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Data-Driven Decision-Making: Leveraging the IoT for Real-Time Sustainability in Organizational Behavior

Saadia Malik

Department of Information Systems, Faculty of Computing and Information Technology—Rabigh, King Abdulaziz University, Jeddah 21589, Saudi Arabia; smalik1@kau.edu.sa

Abstract: In today's business environments, data-driven decision-making has played a crucial role in bringing real-time sustainability to organizational behavior. Furthermore, the Internet of Things (IoT) has been widely adopted recently, but studies investigating its impact on organizational dynamics and sustainability are limited. This study explores the IoT's potential to improve the real-time decision-making and sustainability of organizations. A cross-sectional study was conducted on 250 respondents belonging to a diverse range of industries. Five variables were analyzed in the study—IoT implementation, real-time data analytics, decision-making, organizational behavior, and organizational performance. These variables were scored on a 5-point Likert-type scale, with responses ranging from 1 = Strongly Disagree to 5 = Strongly Agree. The data were collected with the help of a structured questionnaire. The data were analyzed using descriptive statistics, Pearson correlations, and structural equation modeling (SEM) to test the relationships among the study variables. The findings indicate that enhanced organizational behavior (r = 0.1101), decision-making (r = 0.269), and real-time data analytics (r = 0.1888) are all strongly associated with the IoT. Applying structural equation modeling further reveals a direct connection between IoT adoption and company performance. Moreover, it is observed that the coefficients for organizational behavior ($\beta = 0.0707$, $p < 0.01$) and real-time data analytics ($\beta = 0.0851$, $p < 0.001$) are statistically significant. This study demonstrates how the IoT can bring real-time sustainability to organizational behavior by improving decision-making and business operations. Although decision-making is enhanced by the IoT, organizations still need to optimize their resource usage and reduce waste to enhance sustainability. This study bridges a substantial gap in the existing literature by carefully investigating the relationship between IoT technology, organizational behavior, and decision-making techniques. Our findings conclude that leveraging the IoT changes the nature of digital innovation and brings real-time sustainability to organizational behavior.

Keywords: Internet of Things; organizational behavior; data-driven decision-making; real-time data analytics; structural equation modeling; data analytics; sustainability

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1. Introduction

The term "Internet of Things" (IoT) describes a system that involves the interconnection of various physical devices, software programs, and systems using networks and sensors [1]. This allows for automated data exchanges, completely independent of human or computer intervention. Several protocols and standards are fundamental to the IoT because they enable devices to communicate and collaborate; these include IPv6, MQTT, CoAP, and XMPP [2]. These standards permit large-scale data transfers and smoothly incorporate various IoT devices into systems. The widespread use of the IoT has profoundly impacted organizational processes and their services, according to Daniel et al. [3]. For instance, the IoT can help with Responsible Consumption and Production (SDG 12) in the manufacturing sector by allowing manufacturing supply chain optimization, predictive maintenance, and real-time line monitoring. In the healthcare industry, smartwatches and other IoT-enabled medical devices are revolutionizing healthcare, which aligns with

Sustainable Development Goal 3: Encouraging Good Health and Well-Being [4]. According to Bellini et al. [5], these technical advancements pave the way for telemedicine, remote patient monitoring, and enhanced pharmaceutical delivery. In urban planning, the IoT allows smart cities to improve traffic management, optimize resources, and advance urban planning. This helps to move us closer to Sustainable Cities and Communities (SDG 11). In the agricultural sector, agricultural productivity, soil health, and the Zero Hunger (SDG 2) objective can all benefit from precision farming, automated irrigation systems, and the IoT [6]. All these uses show the prevalence of the IoT and how it can improve decision-making, cut costs, and speed up processes for many different types of enterprises, which in turn helps to achieve the SDGs.

One significant advantage of IoT technology is the ability to optimize and track resource utilization in real time. This directly impacts SDGs 12 (Responsible Production and Consumption) and 7 (Affordable and Clean Energy) [7]. Farooq et al. [8] state that numerous systems and processes can be enhanced using IoT sensors, enabling the constant tracking of material, water, and energy consumption. Understanding resource consumption patterns from these real-time data can help firms to optimize resource usage and identify inefficiencies. By maximizing the uptime of machinery and equipment through the integration of the IoT, predictive maintenance contributes to Industry, Innovation, and Infrastructure (SDG 9). Through constant monitoring of machinery performance and condition, predictive maintenance algorithms can identify impending problems or equipment degradation. This allows organizations to maximize the lifespan of essential equipment and decrease the probability of emergency maintenance work being required.

A promising new line in pursuing Affordability and Clean Energy (SDG 7) is the growing use of intelligent energy management systems utilizing IoT-generated data. The IoT enables building management systems to monitor several systems simultaneously, changing the settings where necessary, depending on fault occurrences and occupancy levels [9]. It also effectively supports sustainability and environmental protection since it optimizes the energy and costs incurred. The IoT has the potential to significantly advance progress towards Sustainable Development Goal 12: Sustainable consumption and production through enhanced supply chain management and reduction in total consumption. Companies may improve their supply chain and guarantee that accurate or appropriate commodities are created by using real-time data analysis and IoT sensors [10]. This demand-driven approach leads to negative consequences, such as lower inventory levels and overproduction triggered by goods that stay unsold or go to waste. IoT technology for sustainable waste management contributes to advancing Sustainable Cities and Communities (SDG 11). In another study, Bhuvaneswari et al. [11] established that, through IoT sensors, bright garbage cans can identify optimal litter collection channels that minimize fuel-use and air pollution. Utilizing the IoT for waste management might bring about more efficient recycling and greater support for circular economy initiatives, given that recycling devices will sort and classify different types of garbage in compliance with Sustainable Development Goal 12, which aims to ensure responsible consumption and production [12]. The IoT is the key enabler of an industry-driven, sustainable supply chain featuring responsible manufacturing and consumption (SDG 12). Firms can manage their inventories and monitor product movement through the IoT, providing supply chain transparency [13]. This kind of real-time intelligence would be valuable to businesses for transportation and route finding, problem-solving, and even minimizing their carbon footprint. The IoT may help organizations to increase compliance with CE's principles, improve efficiency, and find new opportunities to develop new products and services. Doing so will help to promote responsible production and consumption, one of the sustainable development goals—SDG 12.

One area that the IoT affects and supports in contributing to waste minimization and the Responsible Consumption and Production SDG 12 is product lifecycle management (PLM). For example, tracking a product from when it is manufactured to when it is disposed of could lead to better products, more efficient resource utilization, and more efficient ways of managing waste [14]. By employing the IoT in remodeling, remanufacturing, and correct product disposal, PLM systems can strengthen the objectives of the circular economy approach that is designed to decrease wastage and enhance sustainability. Technology and the IoT help businesses to accumulate valuable data that can contribute to developing Industry, Innovation, and Infrastructure (SDG 9). This can be achieved in line with SDG 9: Industry, Innovation, and Infrastructure, and the cost savings could again be invested in sustainability initiatives, research, and development, the latest IoT technology, and building a progressive cycle for sustainable benefits. Successful implementation of IoT technology can help early adopting enterprises to support Industry, Innovation, and Infrastructure (SDG 9), which will go a long way in creating new, resilient, value-adding, and sustainable ecosystems and bring forward a culture of perpetual improvement [15]. Finally, IoT data may enhance business decision-making across multiple business operational domains by applying advanced analytics and machine learning to turn IoT data into valuable insights [16]. This allows various organizations to make instantaneous decisions with the help of data, enhancing performance, avoiding possible issues, and implementing new opportunities.

Additional IoT technology includes detailed environmental impact analysis, which corresponds with sustainable development goals 13 and 15, which are Climate Action and Life on Land, respectively, providing business entities with information on their impact on the natural setting. By conducting air quality checks, water usage, energy consumption, and waste management through IoT devices, businesses can gain insights into key business impacts and take appropriate measures to optimize them [17]. With such data, enterprises can work toward sustainability, prove their responsible approach to the environment, and meet performance regulation standards. Besides enhancing the attainment of several SDGs, the IoT is predicted to have social and economic impacts on the effectiveness and resilience of organizations in the future. The IoT significantly reduces the costs of enterprises by enabling the efficient use of resources, generation of waste, and analytics for decision-making [18]. Besides helping achieve Partnerships for the Goals (SDG 17), the IoT can also benefit a company and its stakeholders by enhancing credibility and trust by simplifying the processes of environmental reporting and regulation compliance.

In the present business context, which is more sensitive to the issue of sustainability, coming up with new strategies enables one to predict the market and precede the competitors in the market [19].

While research has indicated that the IoT can offer benefits to enhance business performance, optimize resources, and enable sustainable practices, much is still unknown about its impact on business behavior and real-time decision-making processes. While the literature on the IoT acknowledges its strength in areas like predictive maintenance, optimal supply chains, and waste management, little evidence exists on the impact of the IoT on the behavior of organizations, flexibility, and decision-making for sustainability goals [20,21]. This study aims to fill this gap by investigating how the implementation of the IoT influences organizations' environments and behavior, real-time decisions, and the achievement of sustainable outcomes. This research aims to offer recommendations in response to the research question for the best use of the IoT to improve organizations' sustainability performance, agility, and competitive advantages.

However, the study's primary goal is to establish the IoT's effects on business processes or, in other words, the value proposition of leveraging IoT data for sustainable decision-making. To achieve this purpose, this study adopts a quantitative research approach. This involves the use of field data based on real-life scenarios organized by the researcher to provide an understanding of how the integration of the IoT influences organizational practice and decision-making processes as well as the attainment of sustainability goals. Enhanced sustainability, faster decision-making, and optimization of the IoT are strategies that organizations are using to gain a competitive advantage, considering limited resources and the increasing importance of green policies.

The present research seeks to fill this gap in the literature by examining the effects of the IoT on organizational behavior and decision-making. Unlike most prior research on the IoT, this study brings a fresh perspective by investigating the nature of the impact and how integrating the IoT influences daily practices, real-time adaptation, and sustainable performance. This study has deepened our understanding of how the IoT influences organizational behavior and presented empirical information about the discussed field. These insights can be used to optimize business operations and address the necessities of sustainable management. As a result of the insights gained in this study, the IoT and its possible implications for future organizational change and sustainable development can now be debated more comprehensively in educational contexts.

2. Methodology

This section will discuss the methodological approach of this study, including the population and sample, research instruments, and data analysis tools. The present study employs a cross-sectional research method, which uses a structured questionnaire and reliable statistical tests to examine the impact of the IoT on organizational behavior and performance.

Figure 1 shows the research design for this study. The study design chosen for this research is cross-sectional, which involves collecting data from the participants at one point, as shown in Figure 1. The rationale for using a cross-sectional design is that the study explores cross-sectional data intended to determine the current state of IoT integration, data analysis, decision-making, and organizational culture at a particular time. This design is appropriate for the synchronous examination of association patterns between variables, without referring to extended periods of observation or even follow-up. Since this study focuses on the IoT's dynamic and direct effects on organizations, a cross-sectional research method design is appropriate for collecting the relevant information.

The study selected organizations that have adopted IoT technologies and operate across various industrial sectors like manufacturing, healthcare, retail, technology, and finance. While the different organizations employed different IoT devices, their usage of IoT devices falls into similar categories. The usage of IoT sensor devices is prominent across the selected organizations, such as the usage of monitoring devices by healthcare organizations, the usage of sensors to track machine operations and send alerts in manufacturing, or the usage of self-checkout counters in retail. Similarly, IoT algorithms such as inventory management algorithms in retail or risk management algorithms in finance are also commonly used. The study employs 250 respondents to ensure that the obtained dataset provides a robust and reliable foundation for analyzing and modeling IoT implementation, real-time data analytics, decision-making processes, and organizational behavior. This sample size can be considered relatively large and significant enough to be informative while still being sufficiently manageable to conduct the research comprehensively. A stratified random sampling technique was used to select respondents from the organizations' management, technical, and administrative departments. This approach increases the applicability of the study results to different organizations and helps to avoid biases in organizations' perceptions of using IoT technologies, indicating the heterogeneity of such organizations. This sampling technique aligns with this study's objective of providing a broad perspective on the effects of the IoT on organizational practices and productivity. The inclusion and exclusion criteria for this study have been explained in Table 1.

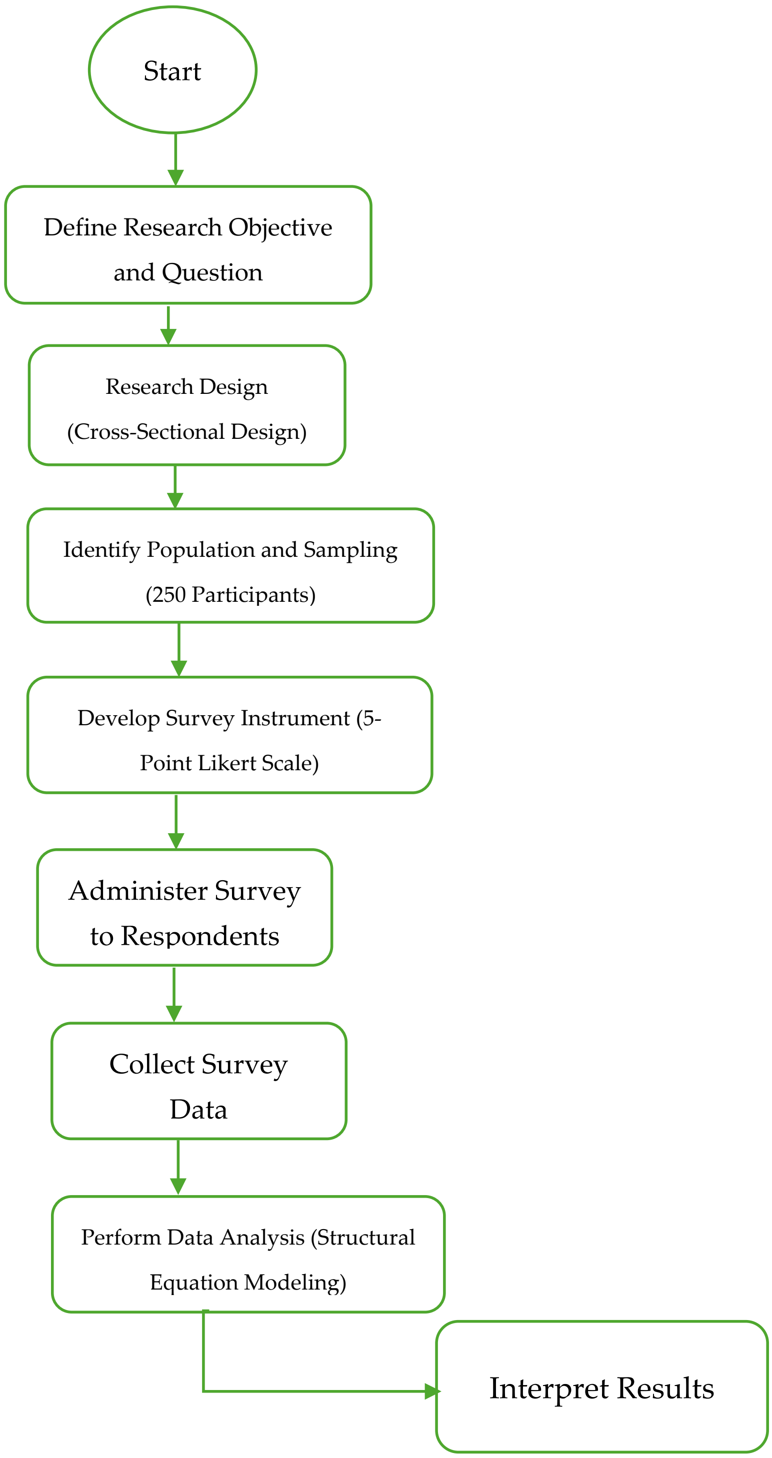

Figure 1. Cross-sectional research design.

For this study, a structured questionnaire was developed and distributed to 250 respondents in different organizations. To ensure the instrument's validity, the survey comprised several sections designed to capture the relevant variables of interest. This study adopted a constructs measure inventory with a 5-point Likert-type scale developed by Hair et al. [22], moving from 1 = Strongly Disagree to 5 = Strongly Agree. The variables analyzed were IoT implementation, real-time data analytics, decision-making, organizational behavior, and organizational performance. IoT integration was measured using items that captured the level and functioning of the IoT within organizational contexts. Real-time data analytics were assessed through items designed to capture the ability of the organization to analyze and act on data in real-time. Decision-making was measured by items that addressed strategic and operational decisions. Organizational behavior was evaluated by items addressing shifts in collaboration, transparency, and organizational culture influenced by the IoT and data analytics. Lastly, the measure of organizational performance included items relating to operations, resources, and competitiveness. Applying a 5-point Likert scale helped to effectively elucidate the respondents' attitudes and experiences and provide an accurate measurement of the study variables.

Table 1. Inclusion and exclusion criteria.

Criteria	Inclusion	Exclusion
Industry Sector	Organizations in manufacturing, healthcare, retail, technology, and finance.	Organizations outside the specified sectors.
IoT Implementation	Organizations that have implemented IoT technologies.	Organizations without IoT implementation.
Organizational Level	Respondents from various organizational levels (management, technical staff, administrative roles).	Respondents from only one organizational level.
Geographic Location	Organizations with diverse geographic locations (local, national, multinational).	Organizations are limited to a single geographic location.
Survey Participation	Respondents are willing to complete the survey.	Respondents are unwilling to complete the survey.
Data Quality	Complete and consistent survey responses.	Incomplete or inconsistent survey responses.

The collected survey data were statistically analyzed using statistical software, mostly STATA Stata 15. Descriptive statistics summarizing the demographic variables and main study variables were generated. A Pearson correlation test was used to analyze the interconnection between IoT deployment, real-time data processing, decision-making, and organizational behavior. Structural equation modeling (SEM) was conducted to establish the causal model and analyze the direct and indirect impacts of the variables stated in the theoretical framework. Also, the variance inflation factor (VIF) was used to assess multicollinearity among the independent variables. This broad and integrated approach helped to provide a reliable and accurate understanding of how the IoT affects organizational practices.

3. Results

In Figure 2, the descriptive statistics provide a comprehensive overview of the 250 observations that comprise the sample population. The gender variable shows more male participants (coded as 1) than female participants (coded as 2), with a mean of 1.39 and a standard deviation of 0.48. With a mean of 2.45 and a standard deviation of 1.34, the age variable indicates that the sample mainly comprises young to middle-aged individuals, ranging from 1 (representing the youngest group) to 5 (the oldest group).

The results for the industry sector variable reveal a concentration in specific sectors, possibly skewed towards industries coded near 4, like technology or finance, with a mean of 4.01 and a standard deviation of 0.92. The results for the organizational structure variable indicate that many firms in the sample have a relatively large hierarchical structure, as indicated by the mean of 1.91 and standard deviation of 0.80. According to the educational level variable, participants' educational levels ranged from moderately high to very high, with a mean of 2.71 and a standard deviation of 1.42. The mean job roles of 4.03 and the standard deviation of 0.76 indicate a cluster of high-level or specialized jobs, probably in management or technology. Given the size variable's value of 3.00 and the standard deviation of 1.35, companies ranging in size from sole proprietorships to multinational conglomerates are likely to be represented in the sample.

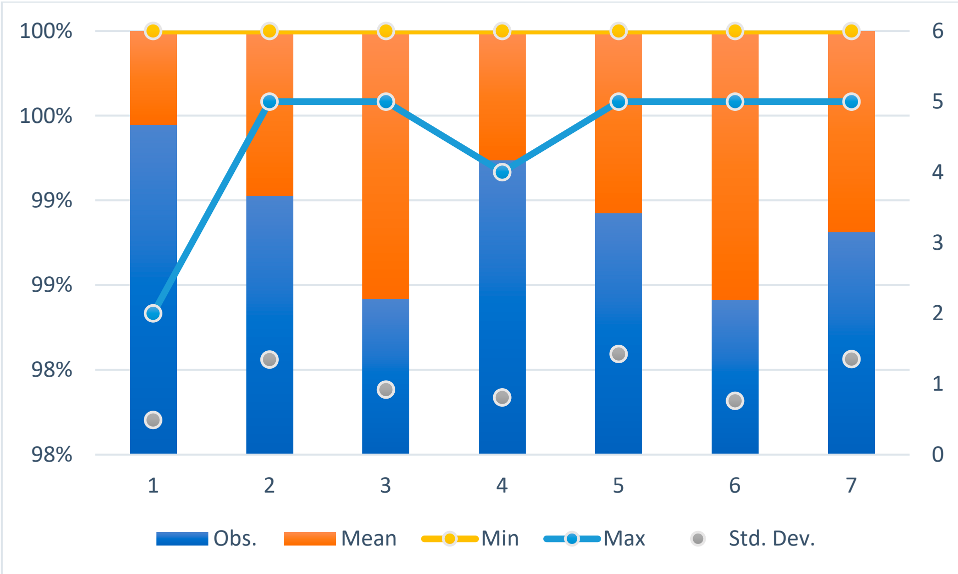

Figure 2. Demographic profile of the study participants.

The results reveal critical demographic and organizational details that were important to the investigation. The distribution of industries and employment fields shows where the IoT is most popular, while the distribution of ages and genders helps to make the sample more generalizable. The evaluation of educational levels and occupations suggests that highly qualified persons will likely lead the implementation of the IoT in significant positions within their companies. Organizations of all sizes and at all stages of development can use the IoT in different ways, and this diversity is reflected in the structure and size distribution. Such diversity is crucial to understanding how the IoT could affect corporate and organizational administration.

By combining these methods, we can ensure that our descriptive analytical framework for the impact of the IoT on company operations is solid. The results show that the IoT is used in many scenarios where organizational factors affect how well the IoT works. These results contribute to the development of specific recommendations for enhancing the utilization of the IoT across various types of business to facilitate improved performance and decision-making. More research is needed to further understand the impact of demographic and organizational factors on the outcomes of IoT implementation.

Table 2's correlation matrix shows the relationships between OB, decision-making, IoT installation, and real-time data analytics, which has a score of 0.10. A weak positive correlation is observed between the implementation of the IoT and real-time data analytics. This suggests that the extent to which the IoT is utilized is moderately correlated with the availability of real-time data analytics. Decision-making and implementation of the IoT are positively correlated (0.26) but strongly related. Results show that better decision-making is associated with enhanced implementation of the IoT.

Table 2. Relationships between OB, decision-making, IoT installation, and real-time data analytics.

	IoT Implementation	Realtime Data Analytics	Decision-Making	Organizational Behavior
IOT Implementation	1.00			
Realtime Data Analytics	0.10	1.00		
Decision-Making	0.26	0.21	1.00	
Organizational Behavior	0.10	0.19	0.21	1.00

This study found a weakly positive association (r = 0.10) between organizational behavior and IoT use. Based on these figures, there is not enough evidence that the implementation of the IoT influences the performance of businesses. Effective real-time data analytics appear to significantly increase the quality of decision-making, owing to the weak positive correlation of 0.21 between the two variables. Lastly, better analytics and decision-making processes may lead to slightly enhanced organizational behavior, as indicated by the weak-to-moderate positive correlation of 0.21 for decision-making and a correlation of 0.19 for real-time data analytics.

Based on the findings, data analytics in real time, organizational behavior, and the direct impacts of IoT deployment are all poorly associated. Data analytics and the IoT are not the only factors that might substantially impact business success. A possible indirect effect of the IoT on company dynamics through enhanced decision-making processes has been revealed by the weak correlations between decision-making and organizational behavior and the adoption of the IoT. These results suggest that implementing the IoT has a minor but beneficial effect on decision-making, which may slightly enhance organizational behavior. Despite the potential impact on organizational dynamics, the IoT has little influence on behavior when considered independently, highlighting the importance of other variables.

A considerable number of studies have concentrated on the various ways in which the IoT has the potential to transform business operations and decision-making. As discussed by Laphou et al. [23], the IoT's positive effects are linked to blockchain technology and the overall positive utilization of the IoT in divergent business sectors. Implementing the IoT makes processes much more efficient, as identified by Sujit et al. [24]. Thus, even though this study has only found modest direct impacts on organizations' behavior, it significantly contributes to the notion of the IoT as an enabler of decision-making. This means that the IoT's positive effects can be noticed in distinct application domains in the form of performance improvements rather than apparent shifts in users' tendencies. It remains crucial for firms that want to benefit from the IoT to incorporate it into their existing plans and frameworks seamlessly.

The IoT has implications for sustainability, as seen by the outcomes presented in Table 2, which include increasing operating efficiency, reducing wastage, and optimizing resource usage. Through IoT implementation, organizations can enhance business productivity, optimize energy usage, and thus minimize environmental impact. This enables them to carry out real-time monitoring and data analysis. Maintenance, on the other hand, prevents the early replacement of equipment and facilitates sustainable practice through resource management and efficiency. Moreover, some organizations have benefitted from the IoT because it has helped them to improve organizational behavior and decisions, which has led to the formulation of new strategies to solve environmental problems. This fosters resilience and sustainability in the long run. The IoT is concerned with more creatively sustainable processes, enhanced business performance, and compliance with broad sustainability objectives.

The findings of SEM are illustrated in Figure 3, which explains how each measured aspect relates to IoT adaptation, organizational behavior, decision-making, and real-time data analytics. Organizational behavior is impacted to a small extent by using the IoT (0.04 standard error, 0.07 coefficient, z-value 1.5, p-value 0.001). This proves that the IoT has a favorable, although small, impact on organizational behavior, which is statistically significant. The exact magnitude of the effect is ambiguous; the 95% confidence interval ranges from -0.16 to 0.02.

A z-score of 0.96, a p-value of 0.00, a standard error of 0.08, and a coefficient of 0.08 indicate a correlation between organizational behavior and real-time data analytics. Despite the small impact size, a significant connection exists, and the confidence interval ranges from -0.08 to 0.25, suggesting some variability but generally a positive trend. According to the results for decision-making, the p-value is 0.002, the z-value is 0.16, the coefficient is 0.008, and the standard error is 0.04. A confidence interval ranging from -0.10 to 0.08, showing a wide range of potential impact levels, implies that decision-making has a tiny but statistically significant positive effect on organizational behavior.

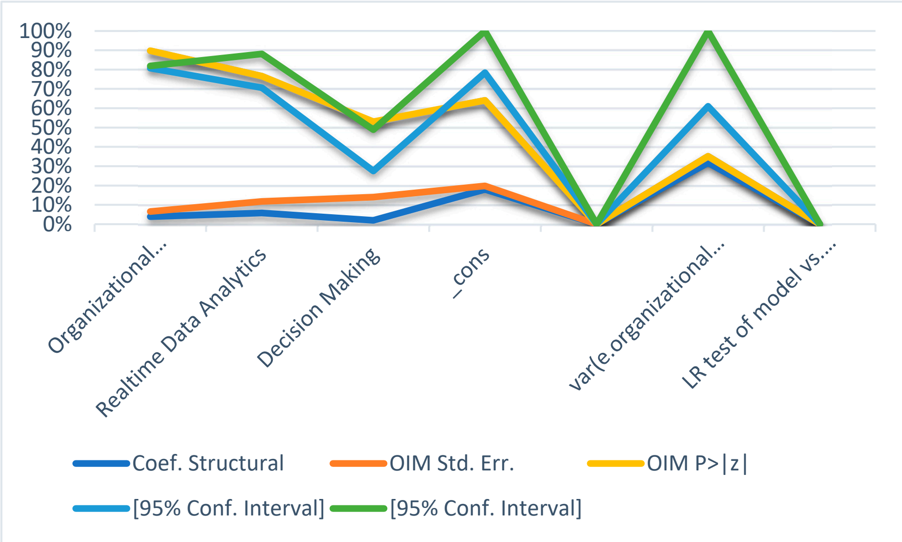

Figure 3. Structural equation modeling.

High levels of organizational behavior are indicated by a z-value of 9.58, a *p*-value of 0.00, a standard error of 0.40, and a model constant term of 3.88. The standard error of 0.08 and the error term variance of 0.82 for organizational behavior indicate some unexplained variability. The model fits the data well without severe inconsistencies, as indicated by a chi-squared value of 0.00 and a probability greater than chi-squared found by the LR test of model vs. saturation.

These results demonstrate that decision-making processes, the IoT, and real-time data analytics influence organizational behavior in small but statistically meaningful ways. Organizational dynamics are complex and these significant elements cannot explain a considerable amount of the variation in organizational behavior. This study concluded that implementing the IoT positively impacts organizational behavior to a modest but significant degree. Although there was substantial variation, real-time data analytics also yielded positive results. Despite its significance, decision-making has a modest effect. Because of the high level of organizational behavior from the beginning, additional root causes of change are likely to be significant.

Comparing these findings to past studies highlights the IoT's benefits to many industries. Mohammad et al. [25] highlighted the extensive advantages of the IoT, with findings that were consistent with these results. In the same way, Laphou et al. [23] emphasized the synergistic effects of the IoT with technologies like blockchain, thus lending credibility to our findings that real-time data analytics enhance organizational outcomes. The modest positive impact on organizational behavior and decision-making we observed in our study aligns with the findings of Sujit et al. [24], who showed that substantial improvements in operational efficiency were attributable to the IoT. Despite the small effect sizes, the IoT and associated technologies may have more significant impacts on social behavior in specific operational or contextual settings than in organizations generally. The significance of integrating the IoT with other organizational and strategic changes cannot be overstated, and this lends credibility to the literature's assumption that an integrated strategy is required for digital transformation.

Organizational behavior is positively affected by the IoT, real-time data analytics, and improved decision-making procedures. Improved data-driven methods may lead to more efficient resource utilization, less resource waste, and more operational efficiency—all of which contribute to sustainability. Organizations can react swiftly to environmental changes because of the real-time monitoring and adaptive tactics made available by incorporating the IoT. This adaptability improves sustainability and resilience. One of the most essential aspects of sustainable growth is a culture of continuous improvement, and firms can enhance their compliance with environmental rules by using data analytics and the IoT.

Table 3's fit statistics provide an in-depth review of the model's accuracy. Compared to the saturated model, this model shows a perfect fit with no degrees of freedom, a chi-squared value of 0.00 for the likelihood ratio, and a value of $p > \text{chi}^2$, which is not applicable. Additionally, the data fit well with the baseline model, which is statistically significant (i.e., over 0.05) with a *p*-value of 0.37 and a chi-squared value (chi^2_bs) of 3.12. The population's root mean square error of approximation (RMSEA) is 0.00, with a *p*-value of 1.00 and a 90% confidence interval ranging from 0.00 to 0.00. Since RMSEA values below 0.05 are positive, and a *p*-value of 1.00 implies a high likelihood that the RMSEA is less than or equal to 0.05, this suggests a strong match.

Table 3. In-depth review of the model's accuracy.

Fit Statistic	Value	Description
Likelihood ratio		
chi^2_ms (0)	0.00	Model vs. saturated
$p > \text{chi}^2$		
chi^2_bs (3)	3.12	Model vs. saturated
$p > \text{chi}^2$	0.37	
Population error		
RMSEA	0.00	Root mean square error of approximation
90% CI, lower bound	0.00	
Upper bound	0.00	
Close	1.00	Probability RMSEA $\leq$ 0.05
Information criteria		
AIC	2199.96	Akaike's information criterion
BIC	2216.04	Bayesian information criterion
Baseline comparison		
CFI	1.00	Comparative fit index
TAG	1.00	Tucker–Lewis index

The Bayesian and Akaike information criteria values are shown, with the former coming in at 2216.04 and the latter at 2199.96. A better match is indicated by lower numbers when comparing models. However, these figures are mainly used for model comparisons because they lack a threshold for goodness of fit. The fit is perfect when the Tucker–Lewis index (TLI) and the comparative fit index (CFI) achieve their highest possible values of 1.00. When values are near 1.00 and compared to a baseline model, the model fits the data well.

According to the fit statistics, the model accurately predicts the observed data. The model fits the statistics appropriately based on the results of the likelihood ratio tests for the RMSEA, CFI, and TLI. The model's robustness is further proved by the RMSEA value of 0.00, the strong confidence interval, and the *p*-value. While the AIC and BIC values indicate a well-fitting model, their actual values are found in their ability to compare different models.

The findings of this study indicate that the structural equation model employed provided a good description of the data. By applying a statistical approach to measure fit indices like the RMSEA and CFI, our research, which is novel in its focus on the impact of the IoT and data analytics on organizational behavior and decision-making, provides further credibility to model representations of linkages in this domain. The study supports the favorable but limited effects of big data analytics and the IoT on organizational action and choice, thereby establishing a robust model fit that is a foundation for future research.

The results of our research, which align with earlier studies, underscore the practical implications of incorporating data analytics and the IoT into business processes. As Mohammad et al. [25] highlighted, the IoT offers numerous advantages, and our findings confirm its positive impact on organizational behavior. Additionally, Laphou et al. [23] have discussed the secondary effects of blockchain technology and the IoT, affirming that real-time data analysis can significantly enhance organizational performance. This echoes the findings of Norina et al. [26] on the positive impact of the IoT on organizational behavior and decision-making, particularly regarding reducing operational costs.

While our study has yielded some positive findings, the small r-squared values have limited our ability to determine the precise impact of the IoT and real-time data analytics on organizational behavior. However, according to our literature review, the IoT is one of the most essential technologies for universal digital transformation. For this reason, there must be a well-defined plan, for which the IoT needs to be incorporated. Future studies and cases on improving organizational behavior and decision-making can strengthen these findings and provide further information on their implications.

Thus, the use of the IoT and real-time data analytics will enhance organizational behavior and decision-making by minimizing operational costs and optimizing the available resources. These considerations have significant implications for the sustainability the recommended practices. Sustainable practices are enhanced by better forecasting, reduced waste, and streamlined processes made possible by increased agility and resilience of IoT integration. The importance of the IoT in bringing about sustainable business changes is proven by the results, which support a good model fit. By learning from these findings, businesses will be more equipped to implement the IoT, which will aid them in sustainable development and environmental preservation in the long run.

The coefficient covariance matrices in Figure 4 provide insight into the interdependencies and variability of structural model variables. The deployment of the IoT is marked by a low coefficient of variability (0.002). Deploying IoT devices and using real-time data analytics, decision-making, and the model constant do not appear to be significantly related in terms of the variability of the variables, with covariances of 0.00. Data analytics in real time exhibit minimal unpredictability, with a variance of only 0.007. The variabilities of decision-making and real-time data analytics have no significant correlation (covariance = 0.00), in contrast to the model constant (covariance = 0.03), which does.

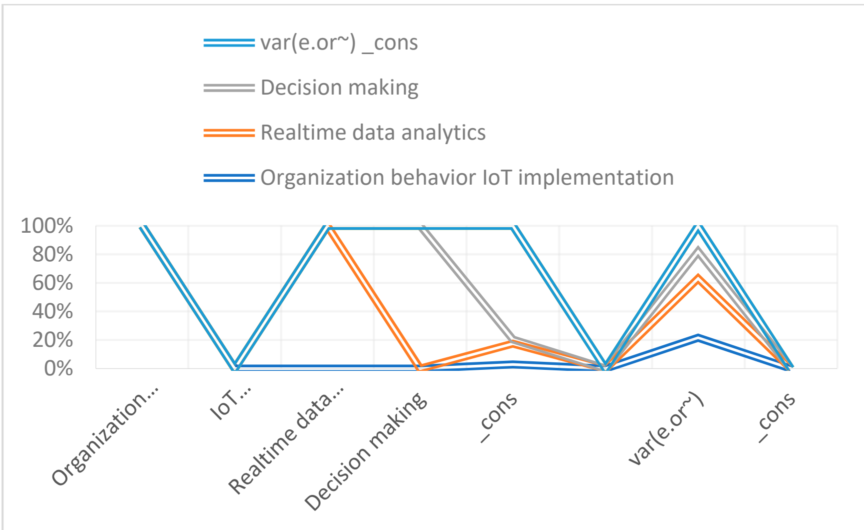

Figure 4. Interdependencies and variability of structural model variables.

The decision-making process is consistent, with a reliability coefficient of 0.002 and a stability index of 0.006. The variance of the model constant term, which is 0.16, indicates a greater baseline degree of variability in organizational behavior. A volatility of 0.007 for the organizational behavior error term (var(e.or~)) indicates minimal fluctuations. Decision-making, real-time data analytics, and IoT implementation are independent variables that do not appear to have any bearing on one another or the impact on organizational behavior.

The covariance matrix strengthens the conclusions from the SEM that the coefficients of the critical variables do not have large variability and barely overlap. This further supports the validity and autonomy of the linkages highlighted in the structural model. This indicates that the predictors related to IoT implementation, real-time data analytics, and decision-making have stable values across the sample and have moderate variances.

Therefore, this analysis shows that IoT implementation, real-time data analytics, and decision-making have different impacts on organizational behavior and low degrees of overlap. The minor standard deviations in the coefficients indicate relatively stable conditions and emphasize these parameters' significance in determining organizational behavior patterns. The dissimilarities in variability also confirm that these factors have different effects on organizational performance.

4. Discussion

These findings corroborate those of earlier studies concerning the unique value added by the IoT and data analytics to organizational practice. Our finding that the IoT has a positive effect on the organizational behavior of Saudi firms corresponds with the findings of Abdur et al. [27], who observed the cross-industry value of the IoT. Laphou et al. [23] observed that the IoT and other technologies that effectively work in tandem with it improve organizational performance through real-time data analytics. Sujit et al. [24] highlighted that the IoT directly impacted operational efficiency, which supports our observations of organizations' decision-making and behavior.

This means that even though the IoT and data analytics are valuable, the changes they bring to organizational behavior are different and not likely to fluctuate wildly. This aligns with the complex nature of their roles and stresses the need to better link the IoT with other organizational strategies in order to bring about comprehensive changes in organizational behavior and decision-making. The generalizability and external validity of this study's methods make them highly suitable for use in further investigations and for optimizing the IoT and data analytics within organizations.

Integrating the IoT in decision-making significantly affects an organization's performance by providing real-time information and improving its function while promoting data usage. This is due to the ability of the IoT to assist effectively in acquiring data from various sources for decision-making at the right times. This capability enables an organization to meet the challenges and dynamic forces within the market and business operations, making it easier to respond to any changes. Regarding data and their quality and timely availability, data mining and analysis are factors that can provide a competitive edge to planning and allocating resources for better performance.

Significant behavior change has been observed in organizations due to the implementation of the IoT. It has encouraged a more integrated approach to information sharing whereby data collected by IoT devices in different sectors are shared among departments. This has enhanced employee productivity and empowered them to decide on their activities by receiving timely information. Moreover, decision-making has been made more rational since data became used as reference points for analysis and discussion, which reduces subjectivity and increases responsibility. This shift has also instilled a continuous learning and improvement culture, with organizations eagerly leveraging the latest IoT information to enhance performance. Therefore, by offering concrete findings, this research adds to the current body of data-driven decision-making and IoT research. This research contributes to the knowledge on how the IoT can be incorporated into decision-making to support organizational performance. It also emphasizes the need for data analysis in real-time, as it supports the existence and development of theories that relate to the role of technology in organizations' strategies.

Furthermore, the study shows how the IoT impacts organizational behavior and the changes that occur due to its use, directly and indirectly, and expands on the current models of how technology adoption takes place and how it affects organizational behavior. There has previously been no intense research emphasis on instances where the IoT is integrated with real-time data analytics and how this impacts decision-making. This research, therefore, fills this gap and offers a detailed framework that other research can use in the future.

In the long term, sustainability can be significantly influenced by the study's conclusions regarding how the IoT affects organizational behavior and decision-making. Organizations can improve resource usage, decrease waste, and increase energy efficiency by utilizing the IoT for real-time data analytics. Therefore, the findings can lead to improved operational sustainability. Based on the study's theoretical background, it may be concluded that organizations can respond swiftly to environmental challenges and requirements if these techniques are used and the organizations become more adaptable. This, in turn, can help them to meet the desired sustainability goals. Therefore, the IoT creates feedback mechanisms, which can be used to promote an adaptive and learning-oriented company culture while implementing sustainability procedures. For instance, the IoT can monitor energy consumption in real time, allowing immediate adjustments to reduce waste. This allows the possibility of continually evaluating and improving such measures, leading to enhanced organizational performance, increased competitiveness, and reduced environmentally adverse effects when factored into organizational decision-making. To realize the potential of the IoT and its potential to support sustainable development, more work needs to be conducted on the extent and manner in which the IoT is embedded in sustainability projects. This integration must include consideration of challenges such as data privacy and resistance to innovation.

Some of the implications of this study are applicable to future research and may be useful to organizations that hope to venture into using the IoT to enhance their decision-making. First, there is a need to develop robust IoT environments that will improve the capture and application of data in organizational practice. To accomplish this, it is recommended that training and development plans should be initiated to enable employees to analyze and utilize data acquired from the IoT. Moreover, organizations must emphasize cultivating a partnership culture, where departments collaborate and share relevant information and resources to pursue organizational goals. This inclusive approach ensures that everyone feels part of a significant collaborative effort, fostering a sense of belonging and shared purpose. Moreover, maintaining agile frameworks allows businesses to pivot quickly and implement new IoT learnings in their strategies.

There are several risks when adopting the IoT for decision-making; for instance, data security issues, high initial investment capital, and organizational cultures that may not readily embrace change. In this regard, organizations should implement mutual and coherent data governance policies that guarantee data credibility and eliminate potential breaches. However, acquiring IoT-ready technologies may be capital intensive and, thus, the option to incrementally grow capability through adopting IoT solutions is advisable to spread costs over time. It is necessary to address the issue of resistance to change by engaging employees in the implementation process, educating them on the advantages of the IoT and offering consistent support and guidance. Other strategies to help change management practices include engaging stakeholders before making decisions and establishing prototypes to assess the IoT's efficacy.

When responding to these challenges and utilizing the full potential of the IoT, an organization can improve its decision-making and increase its organizational performance and competitiveness. This study outlines practical implications to inform practitioners and academics about how the IoT can shape the future of organizational behavior and decision-making.

4.1. Proposed Strategies for Achieving Sustainability

Based on the results of this study, the following strategies for achieving sustainability have been proposed.

4.1.1. Improved Resource Efficiency

- Real-Time Monitoring: Smart IoT devices can obtain resource-use patterns in real time, facilitating the detection of wastage and probable overuse. For instance, wireless sensors can monitor factories' energy consumption, prompting efficient energy utilization and conservation.

- Predictive Maintenance: This can help to predict when equipment is about to fail, thus avoiding downtime and increasing the useful life of machinery. Thus, it eliminates the need to replace it so often and reduces the use of resources.
- Automated Systems: Smart IoT systems can manage resources, such as lights, heating, ventilation, air conditioning, and HVAC systems on the premises by making them work only when needed and, hence, reducing wastage.

4.1.2. Reducing Waste

- Supply Chain Optimization: Managing inventories is one of the most critical areas that the IoT can assist an organization. This provides end-to-end visibility in the supply chain to avoid overstocking and surplus-of-stock situations. For example, sensors can track storage conditions to ensure that perishable food items are kept fresh.
- Waste Management: Smart waste management systems using the IoT reduce fuel costs when planning routes and schedules to make collections. Organic bins can also notify waste–garbage collectors when they are full, hence eliminating the need for frequent collection.
- Product Lifecycle Management: P4C can help organizations to locate products during their usage period and decide whether to dispose of or recycle them. This can aid in constructing designs for products that are easiest to recycle or that can be repurposed, thus cutting down on waste.

4.1.3. Enhanced Decision-Making for Sustainability

- Data-Driven Decisions: The IoT creates large volumes of data on resource use that could be used to make decisions on sustainability. This assists the organization in establishing sustainability goals and goals that can be met according to the data collected.
- Sustainable Supply Chains: IoT data can help us better understand more sustainable sources of materials and how to use data to implement efficient transportation management and reduce carbon emissions.
- Environmental Impact Assessments: IoT devices can continuously monitor the environment, such as air and water quality, so that organizations can determine the level of harm they pose to the environment and work towards rectifying the harm.

4.1.4. Long-Term Environmental and Economic Sustainability

- Cost Savings: Cost reduction is an explicit result of effectiveness; waste reduction saves costs. These additional funds may, in turn, be reinvested in other sustainability endeavors or strategies applicable to the organization.
- Regulatory Compliance: Using the IoT, organizations can implement environmental policies through timely and accurate data on emissions, waste, and resource consumption, thus avoiding penalties and, in the process, improving their corporate image.
- Innovation and Competitive Advantage: The IoT should be adopted early to enable organizations to be seen as innovators, attract green consumers and investors, and create a competitive advantage.

4.2. Implications of This Study

Based on this study's findings and the discussion, the following proposed theoretical framework incorporates organizational learning and adaptation as a central component. This framework highlights the dynamic and iterative nature of IoT-enabled decision-making processes and their impact on organizational behavior and performance. The proposed framework is described in Figure 5:

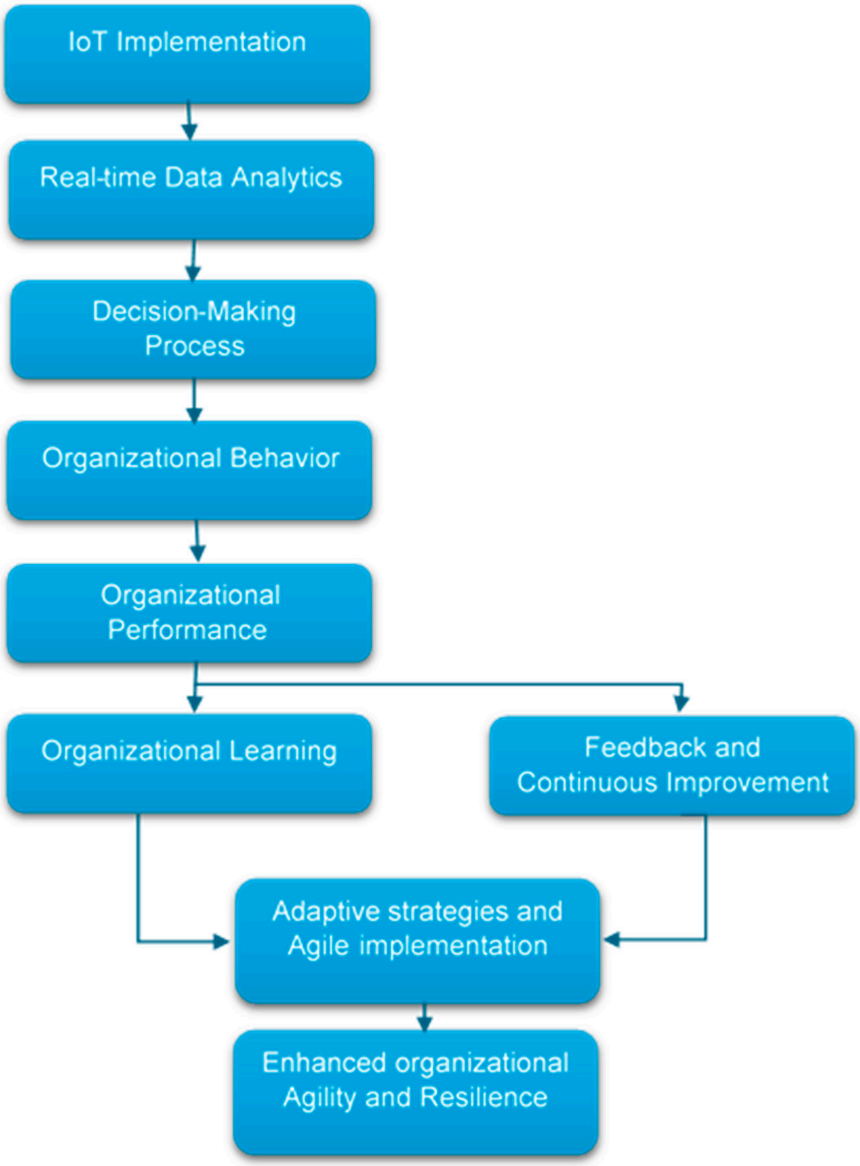

Figure 5. Proposed framework.

4.2.1. Organizational Learning

This measures the organization's capacity to assimilate knowledge generated from IoT data analysis and decisions. Effectively, the systematic process of reviewing an organization's experiences enables it to look for changes that need to be made to improve on the implemented strategies.

4.2.2. Feedback and Continuous Improvement

This component involves constant assessment and auditing of the various processes and measures and the efficiency of decision-making based on an organization's IoT environment. Feedback mechanisms are implemented to capture information from stakeholders to help organizations modify their approaches and plans as needed.

4.2.3. Adaptive Strategies and Agile Implementation

Organizational learning and feedback mechanisms can then be utilized to define and create adaptive leadership and organizational strategies and employ and incorporate the agile processes necessary for efficient responses to changes in the market, customer requirements, and internal issues. Adaptability and responsiveness are emphasized in this element to gain insights from the IoT.

4.2.4. Enhanced Organizational Agility and Resilience

Organizational learning and many other organizational improvement activities and adaptations can significantly assist organizations in becoming more effective and versatile. This comprises the competencies of scanning for change, managing change, looking for opportunities, and sustaining competitive advantages in a competitive environment.

The framework also reveals the cyclic and dynamic application of performance information to overhaul the learning and adaptation process. This learning and implementation cycle enables the creation of an improvement and flexibility culture for organizations using the IoT and real-time data analytics.

In addition to further developing this theoretical foundation, this study assumes that organizational learning and adaptation facilitate improvement. It emphasizes proactivity in the decision-making surrounding the IoT and claims that the business environment will change and organizations will have to adapt.

Therefore, by integrating the IoT into organizations, decision-making should be enhanced together with the values of lifelong learning, adaptability, and innovation. This approach will further help organizations be more ready to meet essential changes in the marketplace and systematically sustain a competitive edge in the long run.

5. Conclusions

This study aimed to understand how the IoT influences data-driven decision-making and behavioral change. The key findings suggest that IoT adoption positively impacts OB (0.04, p-value 0.001) by optimizing data-driven insights and decisions. The current study revealed that the IoT has a statistically significant, although moderate, impact on organizational behavior, decision-making, and real-time data usage. This research indicates that the IoT creates a culture of collaboration, increases productivity, and provides subject-matter data for strategic decision-making, leading to the effective allocation of resources. In addition, the good RMSEA (0.00), CFI (1.00), and TLI (1.00) values also endorse the strong model fit of these variables. Thus, the IoT is recognized as the driving force that contributes to developing a data culture, increases control over general performance, and is a stable, positive factor affecting organizational results.

One limitation of this study is the lack of a large and varied sample size. This study examined only a small subsection of all organizations using the IoT, with many organizations excluded from the research. Additionally, this research does not consider the impact of moderating variables on the effectiveness of IoT adoption, such as preexisting technologies already employed by the organization or the role of management.

Future research should build on the abovementioned findings by examining the IoT's extended repercussions in organizational practice and decisions in various sectors. Some recommendations include the following: Longitudinal studies, which could reveal more details on how continued IoT adoption impacts organizational culture and performance. Moreover, technology, management, and behavioral research may discover other facets of the IoT's impact on organizations. Exploring the IoT's integration with other enabling technologies like AI and blockchain may provide deeper insights into how the IoT can revolutionize existing business practices. These suggestions for future research would assist in strengthening the future of the IoT and organizational behavior and decision-making.

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