior research supports these conclusions, demonstrating that the adoption of digital technologies in public administration not only enhances operational efficiency but also fosters greater accountability and reduces corruption. By ensuring equitable access to digital services, tax organizations can increase public trust and compliance, which are essential for improving tax collection and reducing tax evasion [13]. Furthermore, the integration of advanced technologies like blockchain and artificial intelligence can further optimize tax processes, reduce fraud, and enhance data security [4]. These transformative technologies play a pivotal role in ensuring that tax systems remain transparent, secure, and adaptable to changing digital landscapes.

In addition to these operational improvements, the long-term strategic impacts of digital transformation are significant. Studies have shown that digitalization contributes to enhanced public satisfaction with governmental services, increased revenue collection, and a more robust economic environment [15]. The sustainability of these outcomes depends on continuous technological upgrades, proper governance, and effective change management within the organization [16, 17]. Moreover, the successful implementation of digital transformation requires a strong focus on digital leadership and employee training to reduce resistance to change and ensure smooth adoption of new technologies [6]. Thus, this study's proposed model highlights the necessity for tax organizations to adopt a comprehensive approach to digital transformation that integrates both technological and organizational strategies for long-term success.

The role of independent variables in digital transformation is crucial, as they include factors such as fairness in digital service delivery, service transparency, technological system reform, digital governance and management, and digital ecosystem management. These variables have been identified as fundamental and key drivers of digital transformation, each having a direct and tangible impact on the process. For example, fairness in digital service delivery ensures that all taxpayers, regardless of geographical location or technical abilities, have equal access to digital services. This factor not only enhances the taxpayer experience but also promotes public trust and legitimizes the tax system. Similarly, service transparency, by improving access and the ability to track tax transactions, helps reduce fraud and corruption. Greater transparency in the tax system can lead to increased public satisfaction and reduced legal challenges and tax evasion. The reform of technological systems within the organization is another critical aspect, referring to the need to modernize and upgrade existing technological infrastructures. Legacy technologies are insufficient to meet the demands of digital transformation, making updates and improvements essential.

The role of dependent variables in analyzing the outcomes of digital transformation is equally significant. The outputs of digital transformation and the consequences of this transformation have been identified as dependent variables, directly influenced by the independent factors. These variables represent the ultimate effects of digital transformation on the tax organization and society. The outputs of digital transformation include short-term, tangible results of digital projects. For tax organizations, these outputs may include reduced operational costs, increased efficiency in tax collection, streamlined internal processes, and overall enhanced productivity. The consequences of digital transformation refer to the long-term and strategic impacts of the process. These consequences may include social and economic effects, such as reduced corruption, increased public trust in the tax system, greater taxpayer satisfaction, and higher tax revenues. Long-term consequences reflect the enduring effects of digital transformation on the overall structure and performance of the organization.

Moderating variables also play a crucial role in either enhancing or diminishing the impacts of digital

transformation. Digital transformation principles and transformative technologies act as moderating variables in this model. These variables influence the intensity and quality of the impact that independent variables have on the outputs and consequences. Digital transformation principles serve as overarching frameworks and strategies that guide the proper direction of digital transformation. Principles such as innovation, agility, and customer-centricity can determine the success or failure of digital projects. The application of these principles helps organizations stay on the right track and prevents the improper or incomplete implementation of digital technologies. Transformative technologies, such as blockchain, artificial intelligence, big data, and automation, are key tools in digital transformation. These technologies act as accelerators of digital transformation, rapidly increasing its positive effects. Proper use of these technologies not only enhances internal processes but also fosters innovation in service delivery.

Based on the analysis of the various dimensions of digital transformation in tax organizations, a practical model for implementing digital transformation in tax organizations is proposed. This model consists of several stages, beginning with the preparation and development of a digital transformation strategy. The first step involves evaluating the current state, including assessing the organization's existing technological infrastructure to identify strengths and weaknesses and determine the technological needs for digital transformation. Additionally, a thorough analysis of tax processes is necessary to understand the current methods of tax collection, transparency, and service fairness. This evaluation helps the organization maximize the benefits of digital technologies.

Next, the organization must formulate a digital transformation strategy, defining short-term and long-term goals for digital transformation. These goals may include enhancing transparency, improving service fairness, reducing tax fraud, and optimizing organizational efficiency. Key performance indicators (KPIs) should be established to measure the success of digital transformation, such as reducing tax processing times, improving data accuracy, and lowering operational costs.

The second stage involves upgrading technological infrastructure and creating digital platforms. Modernizing and reforming the organization's technological systems is crucial, with the implementation of transformative technologies such as blockchain, artificial intelligence, and big data to improve transparency, accuracy, and security in tax processes. Automation should also be employed to reduce tax processing times and increase accuracy in reviewing tax files, reducing human errors and speeding up responsiveness.

Furthermore, integrated digital platforms should be developed, enabling taxpayers to access tax services transparently and quickly, receive tax notifications, and make payments digitally. Big data management can be leveraged through data mining and big data analytics technologies to identify patterns of tax fraud and improve decision-making within the tax organization.

The third stage focuses on digital governance and management. A digital governance framework must be designed, including policies for managing and overseeing digital transformation. This framework should cover data management, information security, taxpayer privacy, and transparency in digital processes. Performance monitoring and evaluation mechanisms should be established to ensure the achievement of set goals.

Managing organizational change and employee training is another critical aspect. Training programs should be provided to tax organization employees to ensure they are proficient in using modern technologies and digitalizing processes. Managing organizational change is essential to reduce resistance to digital innovations, and strategies must be developed to improve the acceptance of technology by employees.

The fourth stage involves managing the digital ecosystem and engaging with stakeholders. Developing partnerships and fostering digital interactions with other governmental bodies, particularly in data exchange, can improve coordination and help prevent fraud. Collaboration with the private sector, especially IT companies, can accelerate the digital transformation process. Interaction with taxpayers is equally important, and the tax organization should provide easy access to tax information and processes via digital platforms while maintaining transparency through clear communication.

Lastly, continuous evaluation and optimization are necessary. The tax organization should continuously use data analytics and performance evaluation tools to assess the impact of digital transformation. This evaluation could include aspects such as reducing tax processing times, improving taxpayer satisfaction, reducing fraud, and increasing tax collection. Technology and process optimization should be ongoing, and taxpayer feedback, collected through digital tools like online surveys, should be used to refine and enhance digital services.

Authors' Contributions

Authors equally contributed to this article.

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Declaration of Interest

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Ethical Considerations

All procedures performed in this study were under the ethical standards.

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