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The Mediating Role of Ethical Leadership in the Relationship Between Safety Culture and Trust in the Organization

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ABSTRACT

Human behavior is a critical element revealed in the occupational safety literature. Therefore, it is necessary to understand the basic factors affecting employees' attitudes and behaviors to ensure workplace safety. In this context, this research discusses the concept of safety culture, considering that it has the potential to ensure workplace safety. Another important issue required to change employee behavior is the leadership style. In fact, the safety issue cannot be addressed effectively without the intervention of a manager or leader. It is thought that employees who feel safe in the organization they work for and think that their managers treat them fairly will prioritize safety in their work-related activities. Therefore, this research aims to describe how employees' perceptions of safety culture (SC) affect their level of trust in the organization (TO) and whether ethical leadership (EL) has a mediating effect in this relationship. Based on this, data was collected using the survey method from 213 white-collar employees of 58 SMEs operating in the manufacturing industry in Istanbul. SEM was used to analyze the data. IBM SPSS 22 and AMOS 22 were used for analysis. According to the research results, EL styles fully mediate the relationship between SC and TO.

Keywords: Safety Culture, Ethical Leadership, Trust on Organization, Social Learning Theory, Social Exchange Theory.

JEL Classification Codes: D22, D23, O14

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INTRODUCTION

Understanding and considering the human element as an important safety factor has enabled safety-related studies to accelerate. However, even if not acknowledged, an organization's biggest threat to safety may be its own employees (Georgiadou et al., 2022). The unsafe behavior of employees has been shown to be the cause of the majority of occupational accidents that occur in the workplace. That's why, it is significant for employees to raise their awareness of safety. This situation has created the occurrence of a concept called "safety culture". This concept dominated the era in a short time and was defined in various ways. The concept of safety culture means that each employee in an organization, in accordance with their role, is aware of relevant safety risks and preventive measures and behavior to increase the safety of the organization (Georgiadou et al., 2022). Consequently, SC is considered an effective way to promote safe behavior and manage safety risks within an organization. Therefore, to avoid occupational accidents, it is necessary to understand the basic factors affecting employees' attitudes and behaviors. At this point, in this study, the concept of SC is discussed, considering that it has the potential to ensure organizational safety.

Many researchers have attempted to describe the "desirable" properties that organizations should endeavour to achieve and maintain an appropriate SC. That is, attempts have been made to identify what a "positive" SC might include (Jeffcott et al., 2006). For example, an important feature of an organization's SC is shared perceptions among managers and employees regarding the importance of safety. But, the basis of a positive SC is mutual trust and understanding between employees and managers. The basis of this trust depends on the actions and behaviors of the managers. In other words, it is the responsibility of management to take the first step in initiating a trust-based relationship within the organization (Whitener et al., 1998). At this point, it can be said that the consistency of top management in both their actions and words, which is one of the important components of SC (Jeffcott et al., 2006), leads to organizational trust (Kath et al., 2010). Employees act according to the treatment they receive from the organization. If employees feel that they are being treated correctly, they will have more trust in their organizations. Thus, they behave more appropriately with the decisions made by the organization (Joo et al., 2023). This research used SET to determine the agents that stimulate or

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restrict safe behavior in the firms. Many theories of trust are based on SET, which posits that trust arises through repeated exchange of benefits between two individuals. For example, the behaviors that affect the trust level of employees are primarily the consistency and integrity of behavior. If managers act consistently over time and in different situations, employee trust in their managers increases. More importantly, employees become willing to take risks in their relationships with their managers. Therefore, consistent behaviors strengthen the perception of trust between manager and employee (Whitener et al., 1998). In addition, delegating authority within the organization, sharing control, having open communication, and showing interest in employees are behaviors that affect employees' perceptions of reliability. At the same time, all of these factors constitute the main components of a suitable SC within the organization and increase trust in the organization (Cox & Cheyne, 2000; Kath et al., 2010). As can be seen, safety culture can influence trust in an organization. That is, a "positive" SC within an organization may be one way to appropriately support, encourage, or reward trusting behaviors and relationships (Avram et al., 2015; Lee & Song, 2013; Whitener et al., 1998).

Some studies suggest organizational trust as a factor contributing to the development of a SC in organizations (Bernard, 2024; Burns, 2003), but very little research has been conducted at the organizational level. Lee and Song (2013) measured the effect of SC on OT. Therefore, the goal of this research is to discuss how the agents that constitute SC create a sense of trust in employees and direct them to safe behaviors. However, safety culture alone is not enough to ensure that employees trust their organizations. An appropriate leadership style, along with a safety culture, must also be considered. Actually, Draghici et al. (2022) states in his research that SC is very effective in the safe behavior of employees, sincere and effective leadership of top management is needed (Draghici et al., 2022). Another important issue in this context is the role that leaders' leadership styles play in shaping trust in the organization. When leadership relationships are based on ethical behavior and create a sense of TO, employees perceive the overall organizational context as trustworthy (Pucetaite & Novelskaite, 2014). In this regard, in this study, the issue of EL is discussed. Ethical leaders play the role of moral managers within the organization and develop trust through egalitarian and fair policies (Bellingham, 2003). For this reason, EL differs from other positive leadership styles with its emphasis on ethical aspects. Ethical leaders ensure that employees within the organization participate. It also requires concern for the well-being of employees and for building trusting relationships with them (Freiwald, 2013). As a result, EL are important in promoting ethical behavior in the organization and tend to build trust when communicating with the organization's ethical standards. Based on this view, SET suggests that the perception of fairness of the leader-member interplay leads to trust in managers, which in turn increases TO (Caldwell & Jeane, 2007).

The past researches showing that ethical leadership increases trust in the organization by affecting employee behavior (Kerse, 2021; Le & Nguyen, 2023) raises the issue of how EL mediates the relationship between SC and TO brings to the agenda. An employee's trust in their leader enables them to report errors in safety procedures honestly. Thus, workplace safety management–that is, safety culture–can be continuously improved. On the other hand, providing information about the reward and punishment system for the behavior of employees within the organization and implementing procedures to implement fair norms can create an efficient occupational safety culture. Employees report the mishaps they experience in their jobs to their managers only if they believe they will treat them fairly (Avram et al., 2015). Therefore, EL establish trust-based relationships with employees by encouraging their participation (Brown et al., 2005). They also care about the goodness of employees and encourage them to engage in safe behaviors (Freiwald, 2013). According to SLT, ethical leaders encourage their followers to engage in ethical behavior through behavioral modeling (Heine, 2013). As a result, ethical leaders strengthen safety culture practices within the organization. Thus, employees' awareness of safety increases (Khan et al., 2018). In short, leaders influence employees' safety behaviors and perceptions of SC (Blair, 2003; Lyubykh et al., 2022). Previous research has also revealed that managers' consistent behaviors are significant in encourage safe behavior among employees (Jule, 2020; Freiwald, 2013). For this reason, this research examined the mediating effect of EL on the relationship between SC and TO to win a stronger comprehensing of the relationship between EL and SC. Although numerous researchs have revealed the significant act of different leadership styles in organizational safety (Fragouli, 2019; Heine, 2013; Lyubykh et al., 2022), researchers have argued that EL has not yet considered the mediating role it can play in the relationship between SC and TO. To eliminate this deficiency, in line with SET and SLT, this research goal to contribute to the relevant literature by investigating

the connection between employees' perceptions of SC and their level of TO, and the mediating role of EL in this connection. For this purpose, data was collected by survey method from white-collar employees of SMEs operating in the manufacturing industry in Istanbul.

In organizations, top management can promote ethical leadership by demonstrating ethical leadership and serving as a role model for lower-level management. Managers who exhibit ethical leadership can raise awareness of the safety culture and ensure that employees behave safely. Therefore, white-collar employees were preferred for this study. Essentially, this research revealed that unless an organization develops EL practices, a safety culture may not be directly effective in improving employees' trust levels in the organization. Therefore, the most vital contribution of this study to the literature is to disclose the mediating role of EL in the relationship between SC and TO. Thus, this study progress the literature on EL and SC by revealing that EL can "increase" employees' perceptions of SC.

CONCEPTUAL FRAMEWORK

SC and TO

SC, which affects health and safety in an organization, constitutes a subcomponent of organizational culture that includes individual, business, and organizational characteristics. SC has also been described as "a set of rules related to minimizing the exposure of employees to conditions that are considered harmful" (Cooper, 2000: 114). The aim is to create a good environment in which people are aware (He et al. 2012). SC is, above all, the permanent value and priority that employees at all levels of an organization give to the rest of the organization and public safety (Jeffcott et al., 2006). Essentially, SC expresses the priority given to safety by an employee of the firm and the common value they share. It is also a concept related to employees' ability to fulfill their responsibilities regarding occupational safety and to learn from their mistakes and work accidents (Zhang et al., 2002: 1405).

In organizations with a positive SC, the perception of trust regarding the effectiveness of protective precautions is noteworthy (Cooper 2000: 114). Safety policies and practices create an important impression of the safety environment in the minds of employees. Accordingly, employees who think that there is a safe environment in the workplace follow safety procedures and practices that prevent work accidents. In addition, employees who think that the workplace environment is safe have a positive attitude towards their managers/employers (Avram et al., 2015: 680). For example, the most important elements of a SC are that workplace management takes immediate action to correct safety problems, prioritizes the safety of employees, and has open communication about issues that will affect the safety of employees. The presence of these elements increases employees' sense of trust in the organization (Cox & Cheyne, 2000; Kath et al., 2010). According to Avram et al. (2015), employees' perceptions of SC increase their trust in their organizations (Avram et al., 2015: 681). Another study found a positive relationship between SC and TO (Lee & Song, 2013). Based on this, H1 is formulated as follows:

H1: SC is positively related to TO.

SC and EL

SC express the beliefs that employees share in thinking about and responding to dangers in the workplace (Jeffcott et al., 2006). At this point, leaders' empowering behaviors allow for greater compliance with safety among team members. Thus, organizational members avoid risky behaviors and take care to engage in higher levels of safe behaviors (Bernard, 2024). Ethical leaders and managers who are concerned about the well-being of their employees and try to maintain health and safety standards at the highest level also have priority in the eyes of organizational members (O'Leary, 2016). In this context, research shows that employees' beliefs are affected by the behaviors of their managers (Zeng & Xu, 2020).

SLT (Bandura, 1986) suggests that leaders are a guide for their members. Employees follow the ethical behavior of their leaders and adhere to rules and regulations regarding health and safety. In return for this, ethical leaders use their position power to reward their subordinates' behavior and encourage them to engage in safe behavior (Kapp, 2012). One study stated that ethical leaders encourage employees' participation in work and ensure their welfare by establishing a trust-based relationship with them, and this encourages a culture of safety (Khan et al., 2018: 629). Based on these findings, H2 was formulated as follows:

H2: SC is positively related to EL.

EL and TO

Leadership involves creating an impact within an organization and leaving a mark on its followers. The

social learning perspective on EL is that the leader will affect the moral behavior of his followers by being a role model (Brown et al., 2005: 117-119). EL style differs from other leadership styles because of its focus on the ethical dimension (Trong Tuan, 2012). An EL is defined as a moral manager. The moral manager is responsible, makes fair decisions, and strives for the welfare of their subordinates. Additionally, moral managers try to reinforce moral behavior among employees by introducing a reward system to reinforce moral behavior. As can be seen, the concept of moral is a very important ingredient in EL. Ethical leaders are responsible for hearten moral behaviors within an organization (Erickson, 2006; Heine, 2013).

Leaders are important ethical guides for their employees. The perception of ethical leadership also emerges with a sense of mutual trust among employees (Brown et al., 2005: 121; Trong Tuan, 2012). However, the perception of trust in an organization does not occur spontaneously within an organization. Managers play a significant act in creating a necessary trust within an organization. In this context, managers supporting their promises with their behavior and adopting a fair method in practices, such as rewards and punishment within the organization, affect employees' perceptions of their managers. This perception begins to develop among employees that the leader is ethical and affects the perception of trust in the organization. When leaders/managers do what they say they will do and act consistently, a climate of trust is created in the organization (Joseph & Winston, 2005). Therefore, the behavior of an ethical leader/manager is very important in determining the level of trust that exists within an organization. In addition, the ethical leader/manager must demonstrate their practices for their promises to gain importance. A strong relationship between a leader's promises and practices creates a suitable basis for the development of trust between leaders and employees (Zhu et al., 2004). Research in the literature also revealed an empirical relationship between managers' EL styles and their followers' perceptions of TO (Pucetaite & Novelskaite, 2014). Based on this, H3 hypothesis is created as follows:

H3: EL is positively related to TO.

The Mediator Role of EL

SC refers to the beliefs, attitudes, and assumptions that employees share among work groups in their daily practices at work (Jeffcott et al., 2006). A 'productive' safety culture within the organization means preventing work-related accidents and injuries. Therefore, a proactive security culture is needed within the organization (O'Leary, 2016). The safety culture primarily includes a safe working environment. This includes rules that must be followed to do the job safely, prioritizing the safety of employees, and the participation of both management and employees in this regard. In addition, open communication about issues that will affect the safety of employees and workplace management taking immediate action to correct safety problems is also an integral part of safety culture (Cox & Cheyne, 2000). The existence of comfortable communication regarding safety within an organization creates a trusting environment (Whitener et al., 1998). Reason (1997) also suggests that the sub-components of SC are based on the element of trust (Burns, 2003). Therefore, it can be said that elements related to safety culture have the potential to increase TO.

For instance, one of the precursors of SC; It is known that factors such as transparent communication, delegation of authority, and emotion/perception sharing lead to TO (Kath et al., 2010). On the other hand, perceptions of SC shaped by leaders within the organization affect employees' actions and safety-related behaviors in the workplace (O'Leary, 2016). Thus, employees learn the nature of the behavior that is considered correct by monitoring the rewards and punishments given by ethical leaders (Heine, 2013). In accordance with SET, when employees trust their managers and organizations, they respond in accordance with organizational standards for SC (Joo et al., 2023; Kath et al., 2010). Actually, employees who are concerned about their managers/leaders' behavior may not pay attention to their work development or personal safety. The literature indicates that work environments where trust is low may increase initiative to violate management rules (Kath et al., 2010). Thus, ethical leaders influence employees' perceptions of the organization's safety. Ethical leaders warn their subordinates of the importance of safety and enable them to easily express their perceptions of events. In doing so, ethical leaders also express concern about employees' well-being. If all employees of the firm believe that their leaders truly value safety and realize that their leaders are concerned about it, this will increase their TO (Freiwald, 2013).

However, most studies in the literature utilize transformational leadership theories to explain the safety climate (Bahn, 2013; Tangatarova & Gao, 2021). For example, Draghici et al. (2022) modeled how

safety-focused transformational leadership affects safety behavior through a safety climate. However, they examined behavioral outcomes rather than the direct impact of leadership on organizational trust (Draghici et al., 2022). Another study demonstrated that transformational leadership affects individual safety behavior through safety climate and safety-focused LMX (leader-member exchange) (Shen et al., 2017). In another study, it was found that ethical leaders strengthen the safety culture by establishing transparent communication with their subordinates, considering their well-being, and providing them with adequate explanations (Khan et al., 2018). It is predicted that all of these will increase employees' levels of trust in the organization. In light of this information, it is prospected that ethical leaders will mediate the relationship between SC and TO. Based on this idea, H4 was created as follows:

H4: EL has a mediating effect on the relationship between SC and TO.

In this research, based on the argument that EL may play a mediating role in the relationship between employees' perceptions of SC and their level of TO, the following conceptual research model was developed, as shown in Figure 1.

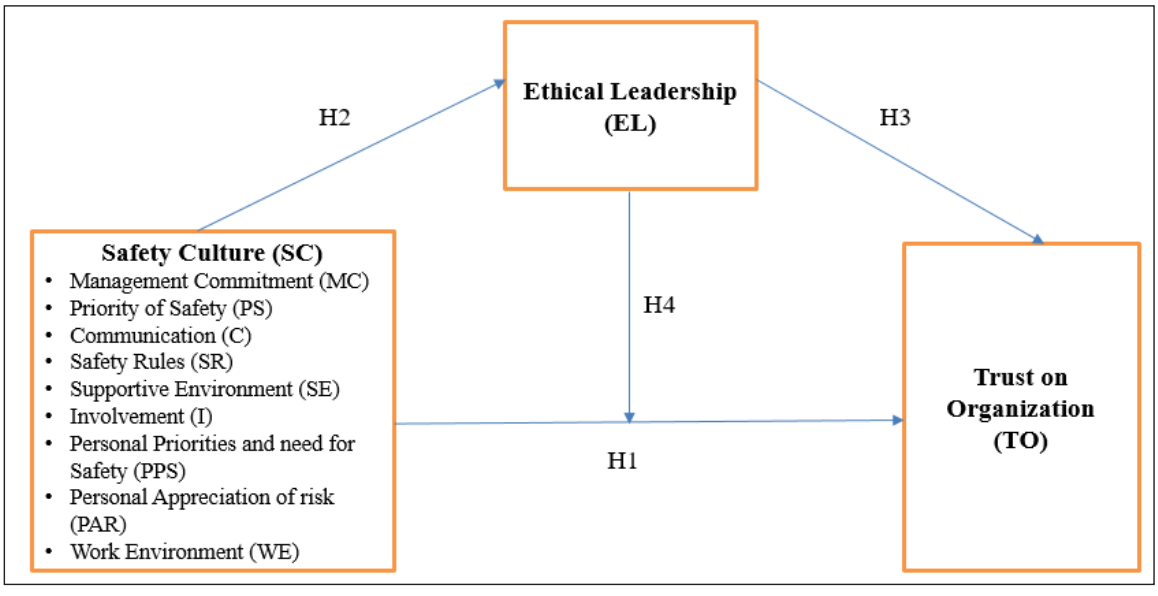

Figure 1. Proposed conceptual model.

METHOD

The Aim of the Study

The aim of the research is to analyze the mediating role of EL in the relationship between SC and TO.

Population and Sample

The sample of the research consists of 213 employees of 58 SMEs operating in the manufacturing industry in Istanbul. The data collection process was carried out using the simple random sampling method between 1 August and 31 December 2023. Survey forms were distributed to 500 people, but only 246 people responded. 33 outliers that disrupted the normal distribution were removed from the data set and 213 of the surveys were included in the study. It is assumed that the data collected using the simple random sampling method and the selected sample represent the population. An application was made to Istanbul Beykent University Social and Human Sciences Ethics Committee for interviews and Ethics Committee Approval was received at the board meeting dated 01/08/2023 and numbered 112932.

Table 1 shows the frequency values of the demographic characteristics of the participants. An evaluation of the demographic characteristics of the participants revealed that 40.40% of the participants were female and 59.60% were male. Of the participants, 45.50% were under the age of 40 years. Because the sector generally employs qualified personnel, 80.30% of the participants had at least a bachelor's degree. Furthermore, 72.80% of the participants reported at least 10 years of work experience.

Table 1. Demographic Data

		Frequency	Percent
Gender	Male	127	59.6
	Female	86	40.4
Age	21-30	79	37.1
	31-40	97	45.5
	41-50	34	16.0
	51-60	3	1.4
Experience	1 and less	12	5.6
	1-5 year	77	36.2
	6-10 year	66	31.0
	11-15 year	28	13.1
	16 and more	30	14.1
Firm size	50 and less	50	23.5
	51-250	46	21.6
	251-500	26	12.2
	501-1000	23	10.8
	1001 and more	68	31.9
Education	High School	13	6.1
	Associate Degree	39	18.3
	Degree	119	55.9
	Master's Degree/ Doctorate	42	19.7
	Total	213	100.0

Table 2 shows the results of the correlation analysis between the sub-dimensions of the SC variable and the variables of TO and EL. According to these results, it can be said that all variables have a significant and positive relationship with each other.

Table 2. Descriptive statistics and correlation coefficient

Variable	Mean	Std. Dev.	1	2	3	4	5	6	7	8	**9**	**10**	**11**
TO	4.065	0.572	1										
EL	4.041	0.546	0.602	1									
MC	4.075	0.439	0.441	0.615	1								
PS	4.103	0.573	0.325	0.495	0.619	1							
C	4.011	0.466	0.211	0.428	0.453	0.617	1						
SR	3.872	0.445	0.119	0.206	0.355	0.328	0.53	1					
SE	3.998	0.430	0.277	0.396	0.482	0.558	0.587	0.505	1				
I	4.175	0.506	0.332	0.482	0.414	0.492	0.488	0.298	0.563	1			
PPS	4.330	0.432	0.228	0.375	0.357	0.451	0.437	0.222	0.459	0.469	1		
PAR	4.086	0.470	0.278	0.309	0.333	0.334	0.275	0.346	0.45	0.454	0.419	1	
WE	3.942	0.422	0.266	0.377	0.423	0.403	0.321	0.259	0.455	0.406	0.361	0.396	1

**. Correlation is significant at the 0.01 level (2-tailed).

Data Collection Method

In this research, the survey method was used to collect data and test the hypotheses. The survey consists of three parts. In the first part, the focus was on trust in the organizational dimension of the TO scale developed by Nyhan and Marlowe (1997); trust in the manager dimension was not used. The trust in the organization dimension consisted of four statements, and the CA value was 0.967. This scale has been used in many domestic and international studies (Candan, 2014; Joseph & Winston, 2005). Taşlıyan et al. (2021) tested the validity and reliability of this scale (TO). The second part is a 5-point Likert-type safety culture scale consisting of nine dimensions and 43 questions. This scale was developed by Cox and Cheyne (2000), and its CA value was calculated as 0.957. Cox and Cheyne (2000) tested the validity and reliability of this scale. The third section included a 5-point Likert-type ethical leadership scale consisting of 10 questions developed by Mayer et al. (2012). CA for the EL scale was 0.945. The survey also included questions regarding the demographic data of the participants. All scales in the survey form were translated by the researchers. The original scales were first translated into our language and then back into their original language (English) to ensure consistency of the questions in the scales with the originals, and support was received from English-language experts in this regard.

Process and Analysis

After the data collection phase, reliability, unidimensionality, discriminant validity, and convergent validity of the scales were evaluated. Following Cox and Cheyne's (2000) study, in which safety culture was subjected to EFA, in this study safety culture was subjected to EFA again. The reliability and validity of

the variables were evaluated using exploratory and confirmatory factor analyses (CFA) (Anderson & Gerbing, 1988; Fornell & Larcker, 1981). In this context, an EFA was conducted for safety culture and nine factors were identified. As the safety culture scale is multifactorial, a second-level confirmatory factor analysis was performed on this scale. After removing problematic survey items with low factor loadings or cross-loadings from the analysis, CFA indicated that the models fitted the data significantly. Constant indices were determined using the safety culture scale. $\chi 2 = 1553.018$, $\chi 2/df = 1.934$, CFI = .904, RMSEA = .066, SRMR = .087.

After this stage, a CFA was conducted, including all variables that constituted the research model (SC, EL and TO). $\chi 2 = 2744.001$, $\chi 2/df = 1.873$, CFI = .885, RMSEA = .064, SRMR = .086. Additionally, it was determined that each item loading in the constructs was meaningful and showed convergent validity. Structural Equation Modeling is based on the two-stage approach suggested by Anderson and Gerbing (1988). In the first stage, the measurement model was designed and completed in advance using a CFA. Later, the research model and hypotheses were tested by applying SEM to the measurement model.

Table 3. SEM results

Relationship	Model 1	Model 2	Model 3
Safety culture → Trust on organization	0.716***		0.067
Safety culture → Ethical leadership		0.767***	0.769***
Ethical leadership → Trust on organization			0.820***

FINDINGS

Model 3 in Table 3 shows that safety culture is positively related to EL (β=.769, p<.001), thus supporting H2. Regarding the relationship between EL and TO, EL was positively related to TO (β=.820, p<.001), thus supporting H3. Additionally, the model explained 36% of the variance in TO and 41% of the variance in ethical leadership.

Three Structural Equation Models (SEM) are applied here:

Model 1, which included safety culture and trust in the organization, showed that safety culture was positively related to TO ($\beta = .716$, $p < .001$) (R^2 (trust in the organization) = .163), which supports the H1 hypothesis.

Model 2, which includes safety culture and ethical leadership, shows that safety culture is significantly related to ethical leadership ($\beta = .767$, $p < .001$, R^2 (ethical leadership) = .410),

As noted in Model 3, after controlling for the safety culture variable, EL was found to be positively related to TO ($\beta = .820$, $p < .001$). Additionally, including ethical leadership in the model increased the R^2 of TO (R^2 (trust in the organization) = .361). Additionally, the inclusion of the agent in the SEM-based model also causes a significant increase in R^2.

Based on the above results, EL was found to fully mediate the relationship between SC and TO, thus supporting the H4 hypothesis.

DISCUSSION AND CONCLUSION

Some studies have explained safety culture through transformational leadership theory. Some empirical findings have even considered transformational leadership or safety-focused transformational leadership as an antecedent to safety culture (Bahn, 2013; Tangatarova & Gao, 2021). While the debate regarding the causal order between safety culture and leadership continues (Draghici et al., 2022), the findings of this study suggest that safety culture is an antecedent of EL. Furthermore, while some previous studies (Bernard, 2024) emphasized the direct role of safety culture in establishing organizational trust, this study demonstrated that safety culture is related to organizational trust through ethical leadership. Safety culture shapes employees' perceptions of an organization's values and norms. This culture becomes visible when leaders promote ethical practices. When employees observe their leaders acting in accordance with ethical principles, they believe that the organization is generally trustworthy. Therefore, trust in an organization is established only through ethical leadership.

This research, based on SET and social learning theories, contributes to the literature by investigating the mediating role of EL in the relationship between employees' perceptions of SC and their level of TO. Although many studies in the literature have suggested that TO is a factor contributing to the development of SC in firms (Burns, 2003; Jeffcott et al., 2006; Kelly et al., 2015), few studies have measured the impact of SC on TO at the organizational level (Lee & Song, 2013). Therefore, more research is needed on the elements that make up a safety culture to establish trust in an organization. On the other hand, it seems that a

SC is necessary but not sufficient on its own to ensure that employees trust their organizations. Draghici et al. (2022) pointed out that an appropriate leadership style should be taken into consideration along with safety culture. In light of this information, this study investigates the mediating role of managers' EL styles in the effect of employees' perceptions of SC on their level of TO.

According to the SEM findings, there appears to be a positive and significant relationship between SC and TO. This finding supports existing literature (Bernard, 2024). Additionally, when the relationship between EL and TO was examined, EL positively affected TO. These results strengthen the findings of past research (Brown et al., 2005; Pucetaite & Novelskaite, 2014). However, a positive relationship was identified between SC and EL. This finding also supports those of past studies (Khan et al., 2018). Finally, this research examines the mediating role of EL in the relationship between SC and TO. In line with these research findings, it has been determined that EL plays a full mediating role in this relationship. These results show that there is a need to develop a SC through ethical leadership as it positively affects trust in the organization. Ethical leaders produce effective health and safety policies, making it possible to implement safety culture-oriented processes through personal commitments, active participation, and establishing trust among employees. No previous research has examined the mediating role of EL in the relationship between SC and TO. This study contributes to the literature by investigating these relationships in the following ways.

First, by detailing a significant body of literature demonstrating the link between SC and TO, this research examines a theoretically important but under-researched area: the role of trust within safety culture. Because many researchers argue that trust plays a central role in SC studies, but trust is rarely measured (Burns, 2003). In addition, this research examines the ethical leadership style of leaders/managers, suggesting that it can motivate employees to engage in safe behavior by considering vital working conditions and creating a sense of trust in employees. Second, this study light to the narrowed study on the effects of managers' EL. This study found that EL strengthens the positive relationship between SC and TO; therefore, ethical leadership can "increase" employees' disposition towards workplace safety. The findings show that EL; It suggests that it has an active role in creating a sense of SC within the organization and a sense of TO. This study ensured the integration of EL and SC by using moral principles of ethical leaders. It can be argued that this integration makes a significant contribution to the literature. Finally, this study provides the basis for utilizing both SET and SLT to examine employees' perceptions of EL.

As a result, in the century we live in, working life requires new and challenging tasks for people in managerial positions. This challenging task requires managers to have a system of ethical values and beliefs when dealing with human elements that are difficult to manage. It also requires managers to pass their efforts and activities in the organization through this system of values and beliefs. However, to control employees' attitudes or behaviors that go beyond the targets of the firm and to prevent its harmful consequences, some rules and procedures must be laid out in a clear, concise, and understandable manner. As a result, leadership style plays a significant act in establishing an environment of trust within the organization and in carrying out safety-oriented work. This type of role provides important input for achieving long-term goals and ensuring success for both employees and the organization. In this context, the attitudes and behaviors of people in managerial positions in organizations, as role models, have gained great importance. As a matter of fact, the findings obtained from this research revealed that employees' perceptions of safety culture and management's participation (attitude and behavior) are important in ensuring a safe business atmosphere. In this sense, managers and leaders operating in a wide variety of sectors should reconsider how uncertain and complex business conditions in the future may have an impact on the roles of employees and organizations. In addition, managers should mobilize all human resource processes to support safety culture. In other words, managers need to establish a structure that considers many safety criteria, from recruitment to performance evaluation, and implement reward-incentive systems. Thus, they can support both the formation and development of SC and TO.

LIMITATIONS

The main limitation of this study is that the data sample only covers employees of 58 SMEs in Istanbul. Therefore, it is not correct to generalize the findings of the research to all businesses. In the future, researchers may include larger-scale businesses in the data sample. Additionally, researchers can include variables that may have a moderating effect on the relationship between SC and TO. Another limitation of the study was that the organizational trust scale was not considered as a whole but only focused on the organizational trust dimension. To obtain a more generalizable result, it is recommended that other dimensions of TO be included in future research. Finally, conducting researches examining the connection between TO and SC in different industries and samples, taking into account different leadership styles, will shed light on organizational life.

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Competency Requirements for Travel Industry Professionals: A Comparative Cross-National Perspective

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ABSTRACT

Tourism and travel, taken together, are a major economic activity in the modern world that mainly thrives on the services of competitive human resources. Since the competencies of employees have become one of the key elements for organizational success, it seems necessary that travel industry stakeholders keep an active role in examining the competencies of human resources for sustainable management and growth in the industry. This study was therefore intended to identify the generic competency requirements for the UK and US travel industries. Derived from numerous job postings using a comparative analysis, it was shown that employers looked for competencies of both soft and hard nature. However, much emphasis was laid on competencies related to the interpersonal, human, and behavioral qualities of the candidates. The study has also revealed a strong coherence between the two countries on numerous competency items. The findings of this study may overall contribute to the development of staff recruitment processes and training programs, employee performance appraisals, daily organizational operations, and hospitality and travel education.

Keywords: Competencies, Human Resources, UK Travel Industry, US Travel Industry, Organizational Development, Tourism and Travel Education.

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INTRODUCTION

Competent people are probably the single best resource that a company can get to remain competitive in an ever-changing business environment. This especially seems true of those in service industries where many of the operations rely on human labor. Many leading tourism and travel companies invest heavily in acquiring and retaining skilled people to maintain their business operations successfully. They spend hundreds of thousands of dollars each year recruiting key staff based on a carefully considered set of criteria, which are usually skills, experience, and ability-based (Lee-Ross & Pryce, 2010).

Recent decades have seen a shift in paradigms toward competency-based management, where the performance and effectiveness of an organization are predicated on the competencies of its employees. Boyatzis (1982), in his model of effective job performance, for instance, posits that effective job performance depends on some critical components, such as the individual's competencies, the job's demand, and the organizational environment. Effective action and thus performance are believed to be obtained when all three components are consistent and correspond with each other. According to him, if any one or two of these components are inconsistent and don't correspond with each other, it is expected that ineffective behavior or inaction will result. He further points out that a person's set of competencies reflects his or her capability, which describes what he or she can do, not necessarily what he or she does, nor all the time, regardless of the situation and setting. One should know what capability the individual has brought to the situation, e.g., the job, to understand the individual's specific behavior that was effective; without knowing this about the person, it would be difficult to predict, describe, or interpret his or her specific actions and why they were effective (Boyatzis, 1982, p.23).

Lawler (1994), in a similar vein, suggests that competency-based organizing, as opposed to a job-based one, has some potential benefits and can create a competitive advantage as it leads an organization to perform better. By moving to a competency-based approach, although having a number of limitations and difficulties associated with it, organizations can form systems that support the development of particular types of competencies, develop individuals who are suited to particular management styles, which, in

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turn, may allow the organization to operate with a management style that can provide a hard-to-replicate competitive advantage, and help markedly in attracting new employees and retain existing ones (Lawler, 1994). In the wider context, the wealth of modern-day businesses and nations, according to McLagan (1997), is contingent on the competencies of their people. The common inclination to think of competencies as a key contributor to organizational success keeps feeding the publicity of a competency-centric mindset in modern-day management.

Competency-based human resources has grown as a common practice over the past few decades, and almost every large organization today utilizes some form of competency-based human resource management—HRM (Boyatzis, 2008). Tourism firms are no exception to considering some set of competencies in hiring, training, development, promotion, and such human resources activities. The commonality of interest in competency-based HRM has prodded many scholars into studying such a subject in the realm of tourism.

Little, however, has been written about the employers' expectations of candidates who seek a role in the travel industry. Although previous research, such as Burton & Burton (1995), Dhiman (2012), Geldenhuys (2000), Lather et al. (2008), Lazarinis & Kanellopoulos (2010), Major & Evans (2008), Navickiene & Buciuniene (2007), Povey et al. (2016), Samuels (1983), Subash (2012), Tsai (2017), and Zehrer & Mössenlechner (2009) provides some useful information on competency or skill requirements for those planning to engage in professions in this industry, more comprehensive studies, without a doubt, are necessary to reassess previous achievements, expand the literature, and gain further insights into one of the least understood subjects of the field. As well as that, one of the major gaps in the literature is the lack of systematic analyses of the employer's demands of candidates who seek to make a career in the travel industry (see also Dhiman, 2012; Zehrer & Mössenlechner, 2009). This, from a broader lens, may lead to various critical problems, including ineffective action plans among stakeholders, poor formal education, lack of competent staff, weak services, and thus impoverished organizational success that overall impede the sustainable growth of the industry. Recognizing that competency needs can change with time, the subject also requires frequent revisits to keep pace with progressive developments in the travel business. It should likewise be acknowledged that some competencies, as opposed to generic ones, can differ according to location, where they may be tailored to fit in with the local business environment.

This paper hence sets out to examine the competencies required by travel firms in the UK and the US, which are renowned for their significant economic and educational activities with respect to tourism and travel. Yet, there is a paucity of outstanding scholarly effort spent on understanding such a critical subject in-depth. The paper, therefore, provides a detailed comparative analysis of employers' expectations of candidates for different job positions in the two countries, which, to our knowledge, finds no previous examples.

At the outset, we provide the methodological approach to this research. Then we discuss initial details, such as job posting essentials and statistics, and identify the common competency needs for various job roles in the UK and US travel industries. In the final section, we draw implications for travel industry leaders and tourism and travel educators and give directions for future examinations.

METHOD

A good way of learning about the expectations of the industry from applicants is to have a look at employers' "real-world" job postings. To do so, we browsed for postings on a popular employment website, Indeed, with a work of two days in June 2023, and visited the main website for vacancies in the US and its division for those in the UK. Using "travel agent" as the keyword and "United Kingdom" and "United States" as location filters, we obtained a total of 798 postings for the UK and 479 for the US. The records were examined for their relevance with the industry and a total of 893 non-relevant items (615 for the UK and 278 for the US), such as those from other sectors (including air transportation, and accommodation), the field of specialization (e.g. engineering), postings published in another languages, and postings with incomplete specifications as well as a total of 43 (34 for the UK and 9 for the US) postings with similar titles (subtle differences) and identical contents issued by same employers (keeping one of them for analysis) were excluded from the study. We conducted a content analysis of the final data (149 for the UK and 192 for the US, which were 77.2% and 88.9% of the overall relevant items, respectively), which is a quite suitable method for this study. Noteworthy is that all computations were made with popular office software, and thus percentages are rounded figures that may not tally to a hundred using a basic calculator.

Moreover, Kendall's non-parametric correlation coefficient, similar to Spearman's correlation coefficient (a standardized measure of the strength of relationship

between two variables that does not rely on the assumptions of a parametric test and performed on data that have been converted into ranked scores), but preferred for a small data set with large number of tied, same ranks (Field, 2018), helped us identify the covariance between the two rank orders of the competency items. Below, we considered Kendall's tau as our datasets included a number of tied ranks, and it has some advantages over Spearman's rho (Field, 2018; Howell, 2010). We also employed Kolmogorov-Smirnov and Shapiro-Wilk tests to examine the normality of the data.

FINDINGS

Job posting essentials and related statistics

UK travel industry

Table 1 exhibits the essential components and related statistics derived from a total of 149 job postings for the UK travel industry, which provide several important initial details for our competency analysis. These components include types of travel firms that posted jobs, types of vacancies posted, types of employment, educational levels required for the open positions, and specifications on candidates' professional experience, respectively. As shown in the table, a wide range of employer categories were identified, more than half of which consisted of travel companies (17.4%), travel management companies (10.7%), travel agencies (10.1%), tour operators (6%), luxury tour operators (5.4%), and undefined companies serving in the travel business (4.7%). Other firm titles are listed sequentially based on the number of observations. All titles were designated as they originally appeared on the postings, or they were derived from the employers' web pages and/or the Web.

Similarly, numerous job categories were obtained, which, with higher weights, were comprised of business travel consultant (8.7%), luxury travel consultant (4.7%), travel consultant (4.7%), travel reservations agent/ reservations agent (2.7%), and travel sales consultant/ sales travel consultant (2.7%). Almost 21 percent of the jobs were comprised of senior executive roles (considering titles, such as executive and senior), while 10 percent consisted of managerial roles (based on titles, such as manager, administrator, leader, and supervisor). It should be noted that job titles were arranged in their original forms to provide a detailed view of the sources of competencies as far as possible.

Surprising as it may seem, employers have chosen not to specify educational requirements for most job positions (91.9%). There were only twelve postings that required candidates to have a certain type of qualification. For instance, vacancies demanding a qualification include apprentice travel consultant (general standard of education/GSE, 100% of the given job), business travel consultant (BA2 level qualification to fares & ticketing, 100%), contact centre agent (general certificate of secondary education/GCSE, 100%), flight ticketing & administration consultant (tourism certification, 100%), marketing coordinator (online marketing/digital qualification, 100%), marketing executive (marketing qualification, 100%), senior travel executive (diploma in travel & tourism or similar certification, 100%), sales travel advisor/travel advisor-sales agent (commercial legal studies & hospitality knowledge, 50%), travel assistant manager (travel qualification, 100%), travel consultant (travel & tourism qualification, 14.3%; travel qualification, 14.3%), and travel counselor (high school diploma, 100%).

Strikingly, industry or activity-based professional experience was a particularly emphasized specification (87.9%). That said, employers did not view work experience as essential with respect to only 1.3 percent of the postings, which were related to the retail travel advisor and personal travel specialist positions, and about 8 percent of the postings made no reference to such a detail. These postings include titles, such as apprentice travel consultant (100% among the other experience categories regarding the given job), business performance and alignment manager (100%), Caribbean luxury travel consultant (100%), Europe/Mediterranean luxury travel consultant (50%), Middle East luxury travel consultant (100%), reservations and customer services associate (100%), senior advisor-sales support & systems (100%), Southeast Asia luxury travel consultant (100%), specialty product specialist (100%), systems administrator-finance team (100%), travel consultant (14.3%), and travel executive (100%). Besides, experience was marked as a preferred feature among 2.7 percent of the postings.

Moreover, job postings referred to many types of employment as shown in Table 1. For instance, almost 41 percent of the jobs were composed of permanent employment. Two other types with significant rates consisted of full-time, permanent (19.5%) and full-time (14.1%) employment. Additionally, about 8 percent of the jobs have not been specified in any category. Various other types are listed sequentially in their original titles.

Table 1. UK Job postings, essential components, and related statistics.

Component
Employer Profile (Frequency, Percentage)
Travel company (26, 17.4); Travel management company (16, 10.7); Travel agency (15, 10.1); Tour operator (9, 6.0); Luxury tour operator (8, 5.4); Undefined/Travel business (7, 4.7); Specialist travel company (6, 4.0), Worldwide travel agency (6, 4.0); Family-run travel company (4, 2.7); Luxury travel company (4, 2.7); Worldwide/Global travel company (4, 2.7); Inbound tour operator (3, 2.0); Large travel company (3, 2.0); Specialist tour operator (3, 2.0); Tour company (3, 2.0); Travel and leisure company (3, 2.0); Corporate travel company (2, 1.3); Independent travel agency (2, 1.3); Independent travel company (2, 1.3); International tour operator (2, 1.3); Travel technology company (2, 1.3); Adventure travel company (1, 0.7); Business to Business/B2B software as a service/SaaS business in travel (1, 0.7); Business travel agency (1, 0.7); Cycling tour agency (1, 0.7); Global travel management company (1, 0.7); Independent retail travel agency (1, 0.7); Independent tour operator (1, 0.7); Independent travel retailer (1, 0.7); International travel company (1, 0.7); Online tour operator (1, 0.7); Online travel agency (1, 0.7); Provider of travel management solutions (1, 0.7); Specialist travel management company (1, 0.7); Specialist winter-sports tour operator (1, 0.7); Strategic travel management and services company (1, 0.7); Tailor-made travel company (1, 0.7); Transatlantic tour operator (1, 0.7); Travel and tourism operator (1, 0.7); Volunteer travel company (1, 0.7); Total (149, 100)
Job Title
Business travel consultant (13, 8.7); Luxury travel consultant (7, 4.7); Travel consultant (7, 4.7); Travel reservations agent/Reservations agent (4, 2.7); Travel sales consultant/Sales travel consultant (4, 2.7); Retail travel consultant (3, 2.0); Sales executive/Sales executive-Travel consultant (3, 2.0); Travel advisor (3, 2.0); Travel manager (3, 2.0); Call center agent (2, 1.3); Customer service agent (2, 1.3); Europe/Mediterranean luxury travel consultant (2, 1.3); Sales travel advisor/Travel advisor-Sales agent (2, 1.3); Senior business travel consultant (2, 1.3); Specialist travel consultant (2, 1.3); Travel itinerary coordinator (2, 1.3); Travel operations coordinator (2, 1.3); Travel operations executive (2, 1.3); Africa travel sales agent (1, 0.7); After sales consultant (1, 0.7); Agency partnership executive (1, 0.7); Apprentice travel consultant (1, 0.7); Asia-team travel consultant (1, 0.7); Business performance and alignment manager (1, 0.7); Business travel operations manager (1, 0.7); Business travel team leader (1, 0.7); Caribbean luxury travel consultant (1, 0.7); Commercial partner manager-Ancillaries (1, 0.7); Contact centre agent (1, 0.7); Corporate travel consultant (1, 0.7); Cruise travel consultant (1, 0.7); Dedicated support analyst (1, 0.7); Digital marketing executive-Projects (1, 0.7); Fares & ticketing executive (1, 0.7); Finance assistant (1, 0.7); Flight ticketing & administration consultant (1, 0.7); Flights coordinator (1, 0.7); Foreign exchange agent (1, 0.7); Global travel advisor (1, 0.7); Group travel consultant (1, 0.7); Holiday planner (1, 0.7); In resort manager (1, 0.7); International business travel consultant (1, 0.7); Land operations executive (1, 0.7); Marketing coordinator (1, 0.7); Marketing executive (1, 0.7); Meeting air coordinator (1, 0.7); Middle East luxury travel consultant (1, 0.7); Oceans & islands travel consultant (1, 0.7); Operations executive (1, 0.7); Operations support executive (1, 0.7); Operations support executive-Servicing (1, 0.7); Outbound sales agent (1, 0.7); Partnership development manager (1, 0.7); Personal travel expert (1, 0.7); Personal travel manager (1, 0.7); Personal travel specialist (1, 0.7); Personal travel supervisor (1, 0.7); Public relations executive (1, 0.7); Public relations senior specialist (1, 0.7); Reservations and customer services associate (1, 0.7); Reservations and ticketing executive (1, 0.7); Retail travel advisor (1, 0.7); Retail travel manager (1, 0.7); Retail travel sales consultant (1, 0.7); Sales & operations agent-B2B (1, 0.7); Sales & operations agent-Foreign independent tour/FIT (1, 0.7); Sales consultant-B2B (1, 0.7); Senior advisor-sales support & systems (1, 0.7); Senior business travel advisor (1, 0.7); Senior business travel agent (1, 0.7); Senior business travel consultant-VIPs client (1, 0.7); Senior corporate travel advisor (1, 0.7); Senior corporate travel consultant (1, 0.7); Senior retail travel sales consultant (1, 0.7); Senior tailor-made travel consultant (1, 0.7); Senior travel consultant-Assistant manager (1, 0.7); Senior travel executive (1, 0.7); Ski travel consultant (1, 0.7); Southeast Asia luxury travel consultant (1, 0.7); Specialty product specialist (1, 0.7); Systems administrator-Finance team (1, 0.7); Tailor-made luxury travel consultant (1, 0.7); Tailor-made travel consultant (1, 0.7); Ticketer (1, 0.7); Trade communications executive (1, 0.7); Travel advisor-Customer booking support (1, 0.7); Travel advisor-Supply operations (1, 0.7); Travel agent (1, 0.7); Travel assistant manager (1, 0.7); Travel branch manager (1, 0.7); Travel consultant-European destinations (1, 0.7); Travel consultant-Long haul (1, 0.7); Travel counselor (1, 0.7); Travel customer service executive (1, 0.7); Travel executive (1, 0.7); Travel reservations agent-Inbound (1, 0.7); Travel sales specialist (1, 0.7); Travel specialist (1, 0.7); Very important person/VIP travel consultant (1, 0.7); Worldwide travel consultant (1, 0.7); Worldwide travel sales consultant (1, 0.7); Total (149, 100)
Employment Type
Permanent (61, 40.9); Full-time, permanent (29, 19.5); Full-time (21, 14.1); Undefined (12, 8.1); Freelance (3, 2.0); Full-time, part-time (3, 2.0); Hybrid remote (3, 2.0); Temporary (3, 2.0); Full-time, fixed term contract (2, 1.3); Full-time, freelance (2, 1.3); Full-time, permanent, remote (2, 1.3); Remote (2, 1.3); Apprenticeship (1, 0.7); Fixed term contract (1, 0.7); Full-time, fixed term contract, hybrid remote (1, 0.7); Full-time, hybrid remote (1, 0.7); Part-time, permanent (1, 0.7); Permanent, hybrid remote (1, 0.7); Total (149, 100)
Educational Level
Undefined (137, 91.9); Travel qualification (2, 1.3); Commercial legal studies & hospitality knowledge (1, 0.7); Diploma in travel & tourism or similar certification (1, 0.7); GCSE or equivalent (1, 0.7); GSE (1, 0.7); High school diploma (1, 0.7); Marketing qualification (1, 0.7); Online marketing/digital qualification (1, 0.7); Tourism certification (1, 0.7); Travel & tourism qualification (1, 0.7); VAII (formally BA2) level qualification to fares & ticketing (1, 0.7); Total (149, 100)
Experience
Required (131, 87.9); Not specified (12, 8.1); Preferred (4, 2.7); Not essential (2, 1.3); Total (149, 100)

US travel industry

Findings from the initial analysis of a total of 192 US job postings are shown in Table 2. As can be seen from the table, travel firms that posted jobs in the US consist of many types. Approximately 16 percent of these firms are comprised of travel agencies. Other outstanding types include the federation of affiliated automobile clubs (8.3%), corporate travel management company (7.3%), travel management company (6.3%), full-service travel agency (6.3%), and travel company (6.3%). Along with that, 6.8 percent of firms whose categories could not be identified operate in the travel industry.

Also, a good many job titles have been identified, of which 5.2 percent comprise senior roles and 2.6 percent managerial positions (considering titles such as manager and director). Significant job titles include travel advisor (15.1%), travel consultant (9.9%), and travel agent (9.4%). Many other titles remain just less than 5 percent, constituting the majority of all job titles.

Most US job postings (66.1%), just as in the UK, did not point to any requirement for education. However, employers either required or preferred a number of educational qualifications for a significant portion of the jobs as opposed to their UK counterparts. As shown in the table, they, for instance, demanded at least a high school education or general educational development (GED), while others sought higher education, such as associate or bachelor's degrees, for many positions. It is noteworthy that 7.3 percent of the postings referred to travel, tourism, and/or hospitality-related education. Positions that demanded educational qualifications include corporate travel agent (33.3% of the given job), corporate VIP travel agent (100%), corporate/government travel agent (100%), destination events and luxury travel manager (100%), destination travel specialist (100%), entertainment travel agent (100%), entertainment travel agent, tour specialist (100%), group air coordinator (100%), international corporate travel advisor (100%), international travel consultant (33.3%), leisure travel agent (66.7%), luxury travel specialist (100%), office assistant/junior travel consultant (100%), reservation specialist (100%), reservation specialist & retail sales/service (100%), senior global travel manager (100%), specialized travel consultant (100%), teen travel counselor (100%), travel advisor (50%), travel advisor assistant (100%), travel advisor/travel agent (100%), travel agent (61.1%), travel consultant (31.6%), travel consultant/customer service specialist (100%), travel consultant/web assist agent (100%), travel coordinator (50%), travel manager (100%), travel reservations agent (50%), travel sales agent (66.7%), travel specialist (50%), vacation counselor (100%), vacation travel consultant (100%), and VIP corporate travel consultant (100%). Along with that, only one employer considered education as unessential, which relates to the travel advisor position (3.3% of the given title).

Although its percentage was less than the UK instance, experience was likewise a highly sought feature among US travel industry professionals. For instance, 62 percent of the jobs required candidates to have some generic or specific work experience. In addition, many employers preferred candidates to have experience, which was expressed in a significant number of jobs (24%). However, experience was not seen as essential for around 5 percent of the jobs. Such jobs include travel advisor (10% among the other experience categories regarding the given job), travel advisor assistant (100%), travel consultant (10.5%), independent travel consultant (100%), international travel consultant (33.3%), cruise travel coordinator (100%), and vacation planner (100%). Apart from that, 8.9 percent of the postings did not refer to any specification regarding experience.

Lastly, job postings also refer to various distinct sets of employment. 46.4 percent of the jobs depended on full-time employment, while about 20 percent hinged on full-time, remote employment. Almost 9 percent of the postings did not point to any type of employment, though. Several other employment sets with fewer shares are exhibited in the table.

Competency requirements for travel industry professionals

A comparative list of competencies, as shown in table 3, provides some interesting findings on UK and US employers' expectations of candidates for open job positions. These competencies were divided into two main groups: the first one being knowledge, abilities, attitudes, and other characteristics, and the second one being skills. Such a categorization, with some closely corresponding items, was a product of the concept competency itself, which usually tends to be parsed into such subgroups throughout the literature, and particularly "skill" standing as an outstanding key term throughout the examined material. Every item comprising at least 2 percent of both UK and US job

Table 2. US Job postings, essential components, and related statistics.

Component
Employer Profile (Frequency, Percentage)
Travel agency (30, 15.6); Federation of affiliated automobile clubs (16, 8.3); Corporate travel management company (14, 7.3); Travel management company (12, 6.3); Undefined/Travel business (13, 6.8); Full-service travel agency (12, 6.3); Travel company (12, 6.3); Luxury travel agency (6, 3.1); Corporate travel management services (5, 2.6); Tour operator (5, 2.6); Full-service travel company (4, 2.1); Leisure travel agency/ Leisure vacation travel agency (3, 1.6); Boat tour company (2, 1.0); Business travel & meetings management company (2, 1.0); Entertainment travel and event management company (2, 1.0); Full-service family owned and operated travel agency (2, 1.0); Full-service travel management company (2, 1.0); Incentive travel company (2, 1.0); Membership-based luxury travel club and community (2, 1.0); Travel wholesaler (2, 1.0); Travel, hospitality and leisure management group (2, 1.0); Adventure travel company (1, 0.5); Boutique travel agency (1, 0.5); Boutique-style corporate event and incentive program company (1, 0.5); Business travel management company (1, 0.5); Catholic pilgrimage company (1, 0.5); City tour company (1, 0.5); Corporate and academic travel management company (1, 0.5); Cruise travel company (1, 0.5); Educational travel agency (1, 0.5); Ethnic travel agency (1, 0.5); Events management company (1, 0.5); Family owned and operated educational travel company (1, 0.5); Family owned and operated travel agency (1, 0.5); Family-run helicopter tour company (1, 0.5); Female owned and operated agency (1, 0.5); Female owned travel management firm (1, 0.5); Full-service corporate travel management agency (1, 0.5); Global corporate travel and event management company (1, 0.5); Global travel management company (1, 0.5); Golf travel company (1, 0.5); Leisure travel company (1, 0.5); Local travel agency (1, 0.5); Luxury online travel agency (1, 0.5); Luxury travel company (1, 0.5); Luxury travel concierge (1, 0.5); Luxury travel consultancy (1, 0.5); Luxury travel specialists (1, 0.5); Meetings and incentives company (1, 0.5); Native American travel office (1, 0.5); Polaris outfitter & adventure tours company (1, 0.5); Provider of university & sports travel management services (1, 0.5); Retail travel agency (1, 0.5); Signature travel network agency (1, 0.5); Small group travel company (1, 0.5); Specialist sports travel business (1, 0.5); Specialized travel company (1, 0.5); Travel advisory company (1, 0.5); Travel and event management company (1, 0.5); Travel and tourism company (1, 0.5); Travel and tourism operator (1, 0.5); Travel corporation (1, 0.5); Worldwide tour operator (1, 0.5); Total (192, 100)
Job Title
Travel advisor (29, 15.1); Travel consultant (19, 9.9); Travel agent (18, 9.4); Leisure travel advisor (8, 4.2); Corporate travel consultant (7, 3.6); Travel coordinator (4, 2.1); Corporate travel agent (3, 1.6); International travel consultant (3, 1.6); Leisure travel agent (3, 1.6); Senior corporate travel consultant (3, 1.6); Travel sales agent (3, 1.6); Independent travel advisor (2, 1.0); Luxury travel advisor (2, 1.0); Senior travel agent (2, 1.0); Specialized travel counselor (2, 1.0); Travel reservations agent (2, 1.0); Travel specialist (2, 1.0); VIP travel consultant (2, 1.0); Administrative assistant/ Travel coordinator (1, 0.5); Africa specialist luxury travel advisor (1, 0.5); After hours travel consultant/After-hours travel counselor (1, 0.5); After hours travel specialist (1, 0.5); Air travel advisor (1, 0.5); Air travel agent (1, 0.5); Corporate travel advisor (1, 0.5); Corporate travel coordinator (1, 0.5); Corporate travel counselor (1, 0.5); Corporate travel specialist (1, 0.5); Corporate VIP travel agent (1, 0.5); Corporate/Government travel agent (1, 0.5); Cruise travel coordinator (1, 0.5); Customer service/Reservation sales specialist (1, 0.5); Defense & government travel consultant (1, 0.5); Defense & government travel consultant/Travel counselor (1, 0.5); Destination events and luxury travel manager (1, 0.5); Destination travel specialist (1, 0.5); Entertainment travel agent (1, 0.5); Entertainment travel agent/Tour specialist (1, 0.5); Fulfillment agent & backup corporate travel advisor (1, 0.5); Golf travel specialist (1, 0.5); Group air advisor (1, 0.5); Group air coordinator (1, 0.5); Group air director (1, 0.5); Group air planner (1, 0.5); Group air/travel for meetings planner (1, 0.5); Group finalization coordinator (1, 0.5); Group reservations specialist (1, 0.5); Group travel advisor (1, 0.5); Group travel consultant (1, 0.5); Group travel coordinator (1, 0.5); Guest service travel advisor/Travel experience designer (1, 0.5); Independent travel consultant (1, 0.5); International corporate travel advisor (1, 0.5); Luxury travel advisor B2B (1, 0.5); Luxury travel expert (1, 0.5); Luxury travel sales agent (1, 0.5); Luxury travel specialist (1, 0.5); Marketing coordinator (1, 0.5); Meeting coordinator (1, 0.5); Member experience associate travel advisor-Call center (1, 0.5); Office assistant/Junior travel consultant (1, 0.5); Onsite travel consultant (1, 0.5); Personal assistant for travel advisor (1, 0.5); Post travel specialist (1, 0.5); Reservation specialist (1, 0.5); Reservation specialist & retail sales/service (1, 0.5); Reservation specialist/Dispatcher (1, 0.5); Senior corporate travel counselor (1, 0.5); Senior global travel manager (1, 0.5); Senior luxury travel advisor (1, 0.5); Senior travel advisor (1, 0.5); Senior VIP travel consultant (1, 0.5); Specialized travel consultant (1, 0.5); Team travel manager (1, 0.5); Teen travel counselor (1, 0.5); Travel advisor assistant (1, 0.5); Travel advisor/Customer service (1, 0.5); Travel advisor/Travel agent (1, 0.5); Travel advisor-Independent contractor (1, 0.5); Travel agent & travel coordinator (1, 0.5); Travel agent/Travel consultant (1, 0.5); Travel consultant-Global 24 hour emergency desk (1, 0.5); Travel consultant/Customer service specialist (1, 0.5); Travel consultant/Web assist agent (1, 0.5); Travel coordinator-International tours (1, 0.5); Travel counselor (1, 0.5); Travel destination agent (1, 0.5); Travel experience agent (1, 0.5); Travel manager (1, 0.5); Vacation counselor (1, 0.5); Vacation group air consultant (1, 0.5); Vacation planner (1, 0.5); Vacation travel advisor (1, 0.5); Vacation travel consultant (1, 0.5); VIP corporate travel consultant (1, 0.5); VIP international travel consultant (1, 0.5); Total (192, 100)
Employment Type
Full-time (89, 46.4); Full-time, remote (38, 19.8); Undefined (17, 8.9); Full-time, part-time (13, 6.8); Full-time, hybrid remote (8, 4.2); Part-time (6, 3.1); Remote (5, 2.6); Contract (4, 2.1); Full-time, contract (2, 1.0); Full-time, part-time, contract (2, 1.0); Full-time, part-time, hybrid remote (2, 1.0); Full-time, part-time, remote (2, 1.0); Contract, remote (1, 0.5); Full-time, part-time, internship (1, 0.5); Full-time, temporary (1, 0.5); Temporary (1, 0.5); Total (192, 100)
Educational Level
Undefined (127, 66.1); High school diploma or equivalent (16, 8.3); Bachelor's degree (7, 3.6); High school diploma or GED (6, 3.1); High school diploma or two/four year college degree (5, 2.6); Bachelor of science or Bachelor of arts degree (4, 2.1); Associate degree (3, 1.6); Diploma or degree in hospitality, travel, tourism, business or relevant field (3, 1.6); High school diploma or equivalent, a graduate of an accredited travel school (2, 1.0); High school diploma or equivalent, bachelor's degree (2, 1.0); Travel school (2, 1.0); Associate degree or equivalent (1, 0.5); Associate degree or equivalent from two-year college or technical school (1, 0.5); Associate or bachelor's degree (1, 0.5); Associate or better in hospitality and resort management (1, 0.5); Bachelor or degree in business administration, tourism administration or related areas (1, 0.5); Bachelor's degree and/or equivalent certification (1, 0.5); Bachelor's degree in sales, marketing, business administration, or a related field (1, 0.5); Bachelor's degree, hospitality or event management related degree (1, 0.5); High school diploma or equivalent, a graduate of an accredited travel school program and some college (1, 0.5); High school diploma or equivalent, Post-secondary education in travel and tourism (1, 0.5); High school diploma, associate degree (1, 0.5); High school education or equivalent or college (1, 0.5); Hospitality or sales education (1, 0.5); Not essential (1, 0.5); Travel & tourism or agent related certification (1, 0.5); Total (192, 100)
Experience
Required (119, 62.0); Preferred (46, 24.0); Not specified (17, 8.9); Not essential (10, 5.2); Total (192, 100)

postings was included in this collection of competencies. Original expressions with close meanings were adjusted and encapsulated to form a single competency item.

A very straightforward implication reveals that both UK and US employers look for competencies of "soft" as well as "hard" nature. Many of the identified competencies refer to the initial category, which, according to Weber et al. (2009), relates to interpersonal, human, and behavioral aspects that are needed to apply the latter, mainly pointing to technical sides. For instance, the most important competence that potential employees were mutually expected to demonstrate was strong attention to detail and accuracy. In addition, the ability to work within a team, a customer-centric mindset, and interest and passion for travel and the travel industry were some other substantial competencies required by industry professionals. In a similar vein, written and verbal communication, customer service, organizational, relationship-building, interpersonal, and time management skills were pronounced qualities for both countries, taking place in the second subcategory along with their counterparts in the upper subcategory. Likewise, many other identified competency items point to the interpersonal, human, and behavioral capabilities of candidates who are seeking career opportunities in the travel industry. Recognizing that travel is a service industry, this, without doubt, seems quite reasonable.

A good number of the competencies, on the other hand, are linked to the technical aspects of the industry. Knowledge, abilities, and skills related to computer technology were considered among the principal competencies for being assigned to one of the job positions. Being competent in essential computer programs and global distribution systems, as given in the table, was ranked as one of the top priorities by both countries' employers. Along with that, good geographical knowledge and being knowledgeable of the travel industry were commonly of significant importance.

As indicated in the table, a number of competency domains were identified using Hogan & Warrenfeltz's (2003) model of managerial education, by also considering the works of National Research Council (2011), National Research Council (2012), Sandwith (1993), and Weber et al. (2009). These included intrapersonal, interpersonal, leadership, business, and cognitive skills. The competency items belonging to the intrapersonal domain outstandingly prevailed over the others in number throughout the two main categories, and what followed this domain were the interpersonal competencies. It should be noted that some aspects of the specified competency categories may overlap with one another, making it naturally quite possible for some items to be considered in more than a single category.

Table 3. Competencies for UK and US travel industry professionals.

		UK			US			
Competencies	**Domain**	**Frequency**	**Percentage**	**Rank**	**Frequency**	**Percentage**	**Rank**	**Difference in Rank**
Knowledge, abilities, attitudes, and other characteristics								
Demonstrating a strong attention to detail—being detail-oriented and accurate	Intrapersonal	43	28.9	1	76	39.6	1	
Proficiency in using computers effectively, including IT and digital literacy, e.g., Microsoft Office Word, Excel, PowerPoint, Outlook, Teams, spreadsheets, Google applications, databases, Internet navigation, messenger tools, and email, social media platforms, Zoom	Business	43	28.9	1	74	38.5	2	-1
Ability to work collaboratively within a team, teamwork—excellent team player, sharing knowledge and supporting colleagues, when necessary, also switching responsibilities	Interpersonal	34	22.8	2	46	24.0	6	-4
Being competent in using global distribution systems, and other computer, travel agent, or tour operator reservation systems—including online booking, e.g., Amadeus, Sabre, Travelport, Worldspan, or Galileo, Apollo-Focalpoint, Concur OBT	Business	33	22.1	3	56	29.2	3	

Having a customer-centric mindset with a desire to provide exceptional service and exceed customer expectations—being service-oriented, excellent customer service, quality-of-service orientation (both internal and external)	Interpersonal	31	20.8	4	53	27.6	4	
Demonstrating an interest and passion for travel and (also enjoying working in) the travel industry, in providing memorable experiences to customers	Other	27	18.1	5	30	15.6	9	-4
Flexibility to adapt to changing work demands, handling other tasks as assigned, and occasional overtime as required—flexible hours, shifts	Intrapersonal	24	16.1	6	34	17.7	7	-1
Ability and desire to work under pressure, also thrive and strive, in a fast-paced environment	Intrapersonal	21	14.1	7	20	10.4	15	-8
Having good geographical knowledge	Business	21	14.1	7	21	10.9	14	-7
Having knowledge, understanding, and awareness of the travel industry, policies, procedures, processes, codes, practices, and systems—including trends and products in the market, low-cost carriers, worldwide airlines, different aircraft types and cabins, retail, tours, travel agency and tour operations, transportation, accommodations, cruising, FITs, documentation, insurance, travel suppliers, travel-related sales, and reservations	Business	21	14.1	7	32	16.7	8	-1
Holding a good and clear English spoken (also warm, personable, enthusiastic, polite, confident, and professional) phone manner	Interpersonal	21	14.1	7	4	2.1	30	-23
Ability to work independently—exercising discretion and judgment	Intrapersonal	20	13.4	8	47	24.5	5	3
Ability to multitask in a fast-paced environment—a multitasker, managing multiple tasks, requests, and projects simultaneously, including dealing with multiple clients, and handling multiple demands at once	Intrapersonal	15	10.1	9	53	27.6	4	5
Being positive, energetic, and motivating—a positive and cheerful attitude	Intrapersonal	14	9.4	10	19	9.9	16	-6
Having excellent knowledge of destinations and their tourism products, e.g., European/Mediterranean holiday destinations, Japan, Scotland, USA	Business	14	9.4	10	7	3.6	27	-17
Fluency in a foreign language, both oral and written, a bilingual, multilingual speaker, e.g., Cantonese, Dutch, French, German, Greek, Hindi/Punjabi/Gujarati, or any other Indian language, Italian, Japanese, Korean, Mandarin, Norwegian, Portuguese, Russian, Spanish, Swedish, Tagalog, Vietnamese	Interpersonal	13	8.7	11	23	12.0	12	-1
Ability to communicate effectively both written and verbally with customers and staff (including travel counselors) in all areas and levels of the company—an excellent communicator	Interpersonal	12	8.1	12	26	13.5	11	1

Fluency in English, both oral and written, good, appropriate use of grammar—a clear voice, fluent, idiomatic English speaker	Interpersonal	12	8.1	12	14	7.3	20	-8
Having strong problem-solving abilities to resolve issues effectively (by taking the initiative)—an active problem solver	Cognitive	12	8.1	12	18	9.4	17	-5
Ability to prioritize, plan, organize, and manage workload, and projects—whilst remaining reactive to the needs of the business, as well as following up with clients and providing a premium level of service	Intrapersonal	10	6.7	13	27	14.1	10	3
Being (well) organized, also precise	Intrapersonal	10	6.7	13	20	10.4	15	-2
Having (a passion for and) knowledge of worldwide, long-haul travel, (popular) tourist destinations, and products, e.g., Africa, Asia, Caribbean, Far East, Latin America, Middle East, Southeast Asia	Business	10	6.7	13	4	2.1	30	-17
Being confident	Intrapersonal	9	6.0	14				
Being self-directed—self-motivated, autonomous	Intrapersonal	9	6.0	14	16	8.3	19	-5
Having a tenacious approach—tenacity	Intrapersonal	9	6.0	14				
Having an excellent understanding of ticketing, rules, and regulations, ticket exchanges, reissue, void, refund transactions, and documentation—including an understanding of a passenger name record/PNR lifecycle and building PNRs and profiles, also group ticketing	Business	9	6.0	14	18	9.4	17	-3
Ability to meet deadlines	Intrapersonal	8	5.4	15	11	5.7	23	-8
Ability to prioritize	Intrapersonal	8	5.4	15	4	2.1	30	-15
Ability to think out of the box with new ideas, suggestions, and different perspectives, try new things—outside-the-box thinking, a start-up mentality	Intrapersonal/ Conceptual-Creative	8	5.4	15	7	3.6	27	-12
Being sales-driven with a keen eye for numbers, a strong work ethic, and a focus on achieving and exceeding sales targets	Intrapersonal	8	5.4	15	9	4.7	25	-10
Excellent understanding of (domestic and international) fares, airfares, and contracted fares	Business	8	5.4	15	11	5.7	23	-8
Ability to plan	Intrapersonal/ Conceptual-Creative	7	4.7	16				
Being proactive, working proactively, including looking for ways to improve internal processes	Intrapersonal	7	4.7	16	10	5.2	24	-8
Flexibility to adapt and customize an approach to changing customer demands, travel trends, industry developments, changeable or reactive situations, and frequent interruptions, while ensuring the quality of work remains high and objectives are set	Intrapersonal	7	4.7	16	8	4.2	26	-10
Ability to engage, interact, and negotiate with customers and individuals in a professional, helpful, friendly, empathic, respectful, and clear manner	Interpersonal	6	4.0	17	13	6.8	21	-4

Ability to maintain a high level of professionalism while working with both internal and external customers—mature and professional attitude and appearance	Intrapersonal	6	4.0	17	22	11.5	13	4
Ability to organize	Intrapersonal	6	4.0	17				
Being calm and approachable even when under pressure—resilient attitude, resilience	Intrapersonal	6	4.0	17	10	5.2	24	-7
Being motivated and focused to achieve individual, team, and company goals and objectives—including strategic attitude, strategic thinking	Intrapersonal	6	4.0	17	5	2.6	29	-12
Being target-driven, goal-oriented/goal-driven—with a focus on revenue and productivity	Intrapersonal	6	4.0	17	5	2.6	29	-12
Being willing to continually learn, grow, and adapt—a passion for learning	Intrapersonal	6	4.0	17	23	12.0	12	5
Demonstrating a can-do attitude	Intrapersonal	6	4.0	17	4	2.1	30	-13
Ability to take initiative, initiative-taker—also a self-starter	Intrapersonal	5	3.4	18	23	12.0	12	6
Being driven, passionate, enthusiastic	Intrapersonal	5	3.4	18	5	2.6	29	-11
Being friendly—friendliness	Intrapersonal	5	3.4	18	7	3.6	27	-9
Confidence in dealing with people/clients at all levels of the business	Interpersonal	5	3.4	18				
Having a desire to succeed—with confidence and determination	Intrapersonal	5	3.4	18				
Ability to resolve customer issues in a professional, empathetic, courteous, and timely manner	Interpersonal	4	2.7	19				
Being keen on exploring and solving problems	Intrapersonal	4	2.7	19				
Being motivated	Intrapersonal	4	2.7	19	4	2.1	30	-11
Being well-traveled	Other	4	2.7	19				
Having a proven track record in reaching and exceeding targets	Other	4	2.7	19				
Having a proven track record of working towards and achieving sales targets	Other	4	2.7	19				
Having an outgoing personality	Intrapersonal	4	2.7	19	5	2.6	29	-10
Ability to take ownership of responsibilities, having a sense of responsibility—accountability	Intrapersonal	3	2.0	20	6	3.1	28	-8
Ability to use marketing campaign management tools—including pay-per-click/PPC, search engine optimization/SEO, and e-mail marketing	Business	3	2.0	20				
Ability to work across different contact channels at the same time, e.g., e-mail, telephone, live chat, and social media	Intrapersonal	3	2.0	20				
Ability to work at a pace	Intrapersonal	3	2.0	20				
Being a good listener—also the ability to actively listen	Interpersonal	3	2.0	20				
Being able to work with minimal supervision, e.g., when resolving customer queries	Intrapersonal	3	2.0	20				
Being creative—thinking creatively, creativity	Cognitive/Conceptual/Creative	3	2.0	20	7	3.6	27	-20
Being determined	Intrapersonal	3	2.0	20				

Being punctual	Intrapersonal	3	2.0	20				
Having a dynamic personality	Intrapersonal	3	2.0	20				
Having knowledge of luxury holiday markets, e.g., European, Middle East, Southeast Asia	Business	3	2.0	20				
Having leadership abilities—a leader by nature	Leadership	3	2.0	20				
Having the ability to pick up and learn new systems/booking systems, call-center telephone systems, and ever-changing technology quickly	Intrapersonal	3	2.0	20	11	5.7	23	-12
Proficiency in using computers effectively, e.g., website content management, Tigerbay CMS, Hyper-Text Markup Language/HTML, video editing, Adobe Creative Suite	Business	3	2.0	20				
Strong commitment to achieving targets and overcoming challenges	Intrapersonal	3	2.0	20				
Supportive of and accepting business changes and improvements for the long-term success of the business	Intrapersonal	3	2.0	20				
Ability and willingness to undertake domestic and international travel, as well as travel to destination locations, when required	Intrapersonal	2	1.3	21	4	2.1	30	-9
Being flexible—flexibility	Intrapersonal	2	1.3	21	7	3.6	27	-6
Being reliable, dependable, and trustworthy, reliability	Intrapersonal	2	1.3	21	9	4.7	25	-4
Proficiency in using customer relationship management/CRM systems, travel customer service platforms, and other sales tools, e.g., ClientBase, Softrip, Zendesk, Salesforce, TravelXen	Business	2	1.3	21	10	5.2	24	-3
Having strong commercial abilities, awareness	Business	2	1.3	21	5	2.6	29	-8
Having a working knowledge of luxury travel products and destinations, e.g., Europe, and Mediterranean luxury holiday destinations—versed in working with luxury hotels, first and business-class air, DMCs, villa suppliers, sourcing guides, etc.	Business	2	1.3	21	6	3.1	28	-7
Ability to make decisions confidently—decisiveness	Cognitive	1	0.7	22	4	2.1	30	-8
Ability to type fast and accurately on the computer keyboard	Business	1	0.7	22	6	3.1	28	-6
Enjoying dealing with the public and working with people, interacting with customers, including while on the phone	Interpersonal	1	0.7	22	4	2.1	30	-8
Having a strong sense of urgency	Intrapersonal	1	0.7	22	4	2.1	30	-8
Having discretion and the utmost respect for client confidentiality	Interpersonal	1	0.7	22	6	3.1	28	-6
Ability to build and maintain relationships effectively—with company employees, clients, and travel suppliers	Interpersonal				17	8.9	18	
Ability to arrange domestic and international vacation travel, also book travel—including air, rail, car rental, hotel, other ground transportation, transfers, restaurant reservations, etc.	Business				12	6.3	22	
Demonstrating a strong commitment to ethics and work ethics	Intrapersonal				12	6.3	22	

Ability to manage time effectively—time management ability	Intrapersonal				10	5.2	24	
Ability to effectively navigate between multiple computer systems and web browsers	Business				9	4.7	25	
Being honest—demonstrating personal and organizational, professional integrity	Intrapersonal				9	4.7	25	
Demonstrating adaptability—being adaptable, versatile	Intrapersonal				7	3.6	27	
Having an entrepreneurial spirit	Intrapersonal				4	2.1	30	
Having strong organizational abilities	Intrapersonal				7	3.6	27	
Ability to learn quickly—a quick learner	Cognitive				4	2.1	30	
Ability to work within the posted hours, specified times, and schedules, e.g., 8 am-6 pm ET, Monday-Friday 9-5 pm PST, 35-45 hours/week	Intrapersonal				6	3.1	28	
Having a strong and very comfortable relationship with paperwork	Business				6	3.1	28	
Having a strong sales acumen, being strong in sales—the ability to close sales, including comfort with consultative sales	Interpersonal				6	3.1	28	
Having strong critical thinking abilities	Cognitive				4	2.1	30	
Demonstrated ability and innate talent to create and deliver great, exceptional client (travel) experiences—with ease and grace	Interpersonal				5	2.6	29	
Demonstrating regular and reliable attendance	Intrapersonal				4	2.1	30	
Being competent in using travel product management systems, including electronic sales reporting systems for travel companies, e.g., Softrip, ARC/IAR, Axis	Business				4	2.1	30	
		Correlation coefficient between the two rank orders = .574, *n* =57						
Skills								
Having excellent verbal and written communication skills—competency in English	Interpersonal	66	44.3	1	110	57.3	1	
Having excellent customer service skills	Interpersonal	27	18.1	2	40	20.8	3	-1
Having strong organizational skills—to ensure all customer requests and internal processes are handled efficiently to achieve high levels of performance	Intrapersonal	17	11.4	3	46	24.0	2	1
Having excellent relationship-building skills to liaise with clients, external suppliers, and internal stakeholders effectively	Interpersonal	16	10.7	4				
Having strong interpersonal (people) skills	Interpersonal	11	7.4	5	35	18.2	4	1
Having strong time management skills—to be able to work effectively to deadlines	Intrapersonal	8	5.4	6	20	10.4	7	-1
Having good IT and computer skills, especially working with spreadsheets, e.g., Microsoft Office Word, Excel, PowerPoint, Gmail, Google Docs, e-mail, and Internet research	Business	7	4.7	7	32	16.7	5	2

Having advanced skills (skilled) in global distribution systems, e.g., Sabre	Business	5	3.4	8	9	4.7	10	-2
Having excellent (relationship-based) sales, selling skills	Interpersonal	4	2.7	9	18	9.4	8	1
Having strong (creative, proactive) problem-solving and resolution skills	Cognitive	4	2.7	9	26	13.5	6	3
Having excellent (including commercial) English language skills	Interpersonal	3	2.0	10				
Having excellent numerical/mathematical skills	Cognitive	3	2.0	10				
Having multiple language skills, e.g., Czech, German, Hungarian, Italian, Polish, Russian, Spanish, Tagalog, Bahasa, and Vietnamese	Interpersonal	3	2.0	10				
Having strong negotiation skills, which can be demonstrated through high-value commercial agreements	Interpersonal	3	2.0	10				
Having strong prioritization skills	Intrapersonal	3	2.0	10				
Having strong listening skills—with the ability to determine root cause quickly, check for shared understanding, and address misunderstandings promptly	Interpersonal				14	7.3	9	
Having strong analytical skills, e.g., identifying significant problems and opportunities	Cognitive				7	3.6	11	
Having strong planning skills	Intrapersonal/ Conceptual-Creative				5	2.6	12	
Having excellent phone skills	Interpersonal				5	2.6	12	
Having strong presentation skills, including oral presentation	Interpersonal				4	2.1	13	
Having strong phone sales skills	Interpersonal				4	2.1	13	
		Correlation coefficient between the two rank orders = .704, $n = 9$						

Additionally, competency items that did not fit well in a certain category were marked as others.

Obviously, no association is seen between the UK and US ranks of many competency items, as they were ranked only by one of the two countries, particularly between the lower-rated ones. To examine the relationship between the remaining items (i.e., items concerning both countries), we conducted a Kendall's rank correlation test as the data involved ordinal variables. K-S test also suggested that datasets were not distributed normally ($p < .05$, $n = 57$). Kendall's tau_b correlation showed that there was a significant positive correlation between the two rank orders in the first group of competencies ($\tau = .574$, $p < .01$, $n = 57$), which suggests that the two countries attributed the same levels of importance to the specified competencies. Substantial divergences, however, can be seen in some competencies considered individually, looking at the column of difference in ranks, e.g., the most striking one being "holding a good and clear English spoken phone manner", with a difference of rank of 23. In the similar vein, taken individually, competency domains that referred to both countries and could be examined statistically, pointed to strong positive correlations as follows—intrapersonal ($\tau = .512$, $p < .01$, S-W test for datasets, $p < .05$, $n = 32$), interpersonal ($\tau = .551$, $p < .05$, S-W test for datasets, $p > .05$, $n = 9$), business ($\tau = .646$, $p < .01$, S-W test for datasets, $p_{UK} > .05$, $p_{US} < .05$, $n = 12$). Other domains did not qualify for statistical analysis due to insufficient numbers of entries.

No relation was also observed between the two countries concerning more than half of the competencies in the second group of items under the title of skills, as they pertained to either the UK or the US. There was, however, a strong correlation between the rest of the items ($\tau = .704$, $p < .01$, S-W test for datasets, $p > .05$, $n = 9$), which indicated a strong cohesion between the two groups of employers. Overall, one can observe a close mutual harmony in

the upper rows of skill items with no (e.g., the first, fourth, and fifth items) or subtle differences. Domain-based statistical analysis did not apply to this group of competencies.

CONCLUSION

The main contribution of this study is that it provides an elaborate and expansive set of generic competencies drawn from a wide range of job positions of two leading travel industries, with a comparative cross-national perspective. These competencies represent the expectations of both UK and US professionals of candidates looking for a career in the travel industry. The study has, distinctively, sought to analyze the competency requirements of travel industry jobs, relying on data derived from real-world job postings of many travel firms, including the leading ones in the two countries, and therefore, expands scientific discussion on the subject by providing critical empirical evidence with an international approach.

The greater gravitation of the identified competencies was toward interpersonal, human, and behavioral aspects, which can be ascribed to a well-known phenomenon that travel is a service-intensive industry. Much emphasis, however, can also be placed on the technical side, as several items pointed to such a facet of the industry, particularly on the use of computer systems effectively. From a domain-based approach, the competencies mainly pertained to intrapersonal, interpersonal, leadership, business, and cognitive features of candidates. People, therefore, looking to make a travel industry-related career in the two countries should especially consider being equipped with these as part of their personal capabilities. This study has further shown that there was a strong association between the two countries on 58.2 percent of the competency items related to knowledge, abilities, attitudes, and other characteristics, and on 42.9 percent of the items concerning skills. Such a connection is especially manifest in some highly rated competencies and points to their cross-cultural importance.

Although this study has a markedly distinct design, its results support some of the merits of previous research. Several items, regardless of ranking, for instance, advocate multiple items of the skills checklist for travel operations professionals, determined by Povey et al. (2016). Major & Evans (2008) have earlier identified some specific skill sets in the UK travel industry, such as computer literacy, good customer contact, selling ability, and good product knowledge, as all of these have taken place among various items identified above. In a similar vein, Samuels (1983) recommended a list of suggested areas of knowledge and skills useful in the travel agency and tour business with a reference to the US travel industry, multiple of them finding their specific examples uncovered in this elaboration. This study further confirms various skills proposed by Reiff (1990) that concentrated on corporate travel. A number of competency items, similarly, corresponded with the guidelines of Horner (1996) for travel agents to deal with their clients effectively. Moreover, effective use of computer technology was a leading competency requirement in the current study, as previously discussed by Lazarinis & Kanellopoulos (2010) in the realm of the Greek travel industry. The present findings also support various competency or skill items suggested by Buciuniene (2007), Geldenhuys (2000), Lather et al. (2008), Navickiene & Tsai (201), Reilly (1991), Subash (2012), and Zehrer & Mössenlechner (2009), which overall point to the common requirements of the international travel industry.

Although significant importance was attached to work experience by both UK (also stressed by Major & Evans, 2008) and US employers, and not much priority was given to educational qualifications, especially by the UK, the core curricula of formal hospitality and travel education should be adjusted to fit the recent expectations of the industry. This especially seems important for achieving sophisticated educational designs by feeding theory-based approaches with empirical evidence. It should also be focused on developing effective training and assessment methods to involve students' competencies (e.g., see National Research Council, 2012, p. 148) by also considering the industry requirements for creating more integrative programs.

This pool of competencies can serve as a useful guide for industry employers as well, both for corporations and startups that look for people in similar positions to those identified in this study or apply human resources training programs. Human Resources professionals may well benefit from the recent findings in managing some critical processes, e.g., recruitment and selection, performance management, and training and development. There may also be advantages to trade associations, e.g., ABTA, ASTA, IATAN, USTOA, and US Travel, that play a major role in the travel industry and have incentives, education partners, and diploma courses aimed at equipping staff and students with desired industry knowledge and skills. Such organizations should consider the current competencies in revising and reinvigorating their training and development programs and curricula.

Limitations and future research

The findings of this study can certainly be a benchmark for more research, as here has been provided a collection of competencies which can be used to form constructed measures, such as questionnaires and surveys, and be the subject of new examinations. However, this study has some limitations since it was conducted on a limited number of job postings in a specified time span. More examinations should be carried out to gain further insight into the realm of competencies for more competitive human resources in the travel industry. Future research can be devoted to uncovering competencies of core nature and can focus on competencies for specific job positions.

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Impact of Uncertainty on Organizational Strategy and Structure: Mersin Foreign Trade Firms' Response to Covid-19

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ABSTRACT

Purpose – This study examines the changes made by organizations in their structures and strategies in response to the environmental uncertainty caused by the Covid-19 pandemic. The contingency theory suggests that organizations try to survive by changing to adapt to their environment in the face of sudden changes in their environment. The aim of this study is to reveal what kind of strategic and structural changes organizations in Turkey have made during the Covid-19 pandemic.

Design/methodology/approach – In order to evaluate whether the environmental uncertainty caused by the Covid-19 pandemic leads to strategic and structural change as stated in the theory, 76 foreign trade firms registered with the Mersin Chamber of Commerce and Industry and ranked in the top 100 in the list of export transactions originating from Mersin port, with annual export sales of more than $10 million, were chosen as the study's sample. The data were collected through a questionnaire. Simple linear and ordinal logistic regression analyses were used to analyze the data.

Findings – Increase in environmental uncertainty has a positive and significant relationship with the organization's orientation towards differentiation strategy, while it has no effect on the organization's orientation towards cost leadership strategy. In addition, structural change in the mechanistic direction has a positive and significant effect on the organization's orientation towards cost leadership strategy, while structural change has no significant effect on the orientation towards differentiation strategy. Moreover, environmental uncertainty did not have a significant effect on structural change. Finally, no significant relationship was found between the change in the strategy of the organization and the mechanistic change of the organizational structure. Overall, although the Covid-19 pandemic increased environmental uncertainty, organizations in the sample of this study did not make significant structural and strategic changes.

Discussion – Organizations were not completely indifferent to environmental change, responded to change tactically with temporary and instantaneous reactions and did not make sustainable permanent changes. The excessive rise in prices (sales) led to unexpected and extraordinary increase in profitability and thus organizations did not consider major change necessary.

Keywords: Contingency Theory; Strategy Change; Structural Change; Environmental Uncertainty; Covid-19 Pandemic.

JEL Classification Codes: D22, D83, L20, L90

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INTRODUCTION

Toward the end of 2019, the Covid-19 pandemic began to impact businesses and daily life significantly. It led to widespread changes in daily life, including social interaction, consumption patterns, and business operations. Countries imposed quarantine restrictions, closed borders, limited travel and access to necessary services to control the pandemic. These restrictions made it more difficult for businesses to operate both domestically and internationally, causing major disruptions in global supply chains. The pandemic, thus, created widespread uncertainty across businesses linked to global supply chains. Given the existing literature on the relationship between environmental uncertainty and organizational structure and strategy, we anticipate that the Covid-19 pandemic may have caused significant impact on organizational structure and strategies. Thus, this study aims to examine how the pandemic has influenced changes in organizational structure and how strategic and structural changes influence each other in an environment characterized by increased uncertainty.

We draw on the contingency framework to address our question. In this framework, the environment is a key factor affecting organizations. Moreover, there is a continuous and occasionally significant change within the environment, creating uncertainty for organizations (Emery and Trist, 1965). Uncertainty, defined as inability to make predictions about the future (Daft, 2015), would force organizations to change their strategies and structures to adapt to their environment.

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According to Burns and Stalker (1961), for an effective organizational design, the internal structure of the organization should be changed according to the demands of the organizational environment. Accordingly, organizations will have different structures depending on whether they operate in stable environments that change little over time or dynamically. In this context, Burns and Stalker (1961) classified organizational structure into two categories: mechanistic and organic. Mechanistic structures tend to involve highly centralized power and authority and formalized bureaucracies, with rigid communication channels and narrow job divisions. Organic structures, on the other hand, are decentralized and less formal, with more flexible channels of communication and broader job divisions. Mechanical structures are considered more effective in environments characterized by low levels of change and uncertainty, whereas organic structures are more appropriate in dynamic and uncertain environments (Burns and Stalker, 1961; Mintzberg, 1979).

According to Chandler (1962) organizations respond to changes in their environment by first modifying their strategies and then adapting their structures to their new strategies. Since Chandler's (1962) influetial study, many scholars have argued that in a dynamic and uncertain environment, organizations tend to apply a differentiation strategy involving creativity and product innovation, wheras in a stagnant or low-uncertainty environment, organizations are more likely to apply a cost leadership strategy involving a focus on internal efficiency, cost minimization, and low prices. More specifically, a differentiation strategy requires an organic structure, which is more conducive to creativity, innovation, and entrepreneurial behavior (Burns and Stalker, 1961; Covin and Slevin, 1988). On the other hand, a cost leadership strategy may be more congruent with a mechanistic structure, which focuses on minimizing cost. Thus, not only the environment but also business strategy is a key determinant of organizational structure. However, the proposition that structure follows strategy has been challenged by several researchers, who maintain that organizational structure leads to adoption of strategies that are more congruent with existing structures and management systems (for instance, see Certo and Peter, 2005; Hall, 2004).

In this study, we examine the relationship between environmental uncertainty, organizational structure, and strategy using a sample of 76 foreign trade firms registered with the Mersin Chamber of Commerce and Industry. We find that the perceived environmental uncertainty had increased significantly following the pandemic. While it had no effect on an organization's orientation toward cost leadership strategy, the increase in uncertainty had a positive and significant association with an organization's orientation toward differentiation strategy. Furthermore, we found a positive and significant relationship between structural change in the mechanistic direction and cost leadership strategy. However, we did not find a significant relationship between differentiation strategy and change toward organic organizational structure. Our results also show that the increase in environmental uncertainty did not lead to significant changes in structure. Overall, even though the Covid-19 epidemic raised environmental uncertainty, the study's sample firms did not significantly alter their structure or strategic approach.

The rest of the paper is organized as follows. Next section presents background theory and hypotheses. We then describe our data, measures and method of analysis. Lastly, we present our findings and discuss the implications.

THEORY and HYPOTHESES

Organizations are social structures that are designed to carry out planned and coordinated actions in order to accomplish particular objectives. They function according to a structured framework that involves interactions with both internal and external stakeholders. While managers work to align efforts to reach set objectives, employees interact with one another and with external stakeholders such as customers, suppliers, and competitors. While the organizational structure deals with internal arrangements, organizational strategies concentrate on influencing and responding to the external environment (Daft, 2015).

The features that make up the structure include elements such as the number of management levels, departments, sphere of control, chain of command, division of labor and specialization, level of formalization, degree of centralization, and communication channels. The structure of an organization is considered fixed unless management decides to change it. If a change in structure implies a change in the organization, then as the environment changes, the organization must change to adapt to the environment. In this way, structure is seen as a means to control employee behavior and achieve desired organizational outcomes (Hatch, 2013).

Burns and Stalker (1961) classify organizational structure as mechanistic and organic. Mechanistic structures, which imply predictability and accountability,

are highly formalized with fixed procedures, responsibilities and ways of doing business. These structures involve high centralization with decisions made at the top of the hierarchy, standardized written rules and procedures, position based on prestige and vertical top-down communication. Organic structures, which aim for innovation, adaptability and flexibility, involve complex and high levels of horizontal and vertical integration with authority and control based on task knowledge. There is a low level of formality where tasks and responsibilities are redefined on a case-by-case basis. Moreover, organic structures involve a high degree of decentralization, where decision making power is delegated to those responsible for implementation or those most knowledgeable about the decision, redefinition of tasks through joint problem solving and lateral interaction, and prestige based on expertise and creativity (Hatch, 2013).

Organizations procure scarce resources from their environment to survive. When the supply of resources is disturbed, organizations tend to change their resource procurement strategies to overcome disruptions and continue their operations. In this way, an organization's strategy is influenced by the environment (Burns and Stalker, 1961; Dess and Davis, 1984; Miller and Friesen, 1984). According to Miller and Friesen (1978), organizations in dynamic and uncertain environments have more creative and differentiated strategies. On the other hand, in stable environments where uncertainty is low, a cost leadership strategy may be more effective. This is because the cost leadership strategy focuses on internal efficiency and is preferred by organizations that produce standard goods and services in environments that do not change rapidly. Thus, we argue that firms would tend toward embracing and emphasizing differentiation strategies if they perceive an increase in environmental uncertainty following the Covid-19 pandemic. This logic leads to the following hypotheses:

H1: There is a positive relationship between an increase in perceived environmental uncertainty and strategic reorientation toward differentiation strategy.

H2: There is a negative relationship between an increase in perceived environmental uncertainty and strategic reorientation toward cost leadership strategy.

In order for the organization to achieve its goals, the structural elements of the organization and the organizational strategy must be compatible with each other. If the organization decides to make a change in its strategy, the organization must also be structurally changed to support this change, as strategy and structure are intertwined. Therefore, different strategies will require different organizational structures (Robbins, 1991). Chandler (1962) stated that if the organization is changing its strategy, the organizational structure should also be changed to support the strategy in order to avoid managerial problems. Miles and Snow (1978) argue that any change in strategy causes managerial problems and therefore organizations should change their structure by shifting to the appropriate structure to eliminate these problems in strategy changes. Miles and Snow (1978) argued that organic structures are ideal for organizations seeking new products, different markets and differentiation of their activities. Due to the low formality of organic structures and centralized information, decision-making and communication, this structure will facilitate the coordination of different and diverse activities. In contrast, a mechanistic structure is ideal for organizations that want to sell their goods at low cost and high price. Through standards, rules and procedures, organizations can keep costs low. According to the results of Miller's study, if the organization is mechanically structured, it will prefer cost leadership strategy and if it is organically structured, it will prefer differentiation strategy (Miller, 1986). This is expressed by the following hypotheses:

H3: There is a negative relationship between strategic reorientation toward differentiation strategy and structural change in the mechanistic direction.

H4: There is a positive relationship between strategic reorientation toward cost leadership strategy and structural change in the mechanistic direction.

Organizations want to develop a harmonious relationship between their internal structure and their environment (Daft, 2015). A stable environment means low uncertainty and predictability. Organizations that operate in an environment with low uncertainty are said to be able to predict customer demands, the time and quantity required by the activity, and raw material supplies. Studies have shown that organizations with this structure are associated with a mechanistic structure, hierarchical and rigid, with vertical communication, where managers design business processes, where power and authority are in top management, and where emphasis is placed on standardization and formalization (Burns and Stalker, 1961). Dynamic environment means high uncertainty and unpredictability. Dynamic environments are associated with organic structures that have organizational flexibility, are less formalized, decentralized, and respond quickly to uncertainty

(Mintzberg, 1979). In summary, structures are considered mechanistic if they are standardized and organic if they are not standardized due to their behaviors that are shaped according to the environment they are in (Burns and Stalker, 1961). According to the literature, organizations change their structures according to the state of the environment in order to adapt to the external environment. In this context, hypothesis H5 is formed as follows:

H5: There is a negative relationship between increase in perceived environmental uncertainty and structural change in the mechanistic direction.

The research model presented by Figure 1 summarizes the conceptual framework and hypotheses of this study. As Figure 1 shows, increase in environmental uncertainty leads to change in strategies which in turn endanger structural change. The model also proposes a direct relationship between environmental uncertainty and organizational structure.

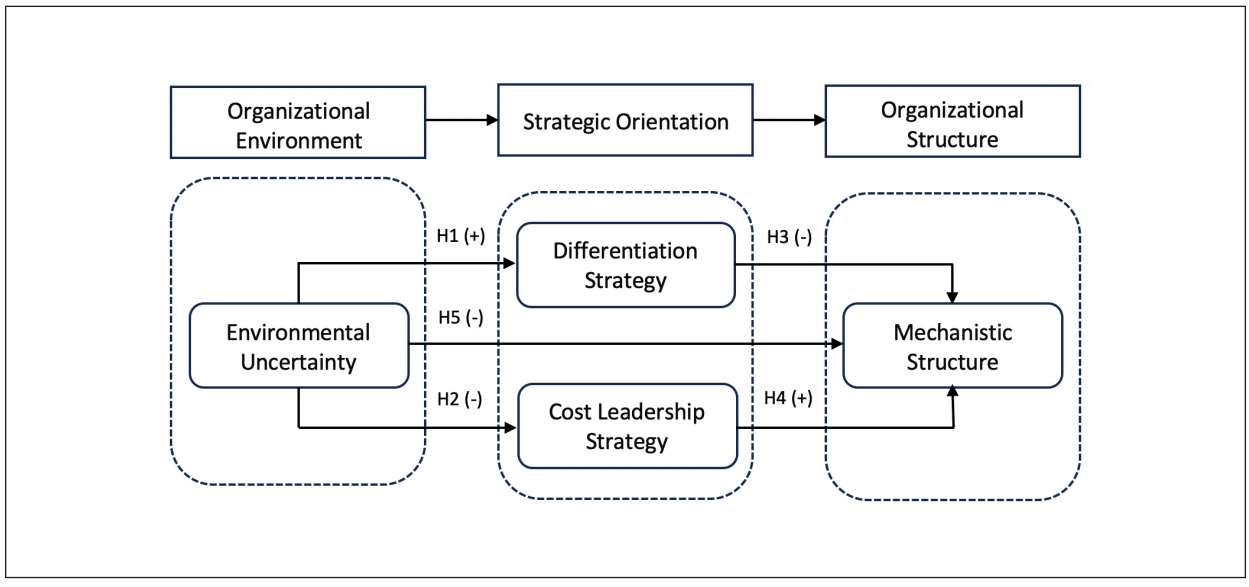

Figure 1: The Research Model

RESEARCH METHOD

The Sample

International trade companies are involved in global trade with firms located overseas. These companies are directly affected by global events and crises that cause disruptions in business and trade. Thus, this study focuses on foreign trade companies located in Türkiye. However, due to time and cost constraints, participating firms were samples from companies registered with the Mersin Chamber of Commerce and Industry in 2019 and ranked in the top 100 in the list of export transactions originating from Mersin port and with an annual export sales amount of more than $10 million. Companies with export sales of less than $10 million were excluded because these companies were not involved in international trade on a regular basis, and thus it was not obvious how the pandemic had impacted them. RoRo shipping companies that provide support services for foreign trade, cargo companies focused on non-commercial transport such as documentation and related services, companies engaged solely in storage, port operators, cooperatives, businesses offering measurement and spraying services, tourism service providers, and those specializing in survey and consultancy services were all excluded from the sample. From the remaining pool, the first 100 companies meeting the established criteria were selected. Following initial telephone interviews, 12 companies declined to share information about their operations, 8 companies reported reducing their activities below capacity due to the economic impact of the pandemic, and 4 companies stated they had ceased operations because of the pandemic. Consequently, after eliminating companies engaged in support services, excluding those unwilling to participate or affected by the pandemic, and enforcing the minimum annual export sales threshold of $10 million, the final sample consisted of 76 companies. A questionnaire consisting of 40 questions was handed in to individuals knowledgeable about their companies' management processes, strategies, and operations.

The questionnaire consists of a total of 40 questions organized in two sections. The first part included questions about firm characteristics such as size,

operations, sales, and performance. The second part consisted of five-point Likert type questions designed to measure perceived uncertainty, organizational structure and firm strategy. All measures in the second part were answered separately for two time periods; once for the pre-pandemic period and another time for the post-pandemic period.

Main Variables

The main variables of interest of this study include the following: perceived increase in environmental uncertainty, change in mechanistic direction, reorientation toward differentiation strategy and reorientation toward cost leadership strategy. Below, we explain how we measured these variables.

Increase in Perceived Environmental Uncertainty: This variable measures the increase in perceived environmental uncertainty during the Covid pandemic. Thus, it is calculated by taking the difference between perceived environmental uncertainty during the pandemic and perceived environmental uncertainty before the pandemic. Our variable of increase in environmental uncertainty takes the value of 1 if the difference is positive, and 0 otherwise. Hence, the value of 1 indicates an increase in the perception of environmental uncertainty. We measured perceived environmental uncertainty using a five point-point Likert scale that included 8 items (Çalışkan and Akkoç, 2012; Çetindaş, 2018; Khandwalla, 1979; Milliken, 1987; Waldman et al., 2001; Wong, Boon-ittab and Wong, 2011). The Cronbach's alpha coefficient of this scale is 0.796, indicating sufficient measurement reliability.

Change in Mechanistic Direction: According to contingency theory, organizational structure consists of three main dimensions: formalization, centralization and specialization. Based on these dimensions, Burns and Stalker (1961) divided organizational structures into two categories: mechanistic and organic. While structures with high formalization and centralization but low specialization are identified as mechanistic, structures with low formalization and centralization but high specialization are defined as organic (Hatch, 2013). Following the literature, we used a five-point Likert type scales to measure the tree dimensions of organizational structure (Hall, 1991; Pugh, et al., 1968; Sağsan, 2008; Walton, 1991). The Cronbach alpha coefficients for the scales of formalization, centralization, and specialization were 0.75, 0.80, and 0.69, respectively. Each of these measures were then transformed into an indicator of mechanistic structure as follows:

1. Mechanistic-formalization: This indicator takes the value of 1 if a firm's level of formalization is above the sample average, and 0 otherwise.
2. Mechanistic-specialization: This indicator takes the value of 1 if a firm's level of specialization is below the sample average, and 0 otherwise.
3. Mechanistic-centralization: This indicator takes the value of 1 if a firm's level of centralization is above the sample average, and 0 otherwise.

We then added these three indicators to arrive at an overall measure of mechanistic organizational structure, which took values from 0, indicating a low level of mechanistic structure, up to 3, indicating a high level of mechanistic structure. This measure of mechanistic organizational structure was calculated for both the pre-pandemic and the post-pandemic periods. Lastly, to measure the change in the direction of mechanistic structure, we subtracted the level of mechanistic organizational structure in the period before the pandemic from the level of mechanistic organizational structure in the period after the pandemic. Values of this variable, that is, change in the mechanistic direction, can range from -3, indicating change in the direction of organic organizational structure, to +3, indicating change in the direction of mechanistic organizational structure. The middle value of 0 indicates that, overall, there is no change in organizational structure. In our sample, this variable ranges from -2 to 3, indicating a wide variation in how organizational structures were transformed in response to the pandemic.

Change in Strategic Orientation: Porter (1980) stated that firms can gain competitive advantage in a market by following either a cost leadership strategy or a differentiation strategy. Because these strategies are widely used in practice, we assume that the firms in our sample follow either the cost leadership or the differentiation strategy. To measure the extent to which a firm follows one of these strategies, we used five-point Likert scales that have been used and validated in previous works (Karacaoğlu, 2011; Parnell, 2011; Zahra and Covin, 1993; Uçak, 2020). Cronbach's alpha coefficients for cost leadership and differentiation strategies were 0.71 and 0.74, respectively.

As open systems however, organizations strive to develop congruence between their strategies and the environment in which they operate (Daft, 2015). Thus, changes in the environment may necessitate changes in strategy. Because the Covid pandemic generated major

changes within the business environment, we expect that firms in our sample adjusted their strategies accordingly. Thus, we constructed two variables to capture how the firms in our sample changed their strategic orientations. We describe these variables below.

1. *Reorientation toward cost leadership:* This variable was generated by subtracting the value of cost leadership in the pre-pandemic period from the value of cost leadership in the post-pandemic period. A positive difference indicates an increase in a firm's propensity to follow cost leadership strategy, whereas a negative difference indicates a decrease in the firm's propensity to follow cost leadership strategy.

2. *Reorientation toward differentiation:* This variable was generated by subtracting the value of differentiation in the pre-pandemic period from the value of differentiation in the post-pandemic period. A positive difference indicates an increase in a firm's propensity to follow differentiation strategy, whereas a negative difference indicates otherwise.

CONTROL VARIABLES

Level of Diversification: Diversification refers to the expansion of a firm into new product markets. Thus, the level of diversification is the extent to which a firm operates in multiple product markets (Burns and Stalker, 1961; Miles and Snow, 1978; Mintzberg, 1979). This variable was measured by asking respondents to select from a list all product market activities (logistics activities and services) in which their organization was involved. The list involved eight product market activities within the logistics and foreign trade sector. These activities included road transportation, maritime transportation, railway transportation, air cargo transportation, producer/import-export, forwarder, agency services, and customs services. We measured the level of diversification by the number of logistics activities and services reported by respondents.

Firm Size: Some studies examining changes in organizational structure and the content of strategies have found that size is related to changes in strategies (Birnbaum, 1984; Zajac and Kraatz, 1993). Fombrun and Ginsberg (1990) found a negative relationship between size strategy change. Other researchers have found that size has no effect on structure or strategy (Kelly and Amburgey, 1991; Ginn, 1990; McCutchen, 1993). Since firm size has been included in studies on structure and strategy, it was included as another control variable in this study. In this study, we measured a firm's size using four size categories that were determined on the basis of the number of employees working for the firm. According to the Regulation on the Definition, Qualifications and Classification of Enterprises published in the Official Gazette of the Republic of Türkiye dated June 24, 2018, and numbered 30458, firms are classified into four size categories based on the number of people they employ. Specifically, firms with less than 10 employees are classified as micro enterprises; firms employing 11-49 employees are classified as small enterprises; firms employing 50-249 employees are classified as medium-sized enterprises, and firms with 250 or more employees are classified as large enterprises. In our paper, we employed the official classification in Türkiye to measure firm size in four categories.

Firm Age: While age increased the magnitude and probability of change in some studies (Boeker, 1989), it decreased the probability of change in other studies (Kelly and Amburgey, 1991) and increased the time taken for change. According to adaptation approaches, including contingency theory, while organizations are influenced by their structure and strategies to adapt to the environment, size and age are also environmental factors. Thus, we control for firm age in our analysis. Based on the life cycle studies of companies, the average life expectancy is shown in the literature to be 12.5 years regardless of company size. Accordingly, companies that have been in operation for a period of 1-5 years are defined as young; companies that have been in operation for 6-10 years are defined as mature; and companies that have been in operation for more than 10 years are defined as old. Hence, firm age is a categorical variable that takes three values: 1 if the firm is young, 2 if the firm is mature, and 3 if the firm is old.

METHOD of ANALYSIS

We used the ordinary least squares regression with heteroskedasticity robust standard errors to test hypotheses 1 and 2, which are about the relationship between increase in perceived environmental uncertainty and change in strategy. To test hypotheses 3, 4, and 5 we used the ordered logit regression method because the dependent variable in these hypotheses is categorical with clear ordering between the categories. All regression analyses were performed using Stata. Lastly, we interviewed several managers with significant experience in the logistics and foreign trade sector to better interpret our regression results and hypotheses that we were unable to support.

Table 1: Summary Statistics

Variable	Obs.	Mean	Std. Dev	Min	Max
Increase in perceived environmental uncertainty	75	0.627	0.487	0	1
Change in mechanistic direction	73	0.055	0.468	-2	3
Reorientation toward cost leadership	74	-0.036	0.454	-1.33	1
Reorientation toward differentiation	72	-0.005	0.365	-1.33	1
Level of diversification	76	2.447	1.976	1	7
Firm Size	76	2.855	1.042	1	4
Firm Age	76	2.553	0.790	1	3

FINDINGS

Table 1 presents the summary statistics for the variables in the study. The data indicate that 62.7% of the sample firms perceived an increase in environmental uncertainty during the Covid-19 pandemic. Regarding organizational changes, the mean score for a change in a mechanistic direction was 0.06, suggesting a very slight overall shift toward more mechanistic structures. Similarly, the strategic reorientation variables show minimal mean changes, with a slight tendency toward cost leadership (mean = -0.036) over differentiation (mean = -0.005). This indicates that, on average, firms in the sample made only negligible adjustments to their strategies following the pandemic. For the control variables, the average level of diversification was 2.5, implying that the typical firm operates between two and three distinct business lines. The average firm age was 2.6, which, based on our coding, corresponds to firms that are at least six years old. Finally, the mean firm size was 2.9, suggesting the sample is primarily composed of small to medium-sized enterprises, with employee numbers typically falling within the range of 10 to 249.

Table 2 presents the Pearson correlations among the study variables. The analysis reveals a positive, moderate correlation between the perceived increase in environmental uncertainty and reorientation toward a differentiation strategy (r = 0.31). The change in mechanistic direction shows a positive, moderate correlation with reorientation toward differentiation strategy (r = 0.42) and a weaker positive correlation with reorientation toward cost leadership strategy (r = 0.20). In contrast, the perceived increase in environmental uncertainty demonstrates negligible correlations with both the change in mechanistic direction (r = 0.03) and reorientation toward cost leadership (r = 0.00). Regarding the control variables, the level of diversification shows weak positive correlations with the perceived increase in environmental uncertainty (r = 0.16) and reorientation toward differentiation (r = 0.14), and weak negative correlations with the change in mechanistic direction (r = -0.10) and reorientation toward cost leadership (r = -0.05). Firm size exhibits weak positive correlations with the perceived increase in environmental uncertainty (r = 0.16) and the level of diversification (r = 0.17), while its correlations with other main variables are negligible. Firm age shows a weak negative correlation with the level of diversification (r = -0.25) and a positive correlation with firm size (r = 0.39), while its relationships with all other main variables are negligible.

Table 3 presents the results of the ordinary least squares regressions used to test Hypothesis 1 and Hypothesis 2. Model 1 presents the regression results when reorientation toward cost leadership is the dependent variable. Model 2 presents results when reorientation toward differentiation is the dependent variable.

Table 2: Correlations

	[1]	[2]	[3]	[4]	[5]	[6]
[1] Perceived increase in environmental uncertainty	1.00					
[2] Change in mechanistic direction	0.03	1.00				
[3] Reorientation toward cost leadership	0.00	0.20	1.00			
[4] Reorientation toward differentiation	0.31	0.42	0.38	1.00		
[5] Level of diversification	0.16	-0.10	-0.05	0.14	1.00	
[6] Firm Size	0.16	-0.06	0.01	-0.01	0.17	1.00
[7] Firm Age	-0.02	0.14	0.02	0.07	-0.25	0.39

Note: Correlations higher than 0.20 are significant at the 10% level.

Table 3: Ordinary Least Squares Regression Results

	Model 1		Model 2	
	Dep. Var.: Reorientation toward differentiation		Dep. Var.: Reorientation toward cost leadership	
Independent variables	**Coef.**	**p-value**	**Coef.**	**p-value**
Perceived increase in env. uncertainty	0.232	0.008	0.005	0.962
Level of diversification	0.028	0.139	-0.012	0.678
Firm age	0.079	0.140	-0.001	0.993
Firm size	-0.054	0.187	0.007	0.922
Constant	-0.266	0.131	-0.028	0.91
Num. of observations	72		74	
F test	2.73	0.049	0.06	0.99
R-square	0.13		0.00	
Adj. R-square	0.08		0.00	

Note: p-values are based on heteroskedasticity-robust standard errors.

Hypothesis 1 proposed a positive relationship between perceived increase in environmental uncertainty and strategic reorientation toward differentiation strategy. The results support this hypothesis, indicating a statistically significant and positive relationship (b = 0.23; p = 0.008). This finding suggests that in dynamic environments characterized by higher uncertainty, organizations are more inclined to pursue differentiation strategies. The control variables (level of diversification, firm age, and firm size) were not statistically significant in Model 1. Hypothesis 2 proposed a negative relationship between perceived increase in environmental uncertainty and strategic reorientation toward cost leadership strategy. The results do not support this hypothesis. The relationship is not statistically significant and is close to zero (b = 0.005; p = 0.962). Therefore, Hypothesis 2 is rejected. Similarly, in this model, none of the control variables are statistically significant.

Table 4 displays the findings from the ordered logit regression analysis, which was conducted to test Hypotheses 3, 4, and 5. Hypothesis 3 proposed a negative relationship between strategic reorientation toward a differentiation strategy and structural change in a mechanistic direction. Contrary to this expectation, the analysis revealed a significant positive relationship between an orientation toward differentiation strategy and mechanistic structural change (b = 6.32; p = 0.008). Therefore, Hypothesis 3 is rejected. Hypothesis 4 suggested a positive relationship between strategic reorientation toward a cost leadership strategy and structural change in the mechanistic direction. However, the results indicate a significant negative relationship between cost leadership strategy orientation and mechanistic change (b = -2.07; p = 0.001), leading to the rejection of Hypothesis 4. Hypothesis 5 posited a negative relationship between increased perceived

Table 4: Ordinal Logistic Regression Results

	Coef.	Robust std. err.	p-value
Perceived increase in env. uncertainty	-0.122	1.307	0.926
Reorientation toward differentiation	6.324	2.390	0.008
Reorientation toward cost leadership	-2.066	0.639	0.001
Level of diversification	-0.180	0.428	0.674
Firm age	1.454	0.973	0.135
Firm size	-1.193	0.401	0.003
cut1	-8.138	2.095	
cut2	4.823	2.329	
cut3	6.216	2.134	
Num. of observations	72		
Wald Chi-square	19.33		0.0036
Pseudo R-square	0.32		

Note: p-values are based on heteroskedasticity-robust standard errors.

environmental uncertainty and mechanistic structural change. The analysis showed no significant relationship between increased environmental uncertainty and mechanistic change, despite the direction being negative ($b = -0.12$; $p = 0.93$). Thus, Hypothesis 5 is also rejected. Among the control variables, only firm size was found to be negatively and significantly associated with changes in the mechanistic direction.

LIMITATIONS

The primary limitation of this study is the sample size. The final sample comprised only 76 companies. This reduction was due to several factors: some companies registered with the Mersin Chamber of Commerce and Industry declined to participate or provide operational information, while others operated below capacity or had ceased operations entirely because of the pandemic. As a result, the sample size was not sufficient to conduct high-powered statistical analyses. Nevertheless, a sample of 76 is sufficient to identify general trends, though it restricts the ability to perform comprehensive statistical analyses.

Another limitation concerns the scope of company selection. To ensure accessibility, the study focused exclusively on firms registered with the Mersin Chamber of Commerce and Industry and conducting foreign trade through Mersin Port. This approach excluded companies operating in other Turkish ports. Future research could address this limitation by expanding the scope to include firms utilizing additional ports such as Ambarlı, Marport, Kumport, Yılport, and Aliağa, thereby providing a broader perspective.

Sector selection represents an additional constraint. The current research is limited to the firms in the logistics and foreign trade sector, which, while relevant, does not capture the pandemic's impact across other sectors. Since the pandemic is a global crisis affecting a wide range of industries, future studies could enhance sector diversity or even adopt a global scope to increase the study's relevance and generalizability.

Finally, the reliability of some scales used in the study presents a limitation. The Cronbach's alpha coefficient, which indicates scale reliability, should be at least 0.70. In this study, the specialization scale achieved a value of 0.69, marginally below the accepted threshold. While this small difference is unlikely to significantly affect the results, it is nonetheless noted as a limitation. For future research, increasing the number of statements in the specialization scale may help achieve a higher reliability score.

DISCUSSION and CONCLUSION

Contingency theory asserts that there is no single best way to organize a business. The most suitable organizational design depends on both the internal and external circumstances facing the organization (Burns and Stalker, 1961). During crisis periods, organizations experience many transformations as they respond to sudden changes in their environment. Typically, organizations first perceive the crisis, then pause to observe the situation, and finally formulate a response. However, not every organization may have the structure to respond effectively, or may not see the need to do so based on self-reflection.

According to the literature, organizations facing sudden change tend to adjust their strategies for external challenges and their structures for internal ones. This means that achieving alignment between strategy and structure becomes essential. The present study examines whether contingency theory (based on the principle that organizations, as dynamic economic and social units, react to sudden changes in their environment) applies to Turkish Foreign Trade enterprises during the Covid-19 pandemic, a period of global crisis. Specifically, it investigates how the pandemic affected the strategies and policies of these Turkish firms.

Regression analysis of the relationship between strategy changes and increased environmental uncertainty found a positive link between adopting a differentiation strategy and heightened uncertainty. However, no negative relationship was found between moving to a cost leadership strategy and increasing uncertainty, contrary to expectations. This suggests that as environmental uncertainty increases, companies in the study sample are more likely to adopt a differentiation strategy. This finding supports the literature (Burns and Stalker, 1961; Miller and Friesen, 1978; Miller and Friesen, 1984; Porter, 1980), which indicates that organizations turn to differentiation in times of heightened uncertainty. However, since the hypothesis was rejected, the study does not fully support previous literature. Interviews with managers reveal that, despite high market uncertainty, companies experienced excessive profitability due to soaring prices driven by steady supply and increased demand. As a result, organizations did not prioritize cost control or feel compelled to change their strategies. The lack of strategy change led to inconclusive analysis results. The significant finding in the analysis, despite unchanged strategies, is explained by the fact that, during the pandemic, low supply and high demand for shipping containers allowed companies to sell available

space at premium prices. Companies then used their ability to secure container space as a way to differentiate themselves from competitors.

The analysis also found no negative relationship between rising environmental uncertainty and a shift toward a more mechanistic organizational structure. This means that increased uncertainty did not prompt organizations in the sample to change their structures. The relevant literature (Burns and Stalker, 1961; Mintzberg, 1979) suggests that predictable, low-uncertainty environments warrant a mechanistic structure with high formality and centralization, while dynamic, high-uncertainty environments require an organic structure with less formality and more flexibility. However, the sample showed no such effect, largely because, as shown in Table 1, there was no significant change in structure or strategy. Interviews confirmed that organizations saw no need to change, mainly due to high profits from surging prices. Some organizations did restrict authority to top management, while others increased employee autonomy to reduce complexity and speed up work. This two-way trend may explain the lack of clear results in the analysis.

In examining the link between strategy changes and organizational structure shifts, the study expected a negative relationship between adopting a differentiation strategy and mechanistic changes, but instead observed a significant positive relationship in the opposite direction. Similarly, while a positive relationship was anticipated between cost leadership and mechanistic changes, a significant negative relationship appeared. The literature (Miles and Snow, 1978; Nystrom et al., 2002; Robbins, 1991) posits that a shift to differentiation strategy should lead to an organic structure, and cost leadership should result in a mechanistic structure. This study's findings were the opposite. Interviews with managers revealed that while strategies remained constant, some organizations made slight moves toward organic structures. Thus, the main conclusion is that, in this sample, structure does not follow strategy. Although some organizations became more organic and maintained their differentiation strategies after the pandemic, there was no evidence that strategy changes drove structural shifts. Instead, when structure did change, it tended to align with existing strategies, in line with the literature (Chandler, 1962; Miles and Snow, 1978). Therefore, if a mismatch arises between strategy and structure, organizations naturally try to align them with environmental realities, even if not done consciously.

The study also found that organizations tending toward a mechanistic structure after the pandemic also leaned toward cost leadership strategies. The literature generally holds that mechanistic structures best support cost leadership, while organic ones support differentiation. However, this study found no correlation between a move toward organic structure and differentiation strategy, possibly because organizations already had a differentiation focus before the pandemic and did not change it afterward. Thus, significant results are not expected where there is no change. Some companies shifted to more flexible (organic) structures during the pandemic without changing their strategies, while others became more mechanistic and still maintained a differentiation strategy. In other words, changes in the degree of mechanistic structure did not reduce the tendency toward differentiation strategy. The trend was for companies with pre-existing differentiation strategies to become slightly more organic, but strategy remained unchanged. Consequently, the idea that structure follows strategy is not supported in this case, since strategies did not change.

The pandemic period proved positive for Turkish Foreign Trade companies in the sample, with no major changes observed in their quantitative results. Interviews indicated that extraordinary profitability, thanks to a shift in global trade to Türkiye, removed the perceived need for change. This suggests that, even in a crisis, organizations may choose not to change if their bottom line is positively affected. According to the study, not every crisis leads to changes in organizational structure or strategy. Hybrid work arrangements in these organizations were required by the government, while tactical strategy adjustments were based on performance. Since market prices increased on their own, organizations did not see change as necessary. Thus, financial performance (profitability) was the main factor discouraging strategy changes, while hybrid work was a government mandate.

Another finding is that organizational structure and strategies did not mutually trigger changes in each other. For example, even though some organizations changed their structures, their strategies remained the same. This suggests that external factors, rather than internal interactions between strategy and structure, drive change. The main factor behind observed changes was profitability, as soaring prices led to unexpectedly high profits, removing any perceived need for change.

While crises inevitably create uncertainty, the extent of organizational change depends on the situation. This study concludes that not every crisis leads to major

changes, and organizations are reluctant to make radical adjustments. Instead, they favor tactical, incremental changes that help them adapt without disrupting the organization. Both quantitative analysis and interviews show that the companies studied made only small, tactical changes during the pandemic, rather than major structural or strategic shifts.

In summary, the study found that the Covid-19 pandemic did not cause significant or lasting changes in the structure or strategies of Turkish foreign trade companies, with high profitability being the primary reason. The main driver of change for organizations is financial performance. As long as organizations maintain or increase sales and market share, they perceive no need to change structure or strategy. Therefore, if these organizations face similar crises in the future, their focus will likely be on maintaining financial performance, rather than seeking change.

This study provides insights for business managers and policymakers on managing uncertainty during crises. One key finding is that businesses tend to favor tactical and operational solutions over radical strategic changes in times of crisis. Quick, flexible, and low-cost responses are more feasible for managers. Additionally, it was observed that, depending on circumstances, organizations may either centralize authority (mechanistic structure) or delegate it and become more flexible (organic structure). This serves as guidance for managers on what organizational structure may be most effective in future crises.

It was also found that businesses are unlikely to change strategies during periods of high profitability, suggesting that managers should weigh both external conditions and the company's financial health when making decisions. Additionally, during crises, businesses prioritize cash flow and short-term operational sustainability. Therefore, government agencies and regulators should consider designing support packages that provide short-term financial relief and operational support, rather than focusing solely on long-term structural transformation.

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Forecasting The Volatility of Bist 100 Index Return with Linear and Nonlinear Time Series Models

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ABSTRACT

The successful modeling and forecasting of volatility, which is the most important element of risk indicators, minimizes financial uncertainties. Classical volatility models are insufficient to forecast structural changes in economic variables. Hybrid models that integrate the benefits of several model architectures have become more significant as the amount of neural network-based research has increased recently. The purpose of the research is to show that mixed models are more accurate and consistent when it comes to predicting variable volatility. For this purpose, the return volatility of the Borsa Istanbul 100 index was modeled, and forecasting performance results were compared with hybrid models. According to the findings, the best forecasting performance was achieved with hybrid structures containing the exponential GARCH-Artificial Neural Networks (MSEGARCH-ANN) combination. It can be said that hybrid models are superior in the risk analysis of volatile financial instruments and in the estimation of macroeconomic variables in general.

Keywords: Volatility, Artificial Neural Networks with Hybrid Models, BIST 100 Index Return.

JEL Classification Codes: C22, C45, C53, G17

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INTRODUCTION

Financial market instruments are immediately affected by various events, including political and economic changes. These markets are particularly exposed to cyclical risks arising from unpredictable or theoretically unexplained factors. While diversification is commonly employed to mitigate risks, it is insufficient to protect against all types of uncertainty. Since the level of risk in financial instruments can vary over time, monitoring risk characteristics is crucial for minimizing ambiguity and effectively managing investment risks.

The risk arising from the variability of financial instrument returns refers to the probability that a stock's actual profit may deviate from its expected return. The central concept in risk management is volatility, which represents the uncertainty associated with the returns of an asset or financial instrument (Hull, 2006: 758). In financial time series, volatility also defined as the measure of changes occurring in financial markets over a specific period can manifest in both the short term, over a few hours, and the long term, over periods of 15–20 years. While economic and political developments tend to generate low levels of volatility, financial events in the market can lead to increased volatility. Indeed, macroeconomic data that indicate low levels are associated with low volatility, whereas high-level data are associated with high volatility (Sevüktekin and Çınar, 2006: 244). Therefore, market developments and investors' potential exposure to significant losses underscore the critical importance of understanding volatility.

Traditional econometric models assume that the lagged values of the error term are homoscedastic. However, in modern financial markets, where variables often exhibit multidirectional relationships, this assumption frequently does not hold, resulting in heteroskedastic structures. Predicting models with heteroskedasticity using conventional linear time series approaches, such as ARIMA, is therefore insufficient. To account for market fluctuations, researchers commonly employ autoregressive conditional heteroskedasticity (ARCH) models, which are parametric methods developed by Engle (1982). The nonlinear and symmetric ARCH model often requires a high number of lags, necessitating numerous parameters for accurate

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This study is derived from Hakan ÖNDES's doctoral thesis titled "Application of Linear and Nonlinear Time Series Analysis On Some Selected Macroeconomic Variables".

prediction. To address this limitation, Bollerslev (1986) introduced the generalized autoregressive conditional heteroskedasticity (GARCH) model (Işığıçok, 1999: 2).

Furthermore, in the context of modeling the conditional volatility of shocks, Taylor (1986) developed the Absolute Value GARCH (AVGARCH) model. Nelson (1990) argued that the asymmetric response of volatility in financial instruments traded on developing markets to incoming information renders standard GARCH models inadequate. Volatility models that account for asymmetric effects demonstrate that negative shocks tend to have larger and different impacts compared to positive shocks (Özden, 2008: 345). To address these asymmetries, Zakoian (1994) introduced the Threshold GARCH (TGARCH) model by incorporating a leverage effect into the conditional heteroskedasticity equation. Nelson (1991) developed the Exponential GARCH (EGARCH) model, while Ding, Granger, and Engle (1993) proposed the Asymmetric Power ARCH (APARCH) model. Despite the development of these alternative models, their predictive performance in forecasting market fluctuations often remains limited.

According to Lamoureux and Lastrapes (1990), using a volatility model that does not allow for structural changes in its forecasted parameters is insufficient for reliable estimation. Therefore, the ARCH models discussed above require specification within a different structural framework. Additionally, traditional ARCH models are not responsive to low and high volatility fluctuations, which are important for understanding market dynamics. Financial markets often experience periods of contraction and expansion that vary in effect and duration. To address these stochastic changes in volatility, GARCH models based on the Markov regime-switching approach (MS-GARCH) have been developed. The first combination of MS-GARCH with ARCH models occurred in 1989 through the Switching ARCH (SWARCH) model applied by Hamilton to return series. For financial time series, MS-GARCH has been utilized by Bildirici and Ersin (2014), Kula and Baykut (2017), and Tan et al. (2021). In the context of Borsa Istanbul index returns, Çavdar and Aydın (2017), Kula and Baykut (2017), Kutlu and Karakaya (2019), and Kaya and Yarbaşı (2021) have applied SWARCH and MS-GARCH models. Similarly, studies on financial markets in other countries, such as Marcucci (2005), Hu and Shin (2008), Augustyniak (2014), Abounoori et al. (2016), and Korkpoe and Howard (2019), have also employed the MS-GARCH approach.

In recent years, researchers have increasingly employed non-parametric models, such as artificial neural networks and fuzzy logic, to analyze prices or returns in financial time series that are difficult to forecast using parametric models. Beyond these approaches, more advanced techniques, known as hybrid (or mixed) models, have been developed to improve the reliability of time series modeling and forecasting. Studies have shown that hybrid models often outperform both traditional parametric and non-parametric models in forecasting accuracy (Güreşen and Kayakutlu, 2008; Bildirici and Ersin, 2014; Lahmiri and Boukadoum, 2015). Hybrid models benefit from a structure that simultaneously leverages the strengths of both parametric and non-parametric approaches.

In the context of BIST 100 Index returns, existing research on hybrid models is not only scarce but also methodologically limited, as prior studies generally focus on single-layer combinations such as GARCH–ANN. This study addresses this gap in the literature by proposing a multi-layered hybrid forecasting framework that simultaneously incorporates conventional time series models (ARMA), volatility models (ARCH, GARCH, TGARCH), regime-switching variance models (Markov Regime Switching-GARCH, EGARCH, GJRGARCH), and artificial neural networks (ANN). The principal novelty lies in employing ANN to capture regime-dependent volatility dynamics—an aspect that has rarely been explored in previous research. By combining the statistical rigor of econometric modeling with the adaptive learning capacity of machine learning, this framework reveals both linear and non-linear dynamics under a unified structure. In doing so, the study goes beyond testing individual models' predictive performance and demonstrates the methodological synergy achieved through their integration, thereby offering a "beyond hybrid" perspective to the financial time series forecasting literature. Unlike earlier works that rely on two-dimensional hybrids, this study demonstrates the added value of a layered integration that simultaneously captures regime shifts and non-linear dynamics.

In the study, first of all, studies in the literature that have been carried out on the return volatility of index series using the MS-GARCH structure and hybrid models were reviewed, and the results are presented in the Literature Review section. The third part of the paper addresses the structures of the datasets and the theoretical framework of the models that were used. The fourth part presents the modeling of the volatility of BIST 100 Index returns, the forecasting process of this volatility, and the comparison of the models based on three different forecasting performance criteria. Finally, in the last part, the results are discussed, and recommendations that are seen fit are made.

LITERATURE REVIEW

Stock markets show constant fluctuations under the influence of several positive and negative shocks experienced in countries. When these markets are substantially affected by these positive or negative shocks, in turn, their risk-return performance is significantly affected. The prevalence of financial crises or major financial collapses has boosted the appeal of models that take into account hybrid structures based on regime switching, which have remained sensitive to recurrent market situations like contraction and growth. Therefore, hybrid models based on regime switching are appropriate techniques to capture structural shifts in the world of finance and main developments in stock market dynamics.

In the relevant literature, there are several studies that have used ARCH approaches, ANNs, and Markov regime switching approaches. As a different study in terms of its approach, this study also discussed previous studies where hybrid models based on Markov regime switching have been used.

In financial time series, the first scholars to utilize models based on Markov regime flipping were Cai (1994), Hamilton, and Susmel (1994). When the tardy values of conditioned variances are removed from the variance equation, the probability function may be quantitatively calculated. The prediction procedure becomes unfeasible when a GARCH-type model is employed since the study of the probability in a Markov chain with K regimes necessitates an integration of all possible K*T (T: time period) routes. This issue has been resolved by these researchers by removing the influence of conditional variances particular to a regime. Gray (1996) asserts that the conditional spectrum of yields varies regardless of the paradigm route and that the GARCH formula combines the conditional projection of prior variation with the invisible path of the regimes.

The use of MS-GARCH-type structures in financial markets has expanded as a result of these advancements. From January 1998 to October 2003, Marcucci (2005) studied how well MS-GARCH systems and other scenario structures simulated the return volatility of the S&P 100 Index. It was observed that the MS-GARCH structures provided more successful results in comparison to the standard GARCH structures. Using the stock market indices of developing countries in East Asia, Hu and Shin (2008) carried out MS-GARCH modeling.

Bildirici and Ersin (2014) combined the MS-GARCH structure and its derivatives with ANNs and used them to model daily stock returns on the BIST 100 Index. To test forecasting performance, they used the MAE, MSE, and RMSE standard, as well as Diebold-Mariano predictive reliability evaluations. Their outcomes showed that the MS-GARCH model of Gray (1996) is more promising than its fractionally integrated and asymmetric power variants, and the best forecasting results are obtained with models based on ANNs. Augustyniak (2014) developed a new technique for calculating the maximum probability estimator with equilibrium variance-covariance matrices of the MS-GARCH model that is based on the Monte Carlo Expectation-Maximization technique and significance sampling. The efficiency of the suggested method was demonstrated through simulations and empirical trials, and its practical implementation was examined.

Abounoori et al. (2016) analyzed some GARCH models based on their capacity to predict Tehran Stock Exchange (TSE) fluctuations. Regarding the identification and forecasting of volatility in terms from 1-day to 22-day periods, their analyses included GARCH equations using fat-tailed remnant restricted with Gaussian distributions. The results showed that the AR(2) MS-GARCH-ged (Generalized Error Distribution) model was more successful than the other models in the 1-day forecasting term. Additionally, while the AR(2)-MS-GARCH-ged and AR(2)-MS-GARCH-t (t-Distribution) models had a more consistent performance than the other models in the 5-day forecasting term, the model with the best performance in the 10-day forecasting term was AR(2)-MS-GARCH.

Kula and Baykut (2017) sought to use the closing prices on a daily basis of the index throughout the period in order to ascertain the fluctuation structure of the BIST 100 Banks Index between 2 January 1996 and 31 December 2016. With the MS-GARCH models they used, they determined that the BIST 100 Banks Index had low risk-regime persistence, and the index did not show consistency in its transition to a low-risk regime when it was in a high-risk regime. The BIST 100 Banks Index was shown to have a significant degree of volatility persistence in both regimes.

Çavdar and Aydın (2017) used the GARCH and SWARCH structures to examine the fluctuation of the BIST Corporate Governance Index. Their findings showed that the regime-switching-based SWARCH model outperformed traditional GARCH models in assessing the fluctuation of the BIST Corporate Governance Index.

Based on the assumption that financial markets are influenced by underlying economic developments, Korkpoe and Howard (2019) conducted a detailed study including Botswana, Ghana, Kenya, and Nigeria to predict the stock return risk in stock markets in Sub-Saharan Africa. They detected heterogeneity in the volatility structure of these markets and demonstrated that the Akaike information criteria of the 2-regime MS-GARCH models better identify the heteroskedastic return-generation processes in these markets. They came to the conclusion that MS-GARCH structures were the best models among those chosen to forecast the future volatility of returns in the financial sectors being studied.

Kutlu and Karakaya (2019) applied a two-regime MS-GARCH approach to analyze the BIST Tourism Index's unpredictability for the period between May 2003 and September 2018. In their analyses, which revealed the differences among three periods as before, during, and after the 2008 crisis, they determined that the volatility of the index could not return to its pre-crisis structure, the volatility continued, therefore there was more volatility in the after the crisis era than in prior to the crisis.

Kaya and Yarbaşı (2021) modeled volatilities occurring in the BIST 100 Index. Considering the period from April 1993 to April 2018, they used an MS-GARCH model for situations of shattered norm, and extreme variability. The system parameters derived for the gauge were important according to their calculations, which included the three-regime MS-GARCH model and the modeled regimes were valid for the index.

In order to simulate the volatility interactions of a Bitcoin (BTC) return sequence, Tan et al. (2021) proposed GARCH models based on Markov regime-switching approach including time-sensitive (TV) likelihoods of transition (TV-MS-GARCH). They did this by using daily searching on Google and regularly Bitcoin (BTC) transactions as external factors, both separately and together. They conducted thorough assessments with similar models, comprising GARCH, GJRGARCH, threshold GARCH, consistent shift probability MS-GARCH, and MS-GJRGARCH, so as to determine the simulation performance of the proposed models. They showed that the TV-MS-GARCH structures with imbalanced and fat-tailed dispersion match the data well compared to other structures based on the Akaike definition of information and other baseline criteria.

Financial time series forecasting is becoming more and more crucial as financial markets adjust to the quickly shifting climate, according to He et al. (2022). A novel deep learning ensemble model that combines CNN, LSTM, and ARMA models is suggested in this context. Simultaneous capture of linear and nonlinear data characteristics is the model's goal. The findings of empirical study show that, in comparison to individual models, the suggested model provides better predicting accuracy and resilience.

According to Kontopoluo et al. (2023), as artificial intelligence capabilities progress, machine and deep learning approaches are gradually replacing ARIMA models, which have long been popular in time series forecasting. By integrating the advantages of both techniques, hybrid models offer better forecasting accuracy, according to their study, which contrasts the use of ARIMA and AI-based models in various industries (financial, healthcare, weather, etc.).

Accurate financial time series forecasting is essential for risk management and investment choices, according to Cappello et al. (2025). Artificial intelligence techniques like ANN are becoming more and more popular as a result of traditional approaches' inability to adequately capture market dynamics. This work presented and evaluated a new hybrid model that combines ARIMA with ANN-based models like LSTM and GRU using data on stocks, exchange rates, and Bitcoin prices. According to the findings, the hybrid model performed better than both conventional and earlier hybrid models, and the Diebold-Mariano test indicated that these differences were statistically significant.

For financial time series forecasting, Agarwal et al. (2025) suggest a new hybrid model based on SVM and LSTM and emphasize the significance of stock market swings as economic indicators. While LSTM improves prediction accuracy by accounting for the impact of prior data, the SVM technique separates non-stationary data and makes it measurable. When tested using a variety of financial data, including the HSI, SENSEX, S&P500, and WTI, the model outperformed both individual and pre-existing hybrid models in terms of predicting.

In terms of its methodological breadth and level of integration, this study is very different from previous techniques found in the literature. The shared research often create an ensemble model that combines machine learning techniques with classical time series models, or they blend classical time series models with artificial neural networks. A hybrid architecture of machine and deep learning techniques is also used in certain investigations. On the other hand, this study concurrently incorporates volatility models from the ARCH-GARCH family (GARCH, TGARCH, EGARCH, and GJRGARCH), classical time series

models (ARMA), and their extended versions with Markov regime switching. Additionally, linear, nonlinear, and regime-dependent dynamics are all simultaneously represented by integrating artificial neural networks into this multilayered framework. In this regard, the suggested method outperforms current models in the literature by providing both a hybrid and a multilayer integrative modeling technique. The results demonstrate that the interaction between model components significantly influences the forecasting performance, in contrast to the single or limited combination models used in earlier research. In this regard, the findings provide a new methodological framework that can be incorporated and expanded upon in the body of existing literature.

METHODOLGY

In this study, ARCH models, Markov regime-switching-based autoregressive conditional heteroskedasticity models, synthetic brain network simulations, and mixed approaches as the methodology. Brief information on these models is provided below.

ARCH Models

In 1982, Engle introduced the ARCH framework to model variations in conditions when the stochastic process changes over time while the dependent deviations remain constant. He represented these variations using a qth-order autoregressive process, which became known as the qth-order ARCH model. Engle (1982) specified the first-order autoregressive process, AR(1), as the main equation as follows:

$$Y_t = \phi Y_{t-1} + \varepsilon_t \tag{1}$$

Here, ε_t is a mistake element that has a fixed variance and zero indicate, while the absolute average of Y_t is zero, and its conditional mean is ϕY_{t-1}.

The standard approach to heteroskedasticity involves the inclusion of a lagged value of an exogenous variable X_t estimating the variance. This zero-mean model is as follows:

$$Y_t = \varepsilon_t X_{t-1} \tag{2}$$

When the consecutive values of the exogenous variable X_t here are constant, the series Y_t has a white-noise technique with stable variance. Moreover, a model including the reliant variation is listed below:

$$Y_t = \varepsilon_t Y_{t-1} \tag{3}$$

The conditional variance of Equation 3 is $\sigma^2 Y_{t-1}$. In this case, the unilateral variation is either null or eternity. As a model more optimal for this case, the following ARCH model is proposed:

$$Y_t = \varepsilon_t h_t^{1/2} \tag{4}$$

$$h_t = \alpha_0 + \alpha_1 Y_{t-1}^2 \tag{5}$$

The variance of ε_t in this model is equal to 1, and the autoregressive conditional heteroskedasticity (ARCH) theory is the name given to the concept. When the information set is ψ_t, the assumption of normality is adapted to the model in Equation 4, and after the zero mean is replaced with $X_t\beta$ as a mean model, the following ARCH(p) regression model is obtained:

$$\begin{aligned} &Y_t|\psi_{t-1} \sim N(X_t\beta, h_t) \\ &h_t = \alpha_0 + \alpha_1\varepsilon_{t-1}^2 + \alpha_2\varepsilon_{t-2}^2 + \cdots + \alpha_p\varepsilon_{t-p}^2 \\ &\varepsilon_t = Y_t - X_t\beta \end{aligned} \tag{6}$$

Here, p refers to to the ARCH method's sequence, α is the scalar with undefined characteristics. (Engle, 1982:756; Işığıçok, 1999:3). Indeed, for $p = 1$, the model becomes ARCH(1).

The ARCH concept, however, has several limitations. One key restriction is that the conditional variance (h_t) must always be positive. To satisfy this requirement, the α_i parameters must meet the condition of positive and finite variance. Additionally, each α_i parameter and their total sum must be less than one (Işığıçok, 1999: 4). Ensuring that the sum of the parameters is less than one guarantees finite variance for the model (Greene, 1993: 146).

Bollerslev (1986) created the GARCH(p,q) structure via expanding the ARCH(p) model to include q delayed values of the conditional variance:

$$\begin{aligned} &Y_t|\psi_{t-1} \sim N(X_t\beta, h_t) \\ &h_t = \alpha_0 + \sum \alpha_i\varepsilon_{t-i}^2 + \sum \beta_j h_{t-j} \\ &\varepsilon_t = Y_t - X_t\beta \end{aligned} \tag{7}$$

Here, when α_0 the constant term, and $i = 1,2,\ldots,p$, α_i, indicate the ARCH parameters, and when $j = 1,2,\ldots,q$, β_j, indicate the GARCH parameters. In the GARCH(p,q) structure, the p and q lag lengths can be determined by using the AIC and SCI criteria.

However, like the ARCH approach, the GARCH structure further has some limitations. The parameters relevant to the GARCH system's contingent variation (α_i and β_j) must meet the positive and finite variance condition. Certainly, as in the ARCH model, this condition also meets the finite variance inference for the model.

The GARCH model cannot capture negative or positive asymmetries because it assumes that the error terms follow a symmetric distribution. Another limitation of the GARCH model is its inability to account for the persistence of shocks in the conditional variance. To overcome these issues, Nelson (1991) developed the Exponential Generalized Autoregressive Conditional Heteroskedasticity (EGARCH) model. This model addresses the main drawbacks of the standard GARCH approach. The EGARCH model is expressed as follows (Nelson, 1991: 350):

$$\log \sigma_t^2 = \alpha_t + \sum_{k=1}^{q} \beta_k g(z_{t-k}) \quad (8)$$

In Equation 8, $z_t = \varepsilon_t / \sqrt{h_t}$ express the normalized errors. The function g(.) in the model is in the form of:

$$g(z_t) = \theta z_t + \gamma\{|z_t| - E(|z_t|)\} \quad (9)$$

Here, θz_t refer to positive or negative shocks. The function $\gamma\{|z_t| - E(|z_t|)\}$ includes the value of ε_t in the structure. The EGARCH approach accounts for the direction of irresolution.

The generalized expression of the EGARCH model is as follows:

$$log h_t = \alpha_0 + \beta log h_{t-1} + \delta_1 \left| \frac{\varepsilon_{t-1}}{\sqrt{h_{t-1}}} \right| + \delta_2 \frac{\varepsilon_{t-1}}{\sqrt{h_{t-1}}} \quad (10)$$

While the δ_1 and δ_2 components in the structure represent the tendency of irresolution, the β component represents the persistence of shocks. h_t varies depending on the quantity and sign of the lagged errors. When $\delta_2 \neq 0$, the model will be asymmetric (Altındiş, 2005:35).

Additionally, the Threshold GARCH (TGARCH) approach is produced via supplementing a leverage (impulse) fickle to the conditional variance expression (Zakoian, 1994:936). The TGARCH model's conditional variance equation looks like this:

$$h_t = \alpha_0 + \alpha_1 \varepsilon_{t-1}^2 + \gamma \varepsilon_{t-1}^2 d_{t-1} + \beta h_{t-1} \quad (11)$$

The γ parameter in the equation refers to the leverage effect. Due to the inclusion of the pry impact in the approach, the dummy variable d_{t-1} is added, and the value of d_{t-1} is 0 for $\varepsilon_{t-1} \geq 0$ and 1 for $\varepsilon_{t-1} < 0$. Clearly, the significant and positive values of the γ parameter show the inclusion of the pry impact (Işığıçok, 1999:7).

In the TGARCH model, an unexpected rise in the series is interpreted as a positive development, and the α_0 parameter influences the conditional variance; conversely, an unexpected fall is interpreted as a negative development, and the α_0 and γ parameters influence the conditional variance. When negative shocks occur, financial market volatility increases to a greater extent. The TGARCH model is used to explain this scenario, which is viewed as a leverage impact on returns. It should be emphasized that the TGARCH model becomes the GJRGARCH model when the variance is substituted for the standard deviation in the conditional variance expression. Here, GJR is made up of the initials of the model's creators, Glosten, Jaganathan, and Runkle (1993)..

Furthermore, Taylor (1986) and Schwert (1990) suggested the Absolute Value GARCH (AVGARCH) structure. The fundemantal formulation of the structure appears to be shown below: η_{11} and η_{21} are the martingale difference coefficients (that is, for $j \geq 1$, $E(\eta_t) = 0$, and $\text{cov}(\eta_t, \eta_{t-j}) = 0$). Nevertheless, $\{\eta_t\}$ is usually independent and non-homogeneously distributed.

$$h_t = \alpha_0 + \sum_{i=1}^{q} \alpha_i h_{t-i} (|\varepsilon_{t-i} - \eta_{21}| + \eta_{11}(\varepsilon_{t-i} - \eta_{21})) + \sum_{j=1}^{p} \beta_j h_{t-j} \quad (12)$$

Here, there are the constraints $\alpha_0 > 0, \alpha_i > 0, \beta_j > 0$, and $(\alpha_i + \beta_j) < 1$. In this structure, the error term of this conditioned variation is explained by the absolute value of the past period considering the old qualities of the conditional variance.

The APGARCH structure that was developed by Ding, Granger, and Engle (1993) is as follows:

$$h_t^{\delta} = \alpha_0 + \sum_{i=1}^{q} \alpha_i (|\varepsilon_{t-i}| + \gamma \varepsilon_{t-i})^{\delta} + \sum_{j=1}^{p} \beta_j h_{t-j}^{\delta} \quad (13)$$

δ is the power term, and γ values are the asymmetry parameters. The equation includes the constraints $\alpha_0 > 0, \alpha_i \geq 0, \beta_j > 0, \delta > 0$ and $-1 < \gamma < 1$. Accordingly, when $\beta_j = 0$ in this model, the model becomes the Asymmetric Power ARCH (APARCH) model.

Markov Regime-Switching-Based Autoregressive Conditional Heteroskedasticity Models

The Markov regime switching approach that was proposed by Hamilton (1989) has a process in the form of $P\{s_k = j \mid s_{k-1} = i, = k, \ldots..\} = P\{s_k = j \mid s_{k-1} = i\} = p_{ij}$, where i is the 1st regime, j is the 2nd regime, k is the number of regimes, is the state variable that indicates the changes in the regimes, and s_k is the changeover likelihood that the ith period to the jth period. In this equation, which expresses the two-regime Markov chain, regime changes are able to be evaluated based on several periods depending on the state variable s_k. When $i \neq j$ in the equation above, $p_{ij} = 1 - p_{ii}$. At this stage, the following is an expression for a two-regime Markov procedure with a changeover likelihood dependent on the status element sk:

$P_r[s=0 \mid s=0\,] = p$: The likelihood of remaining in the low regime while in it

$P_r[s=1 \mid s=0\,] = 1-p$: The likelihood that the low regime will give way to the high regime

$P_r[s=1 \mid s=1\,] = q$: The likelihood of remaining in the high regime while in it

$P_r[s=0 \mid s=1\,] = 1-q$: The likelihood that the high regime will give way to the low regime

As there are two regimes here, the value k in the state variable s_k becomes 2. Low volatility is expressed as $i=0$, and high volatility with abrupt spikes is expressed as $j=1$.

The contingent mean and dispersion, system procedure and contingent variation are all components of a typical autoregressive conditional heteroskedasticity model based on Markov regime-switching. The following is the definition of the conditional mean that displays a random walk process:

$$v_t = \mu_t^{(i)} + \varepsilon_t 04\ Math\ 11\_06 = \delta^{(j)} + \varepsilon_t \quad (14)$$

In the equation above, regime changes are expressed as i (i=1,2). The process with a variance of 1 and a mean of 0 is included in the variable n_t. The conditional variance equations for the MS-GARCH, MS-EGARCH, and MS-GJRGARCH procedures, three of the Markov regime-switching-based GARCH models employed in this investigation, are as follows:

$$h_{t_{s_t}} = \alpha_{0_{s_t}} + \alpha_{i_{s_t}} \varepsilon_{t-i}^2 + \beta_{j_{s_t}} h_{t-j} \quad (15)$$

$$log h_t = \alpha_{0_{s_t}} + \beta_{s_t} log h_{t-i} + \delta_{1_{s_t}} \left| \frac{\varepsilon_{t-i}}{\sqrt{h_{t-i}}} \right| + \delta_{2_{s_t}} \frac{\varepsilon_{t-i}}{\sqrt{h_{t-i}}} \quad (16)$$

$$h_t^2 = \alpha_{0_{s_t}} + \alpha_{1_{s_t}} \varepsilon_{t-i}^2 + \gamma_{s_t} \varepsilon_{t-i}^2 d_{t-i} + \beta_{s_t} h_{t-i}^2 \quad (17)$$

For instance, the MS-GARCH(1,1) contingent variation is expressed as follows:

$$h_{t_{s_t}} = \alpha_{0_{s_t}} + \alpha_{1_{s_t}} \varepsilon_{t-1}^2 + \beta_{1_{s_t}} h_{t-1} \quad (18)$$

The other models can also be expressed similarly. The model given in Equation 18 was expanded by Gray (1996) and Klaassen (2002) to include low and high volatility values as follows:

$$h_{t_{s_t}} = \left[\alpha_{0_{s_t}} + \alpha_{1_{s_t}} \varepsilon_{t-1}^2 + \beta_{1_{s_t}} h_{t-1}\right] \mid [s_t = 0] + \left[\alpha_0 + \alpha_{1(s_t)} \varepsilon_{t-1}^2 + \beta_{1(s_t)} h_{t-1}\right] \mid [s_t = 1] \quad (19)$$

While regime switches in the equation are shown with $s_t, s=0$, refers to the deep fluctuation regime, and $s=1$ describes to the huge fluctuation.

Artificial Neural Network Models

A structure that resembles neurons and neural connections that are the most fundamental elements of the human brain and nervous system in form and function and operates in the form of a mathematical equation of biological neural structures is called an artificial neural network (ANN). ANNs, which allow the simulation of neural cells in the human brain, are algorithms that can produce new data based on previous data.

Neurophysiologist Warren Mc. Culloch and mathematician Walter Pitts (1943) produced a rudimentary neural network using electrical circuits. Since their research, significant steps in ANNs have been taken with the advancement of computer technology, especially in recent years.

In artificial neural networks (ANNs), data are typically divided into two parts: training data and test data. The training data are used to learn the underlying relationship structure (model) among the variables under study, while the test data are employed to generate predictions based on the learned model. This approach makes ANNs highly suitable for solving problems that do not conform to any predefined model pattern. Furthermore, because volatility forecasting or modeling in time series is not strictly theory-dependent, ANNs have become one of the most widely used techniques in this area.

The general structure of an artificial neural network (ANN) consists of three layers: the input layer, the hidden layer, and the output layer. The input layer receives information from external sources, and the number of independent variables in the input layer corresponds to the number of neurons it contains. The hidden layer processes the information received from the input layer and can consist of one or more sublayers. The researcher determines the number of sublayers and the number of neurons in each sublayer through a trial-and-error process. These trials aim to identify the configuration that provides optimal performance.

Information in the hidden layer is processed through transfer (activation) functions within the neurons. The activation function, which is chosen by the user, is a key factor affecting the performance of the network. The hidden layer provides the ANN with the capability

to model non-linear relationships. The output layer processes the information from the hidden layer and delivers the results to the user. Data obtained through the connections in the hidden layer are transmitted to the external environment as the network's direct output. The number of variables in the output layer corresponds to the number of dependent variables used in the analysis.

There are two reasons why ANNs are prevalently utilized in the fields of economics and finance today. First, ANNs do not have linearity-related constraints for the parameters to be predicted. Second, ANN models do not have any presumptions concerning the distribution in the time series to which they will be applied.

Hybrid Models

In this study, two different hybrid structures were used. The first structure included models consisting of combinations of ARCH models and ANN models. In this system that was proposed by Roh (2007), first of all, the time series that is studied is predicted using ARCH models. Then, the theoretical values of this predicting model are used as input in the ANN. In this method, it is aimed to forecast volatility better by making the learning process of the ANN algorithm easier.

The second structure included models consisting of combinations of Markov regime-switching-based autoregressive conditional heteroskedasticity models and ANN models developed by Bildirici and Ersin (2014). In this structure, like the other structure, the Markov regime-switching-based autoregressive heteroskedasticity models are predicted first. Next, the theoretical values of this forecasting model are used as input in the ANN. This structure is expected to possess superior predicting abilities than the hybrid structures described above under the impact from the Markov regime switching structure in predicting volatility.

FINDINGS and DISCUSSION

In this study, the BIST 100 Index series included data on the closing prices in the period between January 1997 and June 2025. For the test data to be used in the ANN, the forecasting data for the January 2025–June 2025 time frame were used. For the stationarity of the series, a return series was created via calculating the index series' logarithmic discrepancy.

$$r_t = 100[ln(P_t) - ln(P_{t-1})] \quad (20)$$

Here, r_t represents returns, and P_t represents closing prices for the BIST 100 Index series at time t. The time-path plot of the obtained return values is shown in Figure-1.

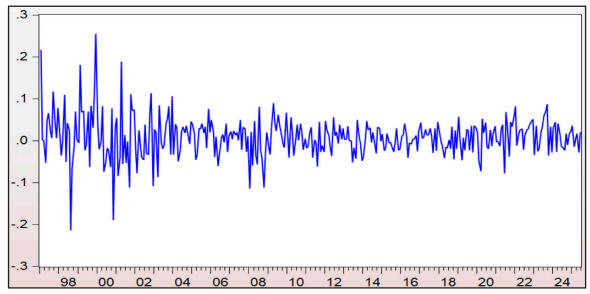

Figure 1: Return Series

As seen in Figure-1, the return series had a trend around the zero mean. This showed that the mean return was zero as expected, and there was no systematic return. Traditional and structural break unit root tests were conducted using EViews 12 to evalute the stagnant of the series in question, and the results shown in Table-1 were obtained.

The ADF, PP, and KPSS tests at level, as well as the findings displayed in Table 1, showed that the return series was stationary and devoid of unit roots. Following this, the return series was put through the Carrion-i-Silvestre unit root test with numerous structural breaks in Gauss 6 and the Lee-Strazicich structural break unit root test in RATS 8. The outcomes of these tests are displayed in Tables 2 and 3, respectively.

According to the structural break unit root tests on the return series whose results are shown in Table-2 and Table-3, the series was stationary at level for both tests. Before the ARCH model results for the return series, the series was forecasted using conventional Box-Jenkins methods in EViews 12, and the most significant model structures are shown in Table-4.

As seen in the results demonstrated in Table-4, between the three models, according to the information criteria and other statistical criteria, the ARMA(3,3) model was determined as the best model. As seen at the bottom of Table-4, at the stage following model prediction, using the residuals of the ARMA(3,3) model above, the presence of conditional heteroskedasticity was demonstrated with the ARCH LM test. Thus, alternative autoregressive conditional heteroskedasticity model predictions were carried out, and the results of the models showing the best performance are presented in Table-5.

According to the ARCH model predictions that were carried out, considering the conditions of in the variance model, the statistically significant coefficients, and the information criteria, the optimal model was found as ARMA(3,3)-ARCH(1). In all models that were used, the heteroskedasticity effect was eliminated.

Table 1: Traditional Unit Root Tests Results for the Return Series

	ADF (None)	PP (None)	KPSS (None)
R (Return)	-19.348 (0.000)	-19.320 (0.000)	0.198
1% Critique Measure	-3.449	-2.573	0.739
5% Critique Measure	-2.869	-1.942	0.463
10% Critique Measure	-2.571	-1.616	0.347
Result	Series is stationary	Series is stationary	Series is stationary

Table 2: Lee-Strazicich Unit Root Test for the Return Series

Lee-Strazicich	LS (Model Crash-Constant)	LS (Model Break-Constant and Trend)
μ (Constant)	-0.7788 [t: -3.0672]	-0.3691[t: -9.0734]
α (S{1}	-4.5283[t: -8.9205]	-3.449 [t: -10.0285]
k*	6	3
1% Critical Value	-4.073	-6.750
5% Critical Value	-3.563	-6.108
10% Critical Value	-3.296	-5.779
Result	Series is stationary under structural breaks.	Series is stationary under structural breaks.
Break dates (Time break):	2008:07; 2020:10	2001:06; 2020:08
	($\hat{\lambda}_1$=0.40, $\hat{\lambda}_2$=0.84)	($\hat{\lambda}_1$=0.16, $\hat{\lambda}_2$=0.83)

Table 3: Carrion-i-Silvestre et al. (2009) Unit Root Test for the Return Series

	Carrion-i-Silvestre (2009)				
	PT	MPT	MZα	MSB	MZT
R	5.772	3.792	-96.672	0.093	-7.552
	(9.036)	(8.844)	(-46.773)	(0.117)	(-4.317)
Result:	Series is stationary under structural breaks.				
Break dates (Time break):	35. (1999:11), 58. (2001:10), 142. (2008:10), 285. (2020:09), 317. (2023:05).				

Note: The values in parentheses are critical values. Here, the PT, MPT, MZα, MSB, and MZT values are 5 different tests that are applied in this analysis. In the Carrion-i-Silvestre test, while the null hypothesis states that the series is stationary under structural breaks, the alternative hypothesis states that it is non-stationary under structural breaks. This situation is similar in the KPSS test. Additionally, as opposed to conventional hypothesis tests, in the case that the test statistic is greater than the critical value in the Carrion-i-Silvestre test, the null hypothesis cannot be rejected.

Table 4: ARMA Predictions for the Return Series

	ARMA(2,3)	ARMA(3,2)	ARMA(3,3)
c	0.007***	0.007***	0.005***
	(0.002)	(0.003)	(0.000)
ϕ_1	-0.555***	-0.565***	0.403***
	(0.000)	(0.000)	(0.000)
ϕ_2	-0.936***	-0.942***	-0.400***
	(0.000)	(0.000)	(0.000)
ϕ_3	-	-0.009	0.898***
		(0.899)	(0.000)
θ_1	0.558***	0.568***	-0.425***
	(0.000)	(0.000)	(0.000)
θ_2	0.982***	0.988***	0.421***
	(0.000)	(0.000)	(0.000)
θ_3	-0.009***	-	-0.983***
	(0.000)		(0.000)
Adj. R^2	0.061	0.071	0.092
F(Prob)	5.354*** (0.000)	6.015***(0.000)	6.752*** (0.000)
AIC	-3.316	-3.305	-3.331
SIC	-3.248	-3.204	-3.252
HQ	-3.288	-3.268	-3.300
JB	0.657(0.445)	0.661(0.442)	0.877(0.393)
BG LM	4.015 (0.134)	4.273 (0128)	0.841(0.656)
ARCH LM	6.700 (0.009)	6.703 (0.009)	6.106 (0.013)

Note: The values in parentheses are probability values for the coefficients. ***, **, and * show significance on the levels of 1%, 5%, and 10%, respectively.

Table 5: Forecasting Results of the ARMA-ARCH mixed type for the Return Series

Variables	ARMA(3,3)-ARCH(1)	ARMA(3,3)-EGARCH(1,1)	ARMA(3,3)-TGARCH(1,1)	ARMA(3,3)-AVGARCH(1,1)	ARMA(3,3)-APARCH(1,0)
c	0.006***	0.005***	0.006***	0.006***	0.005***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
ϕ_1	0.269***	0.406***	0.242***	-0.556***	0.995***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
ϕ_2	-0.305***	-0.401***	-0.289***	-0.238***	0.672***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
ϕ_3	0.851***	0.900***	0.839***	0.482***	-0.336***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
θ_1	-0.285***	-0.427***	-0.253***	0.845***	-0.928**
	(0.000)	(0.000)	(0.000)	(0.000)	(0.033)
θ_2	0.351***	0.423***	0.366***	0.157***	0.184***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
θ_3	-0.948***	-0.984***	-0.924***	-0.638***	0.693***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
α_0	0.001***	0.027***	0.000	0.002	0.000
	(0.000)	(0.000)	(0.190)	(0.151)	(0.338)
α_1	0.171***	-	0.033***	0.336***	0.166
	(0.005)		(0.000)	(0.000)	(0.138)
β_1	-	-8.245**	0.109**	0.914***	-
		(0.011)	(0.040)	(0.000)	
γ_1	-	-	0.860	-	1.668***
			(0.227)		(0.000)
δ_1	-	0.082*	-	-	-
		(0.061)			
δ_2	-	-0.326	-	-	-
		(0.532)			
η_{11}	-		-	0.197**	-0.107
				(0.034)	(0.445)
η_{21}	-	-	-	-0.554***	-
				(0.000)	
T-DIST-DOF	19.999**	-	6.957***	-	6.443
	(0.024)		(0.000)		(0.227)
Adj.R^2	0.034	0.079	0.028	0.095	0.072
AIC	-3.413	-3.320	-3.591	-3.385	-3.171
SIC	-3.299	-3.206	-3.466	-3.524	-3.109
ARCH LM	0.558 (0.455)	1.445 (0.249)	0.083 (0.774)	0.315 (0.661)	0.619(0.379)
JB	0.277 (0.723)	0.186(0.844)	0.442(0.569)	0.335(0.673)	0.439(0.572)
Sign Bias	0.949(0.350)	0.948(0.343)	0.477(0.663)	0.604(0.536)	0.508(0.584)

Note: The values in parentheses are probability values for the coefficients. ***, **, and * show significance on the levels of 1%, 5%, and 10%, respectively.

However, Hamilton and Susmel (1994) stated that the ARCH and GARCH model structures overestimate volatility in conditional volatility cases, and thus, their forecasting performance is not adequate. According to Lamoureux and Lastrapes (1990), on the other hand, using a model structure that does not allow regime changes in parameter prediction for volatility may affect the reliability of the parameters negatively. Therefore, a specification that allows the structural change of ARCH parameters is needed. For this purpose, the Markov regime-switching-based ARCH model structures shown in Table-6 were separately predicted using R Project.

The parameters α and β in Table-6 are parameters that are included in the variance model. The sum of these Markov regime-switching-based parameters was smaller than the sums of the parameters in the standard ARCH-GARCH models (Results for each MS-GARCH model, respectively: Regime I: 0.859, 0.714, 0.198; Regime II: 0.999, 0.778, 0.504). These results showed that the MS-GARCH family of models did not forecast high persistence in low-volatility periods (Regime I), as expected. In the MS-GARCH structure created with two regimes, the initial system was described as the deep-fluctuation regime, and the following system was expressed as the huge-fluctuation regime. Among the 3 models that were used in forecasting, according to the importance degrees with the parameters and the information criterion, the optimum model was determined as the MS-EGARCH(1,1)-GED model. The significant δ parameter in the model in

Table 6: Forecasting Results of the MRSM-ARCH mixed type for the Return Series

	MS-GARCH(1,1)-std		MS-EGARCH(1,1)-ged		MS-GJRGARCH(2,1)-std	
	Regime I	Regime II	Regime I	Regime II	Regime I	Regime II
α_0	0.000***	0.000***	-0.075***	-0.006***	0.000***	0.001
	(0.007)	(0.227)	(0.000)	(0.008)	(0.000)	(0.365)
α_1	0.032*	0.005	-	-	0.005	0.010
	(0.073)	(0.269)			(0.263)	(0.309)
β_1	0.827***	0.994***	0.683***	0.691***	0.007	0.503
	(0.000)	(0.000)	(0.000)	(0.000)	(0.230)	(0.256)
γ_1	-	-	-	-	0.186*	0.000
					(0.094)	(0.489)
δ_1	-	-	0.106***	0.093**	-	-
			(0.000)	(0.017)		
$GED-par.$	-	-	6.104***	13.449***	-	-
			(0.000)	(0.000)		
$STD-par.$	3.785**	14.891***	-	-	58.872***	10.484***
	(0.036)	(0.000)			(0.000)	(0.000)
	Transition matrix		Transition matrix		Transition matrix	
	t+1|k=1	t+1|k=2	t+1|k=1	t+1|k=2	t+1|k=1	t+1|k=2
t|k=1	0.9872	0.0128	0.9003	0.0997	0.9644	0.0356
t|k=2	0.0275	0.9725	0.0148	0.9852	0.0459	0.9541
	Stable probabilities		Stable probabilities		Stable probabilities	
	State 1	State 2	State 1	State 2	State 1	State 2
	0.7049	0.2951	0.8759	0.1241	0.6862	0.3138
LL	509.443		511.849		501.489	
AIC	-982.716		-993.488		-972.881	
BIC	-952.875		-946.657		-926.350	
BG-LM	2.114(0.396)		1.083(0.504)		1.949(0.427)	
ARCH-LM	0.889 (0.274)		0.661(0.499)		0.819(0.302)	
JB	1.027 (0.288)		0.774(0.402)		0.947(0.305)	
Sign Bias	0.683(0.877)		0.913(0.643)		0.725(0.706)	

Note: The values in parentheses are probability values for the coefficients. ***, **, and * show significance on the levels of 1%, 5%, and 10%, respectively.

question showed the existence of a pry or asymmetry impact in the model.

In the comparisons of the δ_1 values of Regime I and Regime II [Regime I δ_1 value (0.106) is greater than Regime II δ_1 value (0.093)], it was concluded that index returns showed abrupt and high-level reactions to the shocks at the market in the deep-venture regime (Regime I), but they became stable following the shocks that were experienced in the huge-venture regime (Regime II). The opposite case was valid for the δ_2 values. The same results could also be derived from the δ_1 coefficients that indicate the persistence of volatility (Regimes I and II). This situation was applicable to both regimes. The approach of δ_1 towards 1 increases the persistence of volatility. This result showed that abrupt increases in returns, as well as shocks that also increase volatility, would disappear in the short and long terms, and the returns would reach a balance.

In the transition matrix showing the Markov forecasting results, "k=1" and "k=2" refer to Regime I and Regime II, respectively. In the selected MS-EGARCH(1,1)-GED model, the transition probability referring to staying in the regime with deep venture (Regime I) once the series was already in Regime 1 was found as 90.03%. Furthermore, while the series was already in Regime II, the transition probability—which refers to remaining in the high-risk regime (Regime II)—was 98.52%. It was found that there was an 0.997% chance of moving from the high-risk regime to the low-risk regime and a 0.148% chance of moving from the deep-venture regime to the huge-venture regime. This finding would imply that there will be strong transitions between the opposing regimes and frequent fluctuations in volatility over brief periods of time.

Finally, considering the unconditional probability values, these values that are known as stable probabilities refer to the probability of the limit values of both regimes at infinity. In other words, in the long term, the unconditional probability values indicate the level of stability that will not allow transition to a previous regime again. For the selected MS-EGARCH(1,1) model in Table-6, while the unconditional probability coefficient for Regime I was 0.8759, it was calculated as 0.1241 for Regime II. The higher stability of

Regime I compared to Regime II suggested that Regime II had a trend towards Regime I. The high value in State 1 indicated that the sudden fluctuations in BIST 100 returns would reach a balance in the long term. If the value in State 2 were high, it would be interpreted as that the fluctuations in the returns would continue in the long period.

To identify the time periods during which the deep- and huge-fluctuation regimes were observed, the Iterated Cumulative Sums of Squares (ICSS) technique was utilized (Inclan and Tiao, 1994:918). This technique is used to identify breaks that will occur as a result of abrupt shocks that can be seen in the variance of a time series. On that reason, the ICSS technique was applied to the BIST 100 Index return series using the RATS software, and the result shown in Figure-2 was obtained.

The 1st break was in December 2001, and the 2nd break occurred in March 2010.

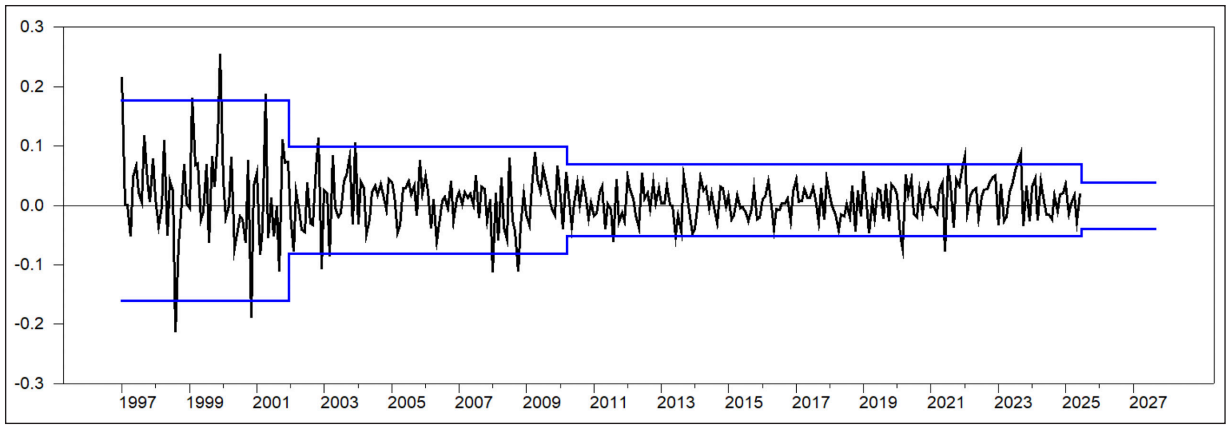

Figure 2: Dates of Variance Breaks Captured in the Volatility of the Return Series

The reasons for the 1st break which occurred in December 2001 may be the economic crisis experienced in Turkey in 2001 subsequent the world financial downturn in 2000 and the uncertainties faced before the general elections in November 2002. The reasons for the 2nd break which occurred in March 2010 may be the negative growth experienced in Turkey in the second half of 2009, the decrease in inflation as a result of the 3-fold increase in the budget balance in the negative direction in contrast to the previous year, as well as the increase in per capita income and decrease in foreign currency values in the first months of 2010.

The return (R) series (variable) was forecasted in the MATLAB program using ANNs by trying different layers. Using the error term of the ARMA(3,3) model that was the optimum model for the return series as input and the return series itself as output, ANN modeling was performed. Due to the large number of data points (n=342), using the cross-validation method, 96% of the data points were dispersed in the training set, and 4% were separated in the test set.

At the model prediction stage, the rectified linear unit transfer function was chosen for the buried layer's neurons, a linear transfer function and the backpropagation algorithm were selected for the neurons in the output layer, and the results shown in Table-7 were obtained.

In the selection of the optimum network structure with the prediction models, the network with the lowest Mean Squared Error (MSE) value was used. MSE is calculated using the formula in Equation 21:

$$\text{MSE: } \frac{1}{n}\sum_{i=1}^{n}(Y_i - \hat{Y}_i)^2 \qquad (21)$$

According to the prediction results of the ANNs with different architectures, the optimum network architecture with the lowest MSE values was determined as the Cascade-Feedforward ANNs. The MSE values of this selected network is marked with *.

In this study, in addition to these predictions for the return series, predictions were also made using hybrid modeling techniques in the MATLAB program. For this, the values in the variance equation of the ARCH model were multiplied by the error terms derived from the model, and the results were used as input for the ANN. The same method was also used for the MS-EGARCH model. The results are shown in Table-8:

In the hybrid model prediction steps, while the MSE values of the three models were close to each other, the MS-EGARCH-ANN (Regime II) hybrid model can be considered the optimum model.

Table 7: ANN Forecasting Results for the Return Series

Network Type	ANN Architecture	Training Algorithm	MSE
Cascade-Feddforward	1-13-1 (Single-Layer)	Levenberg-Marquardt	0.00026*
Elman Backpropagation	1-22-1 (Single-Layer)	Bayesian Regularization	0.00048
Feedforward	1-15-1 (Single-Layer)	Levenberg-Marquardt	0.00031
Recurrent	1-14-1 (Single-Layer)	Levenberg-Marquardt	0.00040
Recurrent	1-9-5-1 (Double-Layer)	Polak-Ribiére Conjugate Gradient	0.00044
Recurrent Backpropagation NARX	1-8-1(Single-Layer)	Powell-Beale Conjugate Gradient	0.00051
Radial Basis	1-9-4-1(Double-Layer)	Levenberg-Marquardt	0.00029

Table 8: Forecasting Results of the Hybrid Models for the Return Series

Network Type	ANN Architecture	Training Algorithm	MSE
ARCH-ANN	1-16-1 (Single-Layer)	Levenberg-Marquardt	0.00016*
MS-EGARCH-ANN (Regime I)	4-11-7-1 (Double-Layer)	Levenberg-Marquardt	0.00015*
MS-EGARCH-ANN (Regime II)	4-10-5-1 (Double-Layer)	Levenberg-Marquardt	0.00011*

Table 9: Forecasting Performance Comparison for the Return Series

Model No	Return (R)	RMSE	MAPE	Theil-U
1	ARCH	0.027	78.391	0.744
2	MS-EGARCH	0.016	39.964	0.221
3	ANN (Cascade-Forward)	0.008	17.392	0.067
4	**ARCH-ANN**	**0.005**	**8.462**	**0.049**
5	**MS-EGARCH-ANN (Regime I)**	**0.005**	**12.506**	**0.047**
6	**MS-EGARCH-ANN (Regime II)**	**0.004**	**10.451**	**0.045**

In fact, the accuracy and consistency of forecasting performance can be assessed using a set of performance criteria. These criteria including RMSE (Root Mean Square Error), MAPE (Mean Absolute Percentage Error), and U (Theil's Inequality Coefficient) are calculated using the formulae given in Equations 22, 23, and 24:

$$\text{RMSE: } \sqrt{\frac{\sum_{i=1}^{n}(Y_i-\hat{Y}_i)^2}{n}} \tag{22}$$

$$\text{MAPE: } \frac{1}{n}\sum_{i=1}^{n}\left|\frac{Y_i-\hat{Y}_i}{Y_i}\right| x100 \tag{23}$$

$$\text{U: } \frac{\sqrt{\frac{1}{n}\sum_{i=1}^{n}[(Y_i-\hat{Y}_i)]}}{\sqrt{\frac{1}{n}\sum_{i=1}^{n}Y_i^2}\sqrt{\frac{1}{n}\sum_{i=1}^{n}\hat{Y}_i^2}} \tag{24}$$

The forecasting performance values of all models that were predicted in the study were calculated in Excel using these criteria, and the results are presented in Table-9.

According to the results of the comparisons made based on the performance criteria, the most reliable forecasting performance for the return variable was seen in the ARCH-ANN hybrid model numbered 4 and the MS-EGARCH-ANN hybrid models numbered 5 and 6 (Regimes I and II).

Finally, the actual values of the return variable and the forecasting values obtained with the hybrid model predictions were calculated in Excel and are shown in Table-10.

Table-10 shows that the hybrid models produced the closest values to the actual ones in forecasting, and they had high forecasting performance. It should be noted that the geometric mean of the absolute values of these three forecasts was calculated to obtain a single forecasting performance result instead of three results, and by substituting the sign of the forecast in, the forecasts in the last column were obtained. Accordingly, for example, hybrid model number 6 showed almost point estimation feature in all months except May. Considering that the deviations in the other months were also very small, it

Table 10: Actual and Hybrid-Forecasted Values of the Return Variable

Months	Actual	Hybrid (ARCH-ANN) Forecast (4)	Hybrid (MS-EGARCH-ANN Regime I) Forecast (5)	Hybrid (MS-EGARCH-ANN Regime II) Forecast (6)	Geometric Mean (4,5,6)
January 2025	0.0354	0.0291	0.0325	0.0350	0.0321
February 2025	-0.0146	-0.0190	-0.0166	-0.0143	-0.0165
March 2025	0.0028	0.0037	0.0032	0.0026	0.0031
April 2025	0.0167	0.0157	0.0163	0.0164	0.0161
May 2025	-0.0278	-0.0261	-0.0241	-0.0211	-0.0236
June 2025	0.0197	0.0149	0.0178	0.0191	0.0171
Total Abs. Dev.	-	0.0191	0.0113	0.0085	0.0129

may be stated that the predictions made based on the hybrid models had high performance levels.

This finding shows that when financial time series are sensitive to regime changes and are backed by artificial neural networks' capacity to recognize nonlinear patterns, forecasting performance rises dramatically. (Marcucci, 2005; Bildirici and Ersin, 2014; Augustyniak, 2014; Kula and Baykut, 2017; Kutlu and Karakaya, 2019; Tan et al., 2021; He et al., 2022; Kontopolou et al., 2023; Cappello et al., 2025; Agarwal et al., 2025) Similar models in the literature are typically restricted to the use of single or binary structures (e.g., ARIMA, GARCH, ANN, ARIMA-ANN, MS-GARCH). Nevertheless, compared to previous research, this study's modeling of regime transitions using a probability-based structure and ANN-based learning of the impact of these changes on volatility shows that a more dynamic and layered structure functions effectively.

Additionally, investor confidence, market stability, and capital flows in the Turkish economy are all significantly impacted by the model's excellent success in predicting the BIST100 index. Accurate modeling of regime volatility offers important insights into the examination of economic cycles as the index represents not only the worth of listed businesses but also overall economic mood and expectations. Divergences between regimes 1 and 2 in particular show how market responses change depending on the economic environment, making it possible to simulate elements like investor behavior, capital inflows and outflows, and risk appetite during times of economic boom or recession. As a result, extremely precise BIST100 projections may be used as a first step in determining consumer confidence, real sector expectations, and the overall trajectory of financial markets.

CONCLUSION and RECOMMENDATIONS

There are many dangers associated with financial markets, thus reducing ambiguity is crucial. In this case, volatility is a crucial signal. Because ARCH models may capture asymmetric market shocks, they are frequently employed to evaluate volatility. However, ARCH has been integrated with Markov regime-switching models due to shortcomings such as overestimation of volatility and poor forecasting.

The search for alternative methods that can model volatility better in recent years has resulted in the concept of hybrid models (techniques) that combines the advantages of two different model structures. The success of hybrid models in forecasting volatility and the limited number of studies in this field gave rise to the need for conducting this study.

Using monthly BIST 100 return data, this study examines the performance of hybrid models that combine ARCH and ANN as well as Markov regime-switching ARCH models with ANN. Heteroskedasticity was found in the initial ARMA model estimates, which made ARCH-based methods necessary.

In the next step, alternative ARCH models were predicted, and it was decided that the ARCH model was the optimum model. Afterward, among the Markov regime-switching-based ARCH models that were run, the MS-EGARCH(1,1)-GED model was determined to be the optimum model. To achieve better forecasting performance, hybrid models which included the combination of the ARCH model and ANNs and the combination of the MS-EGARCH(1,1) model and ANNS were predicted.

Using a single-input, single-output structure, models were trained with various network types. Cascade-Feedforward ANN yielded the lowest mean squared error among the tested architectures.

Consequently, the forecasting performance values of 6 different models, including 1) ARCH, 2) MS-EGARCH, 3) ANN (Cascade-Feedforward), 4) ARCH-ANN, 5) MS-EGARCH-ANN (Regime I), and 6) MS-EGARCH-ANN (Regime II), were compared. Based on RMSE, MAPE, and Theil's U, the best results were obtained from hybrid models 4, 5, and 6. A single forecast was derived using the geometric mean of their absolute forecast values. As the 6-month forecasts closely matched actual values, the models were found to be highly effective.

The MSE-GARCH-ANN hybrid model achieved high accuracy in forecasting BIST100 volatility, effectively capturing regime shifts. This enables early identification of market uncertainties, helping institutional investors optimize portfolios and individuals select hedging strategies more consciously. Regime-based volatility models can help policymakers time monetary and fiscal actions more effectively. Early signals from indices like BIST100 enable timely interventions to preserve macroeconomic stability. Thus, this model can serve as an early warning tool for central banks and regulators, highlighting the importance of incorporating AI-driven analysis into financial policy design. In conclusion, the developed hybrid approach not only contributes to technical success but also provides tangible benefits in terms of market stability, investment security, and policy effectiveness. Therefore, the model can be considered a reference method both in academic literature and in applied economic and political decision-making processes.

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APPENDİX

Table A.1. Literature Review Summary

Author/Authors	Dataset and Method	Similiarity	Difference
Cai (1994)	1972:2-1984:8 USA Treasury Bond: MS-ARCH	Regime-switching mechanism Structural changes in volatility dynamics	Core model components Methodological depth and flexibility Application and data diversity Estimation methods
Hamilton and Susmel (1994)	1987:10-1993:12 USA with weekly stock returns: MS-ARCH	Sensitivity to regime change Volatility prediction Alternative model comparison	Modeling depth and AI integration Application and data diversity How to use model outputs
Gray (1996)	1970:1-1994:4 USA Treasury Bond: MS-GARCH	Regime-transition volatility modeling Critical approach to traditional models	Width of model structure and level of hybridization Combining predictive performance and model output
Marcucci (2005)	1995:1-2004:8 USA with weekly stock returns- GARCH type models and MS-GARCH	Regime-transition volatility modeling Time Series Data and Financial Market Focus	Artificial Intelligence Integration Combination of Model Outputs Economic and Political Interpretation
Hu and Shin (2008)	1999.12-2007.03 weekly stock market index data of developing countries in East Asia- MSGARCH	Focus on Volatility Forecasting Combined Use of Artificial Intelligence and Econometric Methods Measuring Model Performance	Structure of the Model (Level of Hybridity) Regime Transitions and Asymmetric Volatility
Bildirici and Ersin (2014)	2000.1-2013.4 the daily stock returns in an emerging market, the Istanbul Stock Index- MSARMA-GARCH type models and MS-ARMA-FI-APGARCH-RNN	Focus on Volatility Forecasting Hybridization with Artificial Neural Networks (ANN) Focus on the Turkish Market Similarity in Results	Technical Depth and Structure of the Model Scope of Regime Modeling Modeling Purpose and Application Orientation
Augustyniak (2014)	MS-GARCH model: S&P 500 price index weekly October 28, 1987 to October 31, 2012, and S&P 500 price index daily May 20, 1999 to April 25, 2011.	Using the Regime-Switching GARCH Model Forecast Performance Analysis	Artificial Intelligence Layer (ANN) Modeling Depth and Hybridity Level Economic Application and Implications
Abounoori et al. (2016)	1999.1-2015.2 Tehran Stock Exchange – MSGARCH type	Using the Regime-Switching Model Forecast Performance Comparison	Artificial Intelligence and Hybridization Level Model Fit and Distribution Type Interpretation and Economic Inference Dimension
Kula and Baykut (2017)	August 31, 2007-December 31, 2015 Borsa Istanbul Corporate Governance Index (XKURY) and the Fear Index (Chicago Board Options Exchange Volatility Index-VIX-ARDL Model	Regime-Aware Modeling Application on Turkish Markets	Using Artificial Intelligence Depth and Hybrid Structure in Modeling Economic and Political Implications
Çavdar and Aydın (2017)	03.03.2014- 10.03.2017- Borsa Istanbul Corporate Governance Index (XKURY)- ARCH, GARCH, SWARCH	Borsa Istanbul Data Set Volatility Analysis Use of the Regime Transition Model	Model Dept and Artificial Intelligence Forecast performance and economic interpretation

Korkpoe and Howard (2019)	January 4, 2011 - 29 December 2017- Botswana, Ghana, Kenya and Nigeria-BMS-EGARCH, BMS-GJR-GARCH	Regime Transition Volatility Modeling	Artificial Intelligence Component Forecast Synergy Economic Application Layer Data Definition and Frequency
Kutlu and Karakaya (2019)	In three periods from 05/02/2003 to 09/14/2018- Borsa Istanbul Tourism Index, MS-ARCH Model	Volatility modeling sensitive to regime changes Emerging market application	Model Components and Depth Use of Artificial Intelligence Forecast Combination Strategy Performance Analysis and Error Measures
Kaya and Yarbaşı (2021)	BIST100 index closing data for the period of 03.01.1988-20.04.2018- MSGARCH Model	Using MS-GARCH and Regime Analysis Emerging Market Focus Empirical Assessment of Model Performance	Model Structural Depth and Artificial Intelligence Component Combination of forecasts and performance metrics
Tan et al. (2021)	August 1, 2010 - July 31, 2018, BTC price, TV-MS GARCH Model	Volatility Approach Modeling Regime Shifts Implementation with Emerging Market Data	Regime transition probability structure Use of exogenous variables Model combination and forecasting strategy
He et al. (2023)	7 April 2008 - 21 September 2020, EU ETS- Shanghai composite index-BTC price, ARMA-CNN-LSTM	Model Combination Approach Model Linear and Nonlinear Data Together	ANN Architectural Diversity and Regime Methodology Model Performance Measures Economic application
Kontopoluo et al. (2023)	Financial, healthcare, weather, utilites, network traffic data- hybrid techniques ARIMA, SVM, RNN and LSTM	Comparison of Statistical and Artificial Intelligence Approaches Focus on Model Performance & Comprehensive Comparisons	Regime, Data and Market Focus Model Performance Measures Structuring the prediction Policy Implications
Cappello et al. (2025)	2 January 2019- 26 September 2023, Unicredit SpA stock, the Bitcoin prices and the nominal EUR/USD exchange rates, ARIMA, ANN, ARIMA-LSTM, ARIMA-GRU	Comparison of Statistical and Artificial Intelligence Methods Increasing Prediction Accuracy with Hybrid Approaches Prediction Performance Evaluation	Model Synergy and Ensembling with Regime Transition Modeling Data Focus and Application Area Economic/Political Recommendations
Agarwal et al. (2025)	December 13, 2007- December 12, 2017, daily closing prices of the Hong Kong Hang Seng Index (HSI), Standard and Poor's 500 (S&P500) Index of the US, Bombay stock exchange (SENSEX) of India, and North America West Texas Intermediate (WTI), Machine and Deep Learning Hybrid	Data Parsing + AI-Based Hybrid Approach Comparison of Hybrid Model Performance	ANN Architecture Structuring the prediction Policy Implications Model Performance Evaluation

Table A.2. List of Abbreviations

Abbrevations	Explanation
ARMA	Autoregressive Moving Average
ARIMA	Autoregressive Integrated Moving Average
ARCH	Autoregressive Conditional Heteroskedasticity
GARCH	Generalized Autoregressive Conditional Heteroskedasticity
AVGARCH	Absolute Value Generalized Autoregressive Conditional Heteroskedasticity
TGARCH	Threshold Generalized Autoregressive Conditional Heteroskedasticity
EGARCH	Exponential Generalized Autoregressive Conditional Heteroskedasticity
APARCH	Asymmetric Power Autoregressive Conditional Heteroskedasticity
GJR-GARCH	Glosten-Jagannathan- Runkle Generalized Autoregressive Conditional Heteroskedasticity
SWARCH	Swtiching Autoregressive Conditional Heteroskedasticity
MS-GARCH	Markow Regime Switching Generalized Autoregressive Conditional Heteroskedasticity
ANN	Artificial Neural Network
TV-MS-GARCH	Time Varying Markow Regime Switching Generalized Autoregressive Conditional Heteroskedasticity
MAE	Mean Absolute Error
MAPE	Mean Absolute Percentage Error
MSE	Mean Squared Error
RMSE	Root Mean Squared Error
GED	Generalized Error Distribution
CNN	Convolutional Neural Network
LSTM	Long Short Term- Memory
GRU	Gated Recurrent Unit
SVM	Support Vector Machine
ADF	Augmented Dickey Fuller
PP	Philips Peron
KPSS	Kwiatkowski–Phillips–Schmidt–Shin
STD	Student t distribution
LS	Lee- Strazicich
ICSS	Iterated Cumulative Sums of Squares

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Economic Growth in A Gender-Responsive Way: An Investigation for Country Groups Based on Human Development Index

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ABSTRACT

The impact of gender norms on the national economy is an area that has been overlooked in extant literature. Since there has been a paucity of evaluation of gender and gender equality from an economic growth perspective, compared to the extensive literature on gender and gender equality, this study investigates gender-responsive economic growth within the regulation of the classification created within the scope of the human development index. The study analyses the linkage between human development and gender-related indices at four different levels of development. The relationship is analyzed using a panel data analysis method with data from 1995-2021. The study finds that the variables that increase economic growth in the four country groups are labor force participation rate and the gender-related development index. In contrast, the gender inequality index decreases economic growth in almost every country. The present study's findings indicate a relationship between gender-related index (i.e., independent variables) and economic growth. The extant research findings demonstrate that gender equality is a fundamental component of sustainable economic growth. The findings also provide evidence as to why gender issues are addressed in the literature under the heading of "smart economy." In this context, it is widely accepted that the pursuit of gender equality is a prerequisite for the attainment of sustainable economic growth.

Keywords: Economic Growth, Gender Development Index, Gender Inequality Index, Panel Data Analysis.

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INTRODUCTION

Human development is a concept inextricably linked to the development field (McNeill, 2007). Human development is predicated on positioning humans as the fundamental development subject to provide resources to enhance people's functions and capabilities through various means. The human development approach underscores the importance of ensuring equitable access to literacy, nutrition, and health facilities despite the potential economic returns (Anand and Sen, 1994:2). The human developments' idea has evolved as part of the basic physiological needs as expanded by the UNDP (Anand and Sen, 1994:2). The UNDP has broadened the scope of human development to address new issues such as gender, human rights, security, consumption, technology, and the environment (McNeill, 2007).

The pursuit of development and the enhancement of human welfare are widely regarded as the primary objectives of democratic societies. In this context, the evaluation of policy implementations should not be confined to GDP calculations alone. Hence, it is necessary to utilize multidimensional indicators beyond GDP calculations (Herrero et al., 2012). In 1990, the United Nations Development Programme (UNDP) emphasized the distinction between human and economic development, contending that human development encompasses a broader dimension. Consequently, the Human Development Index (HDI) has been devised as a multidimensional yet straightforward approach to assess states' human development (Sagar & Najam, 1998). HDI, as proposed by the United Nations, is a protocol designed to measure the degree of development of states presented on Amartya Sen's concept of functions and capabilities. The HDI defines health, education, and material well-being as fundamental human functions (Herrero et al., 2012).

Human development expands people's choices (Ranis et al., 2006). The HDI, as developed in this particular context, may be regarded as a composite index that measures mean achievements across three major dimensions of human development. These dimensions are described as follows: first, the length and quality of life (defined in terms of health and mortality); second, knowledge (defined in terms of school enrolment and years of schooling); and third, a decent standard of

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living (expressed in terms of national gross income) (Noorbakhsh, 1998; Ranis et al., 2006). The United Nations (UN) is contemplating a comprehensive evaluation of the nation's average achievements in education, income levels and, health with a particular focus on the equitable distribution of these achievements across the population (Malik, 2018). Since 1990, the Human Development Report (HDR) released by the UNDP has emphasized the importance of other indicators of well-being that are not usually seen as directly related to income, such as life expectancy and education level, as opposed to reliance on income as the exclusive measure of economic progress (Bardhan & Klasen, 1999).

UNDP's social and human development measures include GEM (gender empowerment measure) and the HDI/GDI (gender development index). The HDI/GDI measure has attracted more attention than other measures within this scope. UNDP has calculated and presented the indices for more than 175 states worldwide every year since 1990. These states are ranked annually according to their human development performance. A second notable element is that, in contrast to previous concepts, HDI/GDI defines human development as a process (expansion of options) rather than a stock of achievements. Therefore, these criteria are dynamic concepts that impact the development process. Furthermore, the HDI/GDI proposes a human-centered development paradigm by defining human development as the ultimate goal of development rather than a by-product of economic growth, marking the conclusion of the era of development paradigms that emphasized solely economic growth (Hirway & Mahadevia, 1996).

Human development is an all-encompassing concept, and as such, it cannot be assessed solely from an income perspective. However, it is essential to acknowledge the role of income as a substitute factor. Earning a high level of income is crucial in expanding one's options. Individuals can trade a high-income level for other opportunities, such as purchasing a property in a rural location, accessing air quality and a lower risk of disease, or enrolling their children in private schools to ensure they have access to a higher quality of education. From this perspective, income can be regarded as a substitute for human development if it surpasses a certain threshold. Below this threshold, the primary focus of income is not on contributing to human development but on ensuring survival (Sagar & Najam, 1998).

Focusing exclusively on income as a metric for human development is inadequate for ensuring comprehensive progress, and the HDI is regarded as a more comprehensive indicator of human development than income-based measures. Nevertheless, the HDI is viewed as a reductionist measure, incorporation only a specific subset of potential human decisions (Ranis et al., 2006). It has been acknowledged that the utilization of income as a solitary welfare indicator is inadequate in itself. To enhance the reliability of welfare measurement, it is imperative to incorporate a range of social indicators. Even though the HDI is, a superior factor of economic welfare compared to GDP per capita, it does not indicate wealth distribution by region, between urban and rural populations, gender, and other social characteristics (Tisdell et al., 2001).

Gender equality is an important idea, not only today, but throughout history. Criticism based on gender, from a feminist perspective, seems reasonable in the context of human development. Mary Wollstonecraft, a pioneer of early feminist thought, was one of the first to question the relationship between human development and gender. Mary Wollstonecraft advanced the foundational tenets for the emancipation of women in 1792, encompassing the imperatives for the provision of equal educational opportunities for girls and the dissolution of prejudices against women. Wollstonecraft further advocated for evaluating women based on their own merits and achievements, as opposed to the accomplishments of their spouses (Dilli et al., 2019). Wollstonecraft's ideas attracted attention to issues that were later measured using gender-based indices such as GDI and GII at an early stage, thereby paving the way for steps to be taken towards women's empowerment and gender equality. Subsequent political measures were implemented to enhance the visibility of women in social life and to ensure equal access to opportunities. Subsequent to the International Population Conference (Cairo, 1994), measures such as these gained significant traction, gradually entering the agendas of national and international institutions and permeating everyday discourse (Permanyer, 2013). In recent years, policymakers and academics have regarded gender equality as a 'smart economy.' It is asserted that gender inequality is pivotal in various aspects of development. Enhancing women's access to resources and legal status leads to improved education for children, reduced corruption, and consequently increased economic growth (Dilli et al., 2019). For these reasons, the UNDP has concentrated on gender issues since 1995.

In 1995, the UNDP published an HDR that focused on gender and transformed its perspective entirely. This report presented the GDI and GEM, two significant

measures of gender (Permanyer, 2013). The 1995 HDR argued that human development would be at risk without the GDI and this index (Hirway & Mahadevia, 1996). It must be acknowledged that, whilst the HDR prepared by the UNDP addressed the economic situation of women from its inception, the earliest manifestation of this trend was observed in HDR 1995, with the introduction of the GDI. The GDI utilized the Gender Equality Sensitivity Indicator (GESI), a metric based on inequality or equality between women and men (Tisdell et al., 2001). The earliest composite indices formed to reflect global gender inequalities in basic skill levels were the GDI and GEM. These measures have enormously impacted academic and non-academic communities and have become widely used worldwide to assess inequalities between men and women. These indices have also been particularly useful for raising consciousness about gender relevant issues in human development (Permanyer, 2013).

GDI is specified as the proportion of females' HDI values (HDIf) to male HDI values (HDIm), thereby illustrating the disparity in developmental progress between female and male populations within a nation (Malik, 2018). The GDI is a metric that demonstrates the costs of gender inequality in human development. In this context, GDI measures the negative affect of gender inequality on states' human development levels. However, it is often misinterpreted as a measure of gender inequality itself. GDI is a valuable tool that can be used to determine the coupling between the level of averse to gender inequality and human development. It provides a comprehensive demonstration of the human development costs associated with gender inequalities in primary human development. However, The GDI does not adequately measure women's position in society compared to men (Gaye et al., 2010: 4-5).

The GDI is a composite index used to measure a state's overall economic and social development level. It is calculated using three core components: education, GDP per capita, and life expectancy. These components are disaggregated to account for gender inequality, with data for each indicator being assigned a single social value that assumes that gender equality is a very strong social preference (Bardhan & Klasen, 2000). The values for GDP per capita, life expectancy, and educational attainment are subsequently utilised to calculate a GDI for each state (Dijkstra & Hanmer, 2000).

As previously referenced, the initial global indices designed to reflect gender inequalities were GEM and the GDI, which were launched in the 1995 HDR. Since their inception, the UNDP and other development partners have utilized these two measures as advocacy and monitoring instruments for gender equality. GDI was elaborated to address gender inequalities in welfare assessments. HDI, a combined measure of well-being incorporating successes in education, income, and health includes penalization for gender inequality in these three dimensions. The overarching concept of the index, development is well measured and theorized in almost identical terms to the HDI developed by the UNDP. The more the GDI departs from the HDI, the greater the inequality measured. The composite structure of the GDI combines absolute and relative aspects, meaning that in states with low absolute income levels, gender equality cannot be achieved even in the case of full income equality. While the GDI strongly correlates with the GDP level, the difference in education and health indicators cannot be reflected. For this reason, GDI cannot be clearly distinguished from HDI. This close relationship between GDI and HDI implies that GDI cannot be interpreted as an independent indicator of gender differences in welfare, as it depends on HDI for interpretation (Gaye et al., 2010: 3-5). Within the scope of the study, a country classification is made based on HDI, and analyses are carried out.

The concept of a gender-adjusted HDI is favored; however, several practical and conceptual problems are identified in its calculation. The extent of the downward shift in the HDI is referred to as the gender inequality penalty. This is determined almost exclusively by gender differences in the component of earned income, while gender differences in education and life expectancy are largely neglected. It is also noted that the estimation of the earned income component limits its usefulness for international comparisons. The analysis of the component of labor income in the GDI is inconsistent, leading to the phenomenon that rich states are penalised more than poor states for equivalent levels of gender pay inequality. Consequently, high gender inequality penalties are imposed on Middle Eastern states, where high gender disparities in earned income are associated with relatively high-income levels, resulting in lower GDI rankings (Bardhan & Klasen, 2000).

While GDI does not essentially constitute a metric of women's accomplishments, it does integrate the concept of gender inequality into the comprehensive evaluation of a nation's overall welfare. In this sense, the GDI suggests that gender inequality is not only a problem for women, who are its victims but also equally damaging to overall development in a country (Bardhan & Klasen, 1999). The GDI and GEM have been the subject of considerable criticism because these measures do not sufficient

reflect the extent of gender inequality in developing and developed states (Schüler, 2006). It has been asserted that both measures are ineffective in reflecting women's rights, especially concerning non-market exchange, and are biased against market exchange measures. Despite this bias, a significant proportion of the exchange within the family was non-market. In less developed states, a substantial proportion of production is inaccessible to market exchange, and the subsistence and semi-subsistence sector is inadequately regulated (Tisdell et al., 2001). Within this context, women's labor can become invisible, thereby complicating the measurement of gender inequality.

In the context of research conducted on the GDI, a prevalent misinterpretation pertains to its utilization as a metric for gender inequality. It has been determined that the underlying calculation formulation of the GDI remains ambiguous for a considerable proportion of researchers. As previously mentioned, the GDI measures human development and adjusts it to gender inequality (Schüler, 2006). In the HDI published by the UNDP in 2010 (UNDP, 2010), the GDI was downgraded, and the GEM was dropped, with the gender inequality index (GII) being developed and measured for 137 states (Klasen & Schüler, 2011). The GII can be conceptualized as a evaluate of welfare loss, focusing on the differential levels of achievement between the sexes and the extent to which one sex is systematically differentiated from the other (Klasen & Schüler, 2011). The dimensions of the GII, which is also included in the scope of the study as an independent variable, are as follows:

Dimension 1: Reproductive health: The reproductive health status of states was captured by two indicators: the adolescent fertility rate and maternal mortality rate.

Dimension 2: Empowerment: The selected indicators for GII are education level (secondary education and above) and parliamentary representation.

Dimension 3: Economic activity: In this dimension, the GII utilizes gender-specific labor force participation (LFPR) rates as a metric, replacing the gender-specific earnings component employed in the GDI.

The average of the first of the three dimensions above, reproductive health, is adolescent fertility and maternal mortality. The average of the second dimension, empowerment, is representation in parliament and level of education. The average for economic activity is labor force participation. Since the indicators for reproductive health are gender-specific, data from men is only collected for the two other dimensions. Inequality aversion calculates the welfare losses related to inequalities between women and men. In this context, GII is utilized to measure the welfare loss due to these inequalities, compared to the gains that would be achieved in the case of perfect equality (Klasen & Schüler, 2011). When the dimensions are analyzed, the GII's inclusion of reproductive health indicators, such as MMR and AFR, in the calculation is considered the innovative aspect of this index. The objective of incorporating an issue of paramount importance to women's well-being into the evaluation of gender inequality is to ensure a comprehensive and nuanced assessment of the prevailing circumstances (Permanyer, 2013).

In contrast to GDI, the GII is a tool of inequality rather than gender-responsive development. Furthermore, it is consistent with the geometric mean and the use of labor force participation data instead of income (Klasen & Schüler, 2011). The GII, which has been the subject of both praise and criticism, is believed to give rise to conceptual and methodological challenges due to its integration of metrics calculated separately for women and men with indicators specific to women (Permanyer, 2013). Given the shortcomings and criticisms directed towards UNDP's gender-related indices, this study aims to ascertain their impact on economic growth by incorporating both gender-related indices.

Social institutions have been identified as a significant factor in the context of gender inequality. It is evident that norms, values, and attitudes embedded within the social structure are among the most critical determinants of gender equality. These norms, which have existed for centuries, determine women's position in economic and political terms. Gender roles, as defined by social institutions, are a determining factor in the participation of genders in economic and social life, based on biological and physiological characteristics. In this context, when women are subject to limited evaluations based on biological and physiological characteristics, it is evident that the perception of women is based on the idea that "motherhood" is a natural duty of women and that womanhood is defined through motherhood (De Beauvoir, 2019a: 227-228). The modification of social norms is an endeavour that is characterised by significant complexity and has the potential to supersede legal and regulatory frameworks in diverse domains (Jütting et al., 2008). In this context, it can be argued that social norms do not directly follow the development process (Dilli et al., 2019).

Women's status is primarily influenced by enduring norms and values that are embedded within long-standing social institutions. These social institutions are predicated on a duality that delineates men as "subjects" and women as "other." It is challenging to comprehend how women, who are themselves essential beings, accept being labelled as "other". However, the historical context in which men have granted themselves this privilege has been characterised by the majority imposing its own realities on the minority. However, from the perspective of the male-female dichotomy, there is no minority in this context. In this sense, a parallel may be drawn between women and the proletariat. Despite the fact that the proletariat does not constitute a numerical minority and does not comprise a distinct societal group, their class status is not contingent upon a particular occurrence. Rather, it is the outcome of historical evolution (De Beauvoir, 2019b: 27-28). For instance, long before the Industrial Revolution in Northwest Europe, while poverty persisted in the region, a significant proportion of women entered the labor market. However, contrary to the prevailing expectation that industrialisation would engender gender equality and enhance women's social status and standards, it has been argued that the Industrial Revolution resulted in the establishment of a gender-biased economy in England, predicated on the male breadwinner model (Dilli et al., 2019). This phenomenon underscores the resilience of social institutions in perpetuating women's secondary status, even in the context of economic advancements.

Education, widely regarded as a pivotal instrument for women's empowerment, has been observed to fall short in its potential to truly empower girls, mainly due to the pervasive influence of male-dominated social norms (Malik, 2018). This is evidenced by the challenges women face in carving out a meaningful place for themselves within the public sphere despite their educational attainments. These challenges are compounded by the entrenched gender norms within the prevailing patriarchal structure, often relegating women to a secondary position relative to their male counterparts in terms of employment participation across a multitude of nation-states worldwide, despite their educational qualifications. In the context of life expectancy, it is projected that, under conditions of equitable treatment, women will have an average life expectancy of five years greater than that of men. As a biological advantage, female life expectancy should be five years higher than male life expectancy. However, if this is not the case, it is accepted that a gender gap exists (Bardhan & Klasen, 1999). In this context, life expectancy, education, and labor force participation variables are included to the model constructed in the research within the scope of gender-related economic growth.

EMPIRICAL LITERATURE

Using gender-related indices facilitates the analysis of hypotheses that establish a correlation between cultural practices and human development, gender equality, and economic growth (Jütting et al., 2008). The publication of global indicators of gender inequality has the potential to stimulate governments' interest in gender inequality and the efforts to combat it (Dijkstra & Hanmer, 2000). These indices may also contribute to theoretical and empirical debates on the existence of a coupling between gender equality and macroeconomic growth. A literature review reveals a limitation in the number of studies that analyze the linkage between gender inequality and economic growth and development. In this context, studies that examinate the impact of gender equality on economic growth are important and contribute to literature.

Gender inequality in social institutions influences various domains, including economic growth and women's participation in the labor market (Jütting et al., 2008). The degree of development may give rise to variations in the linkage between economic growth and gender-related development across states. In this context, Jonsson (2011: 25) analyzed the relationship between GDI and GDP, concluding that the level of development of states is effective on the level of the relationship. Moreover, the study found a positive linkage between GDI and GDP in high, medium, and low states. In this context, although the direction of the linkage differs according to the level of development, the relationship remains similar. In contrast, Mandegar and Olsson (2023) examined the linkage between gender inequality and economic growth, finding a negative link between GII and GDP. The authors hypothesize that increased inequality in developed and underdeveloped states will reduce economic growth. Similarly, Khakimova (2024) analyzed the coupling between gender inequality and economic growth in Asian states, concluding that gender equality effectively increases economic growth. However, the study also found an inverse linkage between the gender equality index and economic growth in upper-middle and lower-middle-income states, suggesting that gender equality may impede economic growth in these regions.

It is acknowledged that the LFPR is a pivotal component of economic growth. Yet, it is imperative to recognize the necessity for a more profound examination of this phenomenon, particularly in the context of women,

who constitute a substantial segment of the labor force. In this regard, Akhtar et al. (2023) conducted a comprehensive analysis exploring the correlation between the gender equality index, women's LFPR, and economic growth in Malaysia. The study's findings suggest that enhancing women's attendance in the labor market and promoting gender equality can accelerate economic growth. Similarly, Tsani et al. (2013), in their study on women's labor force participation in Southern Mediterranean states, concluded that reducing barriers to women's participation positively impacts economic growth. Contrary to these findings, Thaddeus et al. (2022), in their study on the linkage between economic growth and female LFPR in Sub-Saharan Africa, found a negative coupling between female labor force participation and the growth. Therefore, in these states, female LFPR has a dampening effect on growth. Ruiters and Charteris (2020) studied the connection between gender equality, development, and economic growth in South Africa. Their findings indicated that development positively impacts gender equality in the long term, while women's participation in the labor market does not directly influence economic growth. In a research examining the linkage between economic growth and female LFPR in Bangladesh, Haque et al. (2019) found a positive link in the short run and a negative linkage in the long run (Haque et al., 2019). Urama et al. (2022) found a positive linkage between economic growth and female LFPR and a negative link between economic growth and fertility in Sub-Saharan African states.

The expected enrolment rate is widely regarded as a valuable metric for evaluating the resources allocated to girls during their educational attainment. In this regard, a compelling line of inquiry would be to examine the correlation between the expected enrolment rate of girls and economic growth. In this context, Gylfason (2001) conducted a study that revealed a direct positive linkage between the predicted enrolment rate of girls and economic growth. Fatima (2011) found a similar positive relationship between economic growth and female education in Pakistan. Oztunc et al. (2015) examined the link between economic growth and female LFPR, female primary school enrolment, fertility rate in Asia-Pacific states. The study found that birth rates and female LFPR, especially education, are essential for economic growth. Conversely, Barro and Lee (1994) found that economic growth is negatively related to female schooling in their comprehensive study on the factors of economic growth.

Birth rates are a contentious issue in the socio-economic field. The linkage between birth rates and the economy, particularly in economic growth, is a subject worthy of analysis, particularly in the context of the aging population. In this regard, Brander and Dowrick (1994) analyzed the connection between birth rates and economic growth, finding a negative relationship. The authors attribute this relationship to investment effects and capital dilution. Subsequent studies have sought to expand upon this research, with Li (2016) analyzing the linkage between economic growth and birth rates in developing states. This study revealed that economic growth occurs with declining fertility rates, suggesting a reciprocal relationship between the two factors. Furthermore, the study emphasized that societies with limited human capital exhibit high fertility rates and large families, often resulting in constrained investment in children within these families. Sah and Valeriani's (2024) examination of the link between economic growth and fertility rate in Indonesia concluded that birth rates negatively affect economic growth. This finding aligns with the conclusions of Urama et al. (2022).

Life expectancy has been demonstrated to influence economic growth; however, states' initial life expectancy periods may give rise to divergent outcomes (Desbordes, 2011). Zhang and Zhang's (2005) research found that life expectancy positively correlates with economic growth, but the correlation diminishes over time. Bowser (2010) analyzed the coupling between economic growth and life expectancy in the USA, preferring net earnings per capita as an indicator of economic growth. The study concluded that an increase in life expectancy leads to a rise in net earnings per capita at the county level, considering the initial life expectancy. Kunze (2014) analyzed the link between life expectancy and economic growth, finding that inheritance effects differentiate the increase in life expectancy. The study found that life expectancy decreases economic growth when inheritances are effective, while an inverted-U-shaped link exists in economies where inheritances are ineffective. Kasnauskiene and Michnevic (2017) concluded that increasing life expectancy in Central and Eastern Europe hurts economic growth, but the population aged 30-59 positively affects economic growth. Similarly, Azam et al. (2019) and Biyase and Malesa (2019) examined the relationship between life expectancy and economic growth, concluding that an increase in life expectancy increases economic growth in both developing states and Southern African Development Community member states.

METHODOLOGY

Since 1990, the UNDP has published the HDR, with states categorized according to human development levels. Within the scope of this classification, states are divided into four categories: very high, medium, high, and low human development. This study analyses the link between human development and gender-related indices at four different levels of development. Among the gender-related indexes developed by the UNDP, the GDI and GII variables are analyzed together within the scope of the study. The combined utilization of these indices, which exhibit deficiencies in various domains, is deemed significant in understanding the connection between gender-responsive economic growth. In this regard, the model developed within the study is presented below.

$$GDP_{it} = \propto_i + \beta_1 GDI_{it} + \beta_2 GII_{it} + \beta_3 LFPR_{it} + \beta_4 EYS_{it} + \beta_5 TFR_{it} + \beta_6 LE_{it} + u_{it} \quad (1)$$

The dependent variable is indicated by GDP_{it}, the constant term by α_{it}, the slope coefficient by β, and the independent variables by GDI_{it}, GII_{it}, $LFPR_{it}$, EYS_{it}, TFR_{it}, and LE_{it}. The error term is represented by u_{it}.

The table below shows the dependent and independent variables in the model created within the study's scope.

The data presented in Table 1, which pertains to the variables examined in this study, has been sourced from two primary databases: the OECD (GDP, LFPR, TFR) and the UNDP database. The analyses conducted encompass the period from 1995 to 2021. To create a standard data set, uninterrupted data of all states can be accessed until 1995 as the start date and 2021 as the end date, so the scope consists of years with data.

The present study analyses gender-responsive economic growth in four distinct groups within the scope of HDI by applying the panel data analysis method. Table 2 displays the descriptive statistics results for the dependent and independent variables.

A subsequent analysis of the descriptive statistics results in the table reveals that the probability values of the dependent and independent variables are lower than the critical value (0.05) according to the Jarque-Bera values of the variables in the very high states and do not fit the normal distribution. Similarly, in states classified as high, all variables do not fit the normal distribution. In medium states, GII and IMS among the independent variables were found to be normally distributed, while the remaining variables did not demonstrate a normal distribution. Finally, in low states, all variables except GII and TFR were found to be normally distributed.

Ascertaining the relationship between variables is paramount in panel data analysis. To this end, the study employs multicollinearity and endogeneity tests at the variable level. Table 3 delineates the outcomes of the multicollinearity issue, while Table 4 presents those relating to the endogeneity problem.

Examining the VIF value is a method of determining whether a multicollinearity problem exists among the variables. A VIF value greater than or equal to 10 indicates a multicollinearity problem in the relevant variables (Webster, 1995: 683-684; Topaloğlu, 2018). The centered VIF values in the above table indicate no multicollinearity problem exists since the values are all less than 10 in all four models.

Table 1. Variables ve Definitions

Variable	Definition	Notation
Gross Domestic Product	GDP growth (annual %)	GDP
Gender-related Development Index	Ratio of female to male HDI values	GDI
Gender Inequality Index	Overall average of reproductive health, empowerment, and labor market data (women and men) across genders	GII
Labor Force Participation Rate	Total female labor force/Total working age population	LFPR
Expected Years of Schooling	Number of years of schooling that a girl of school entrance age can expect to receive	EYS
Total Fertility Rate	Children per women	TFR
Life Expectancy at Birth	Number of years a newborn infant could expect to live (female)	LE

Table 2. Descriptive Statistics

VERY HIGH							
	GDP	GDI	GII	LFPR	EYS	TFR	LE
Mean	2.7760	0.9793	0.1989	52.8027	16.1718	1.6887	80.9626
Medi.	2.8534	0.9810	0.1630	53.0450	16.2296	1.6100	81.2525
Maxi.	24.4753	1.0410	0.7660	85.5000	23.5853	3.2320	87.7310
Mini.	-23.5081	0.8330	0.0130	21.4500	8.5136	0.8080	70.6680
Std. Dev.	3.9807	0.0274	0.1319	9.4098	2.2448	0.4016	2.9367
Skewn.	-0.5724	-0.9942	1.3270	-0.1482	0.0375	1.3022	-0.4466
Kurto.	7.4625	7.0817	5.3163	3.9691	3.4669	4.8184	2.7920
JB	1126.697	1094.288	658.721	54.5167	11.8688	535.581	44.6555
Probl.	0.0000	0.0000	0.0000	0.0000	0.0026	0.0000	0.0000
HIGH							
	GDP	GDI	GII	LFPR	EYS	TFR	LE
Mean	3.9151	0.9532	0.4046	46.4813	12.9558	2.2169	74.2710
Medi.	4.2932	0.9590	0.4155	48.5650	13.0304	2.1180	75.4510
Maxi.	37.6872	1.0340	0.6740	72.7000	16.3276	4.0140	81.6660
Mini.	-32.9088	0.7720	0.1170	10.6400	8.7330	1.0780	52.3880
Std. Dev.	5.3147	0.0450	0.1023	13.6338	1.4787	0.6372	5.1580
Skewn.	-0.4196	-1.0895	-0.3736	-0.6301	-0.2249	0.6057	-1.8854
Kurto.	13.7892	4.3194	2.7787	3.0147	2.4662	2.7849	7.5170
JB	3044.887	168.713	15.792	41.289	12.670	39.355	900.171
Probl.	0.0000	0.0000	0.0003	0.0000	0.0018	0.0000	0.0000
MEDIUM							
	GDP	GDI	GII	LFPR	EYS	TFR	LE
Mean	4.0412	0.8829	0.5585	49.6377	10.2072	3.5905	65.8144
Medi.	4.3541	0.8850	0.5585	49.3650	10.4004	3.5770	66.8830
Maxi.	53.3818	1.0170	0.8380	94.4000	15.1332	6.1830	77.4940
Mini.	-36.6582	0.6450	0.3580	8.2600	5.8299	1.8030	42.4870
Std. Dev.	5.7716	0.0685	0.0757	21.0895	1.9938	0.9713	7.2883
Skewn.	-0.0108	-0.3455	0.0074	-0.1724	-0.1126	0.3418	-0.8156
Kurto.	24.1485	2.8260	3.0718	2.1161	2.5279	2.4821	3.3940
JB	8721.563	9.902	0.105	17.554	5.336	14.342	54.914
Probl.	0.0000	0.0071	0.9490	0.0002	0.0694	0.0008	0.0000
LOW							
	GDP	GDI	GII	LFPR	EYS	TFR	LE
Mean	4.6110	0.8384	0.5811	58.9737	7.4577	5.2804	60.1820
Medi.	4.7084	0.8475	0.5755	70.8900	7.3363	5.3425	61.1785
Maxi.	18.3127	1.0120	0.7890	92.0200	11.4213	7.1230	69.0960
Mini.	-17.0047	0.3830	0.4000	13.8200	3.5719	3.4700	42.1530
Std. Dev.	4.1852	0.0856	0.0846	25.9382	2.4684	0.7988	6.3009
Skewn.	-0.8260	-1.5862	0.1243	-0.4731	0.0618	-0.320	-0.6920
Kurto.	7.5127	7.6830	2.9783	1.5796	1.5798	2.7545	2.9116
JB	150.107	207.970	0.405	18.934	13.209	0.418	12.502
Probl.	0.0000	0.0000	0.8167	0.0000	0.0014	0.8113	0.0019

Table 3. Multicollinearity

VERY HIGH	GDI	GII	LFPR	EYS	TFR	LE
Centered VIF	1.470	3.341	1.564	2.038	1.494	2.312
Tolerance Value	0.680	0.299	0.639	0.491	0.669	0.433
Mean VIF	2.036					
HIGH	GDI	GII	LFPR	EYS	TFR	LE
Centered VIF	3.414	2.266	2.865	1.967	2.086	1.603
Tolerance Value	0.293	0.441	0.349	0.508	0.479	0.624
Mean VIF	0.449					
MEDIUM	GDI	GII	LFPR	EYS	TFR	LE
Centered VIF	2.250	2.473	1.840	2.429	2.133	2.678
Tolerance Value	0.445	0.404	0.543	0.412	0.469	0.373
Mean VIF	0.441					
LOW	GDI	GII	LFPR	EYS	TFR	LE
Centered VIF	4.275	3.190	1.083	3.630	3.825	3.753
Tolerance Value	0.234	0.313	0.923	0.276	0.261	0.266
Mean VIF	0.379					

Another situation that should be fully considered is an endogeneity problem in variables. This can be examined through correlation values or detected with the help of the Block Exogeneity Wald Test. Within the scope of the study, the Wald Test was applied to the VEC (Vector Error Correction) model, and the test results are given in Table 4.

The probability values in the table are more significant than the critical value (0.05), indicating that the H_0 hypothesis cannot be rejected and, therefore, the variables are exogenous. In this context, the Block Exogeneity Wald Test method is employed to ascertain no endogeneity problem among the variables in all four models. When the multicollinearity and endogeneity results are evaluated together, it can be determined that there is no problem with using the model's variables within the study's scope.

It is imperative to examine cross-section dependency as a component of panel data analysis. Cross-section dependency signifies whether a shock in one of the states within the model's scope influences other states. Examining cross-section dependency before the stationarity test constitutes a pivotal step in selecting the unit root test. When cross-section dependency is identified in the variable, the second-generation unit root test should be given preference. Conversely, if no cross-section dependence is found, the first-generation unit root test should be selected. The results concerning cross-section dependency are outlined in Table 5.

In cross-section dependency tests, CD test results are considered if the cross-section dimension is larger than the time dimension (N>T), and LM test results are considered in the opposite case. Regarding the data sets of the study, N>T is only in very high states, while T>N is in the other three country groups. In this context, CD test results in very high states and LM test results in high, medium, and low states are considered. When the results in the table are assessed, it is evident that there is cross-section dependence in all four country groups. Cross-sectional dependence (CSD) is a crucial factor in determining the most appropriate test for the stationarity test. In instances where the series of variables does not contain CSD, first-generation unit root tests are to be preferred for the stationarity test. However, in instances where the series contains CSD, signifying that a shock experienced in one country has ramifications for others (Topaloğlu and Korkmaz, 2021), it is imperative to undertake the stationarity test employing second-generation tests that take CSD into consideration. In this context, the stationarity test is performed using the CIPS test, which is a second-generation unit root test. In this context, the stationarity test was performed with the CIPS

Table 4. Block Exogeneity Wald Test Results

	VERY HIGH					HIGH				
GDI	GII	LFPR	EYS	TFR	LE	GII	LFPR	EYS	TFR	LE
Chi-square	5.7256	0.0017	0.0038	0.5906	0.0011	1.7743	1.1850	1.2195	0.1076	1.2063
Prob.	0.1670	0.9673	0.951	0.4422	0.9736	0.4118	0.5529	0.5435	0.9476	0.5471
GII	GDI	LFPR	EYS	TFR	LE	GDI	LFPR	EYS	TFR	LE
Chi-square	1.1456	3.8143	4.3986	2.2970	0.3355	0.7753	1.9393	1.1108	2.0214	0.4141
Prob.	0.564	0.1485	0.1109	0.3171	0.8456	0.6787	0.6787	0.6787	0.6787	0.6787
LFPR	GDI	GII	EYS	TFR	LE	GDI	GII	EYS	TFR	LE
Chi-square	1.9942	0.8457	3.5055	2.6922	0.6353	0.0008	0.8414	0.0281	1.2713	0.5122
Prob.	0.369	0.6552	0.1733	0.2603	0.7278	0.9774	0.359	0.8668	0.2595	0.4742
EYS	GDI	GII	LFPR	TFR	LE	GDI	GII	LFPR	TFR	LE
Chi-square	3.8097	0.5139	4.2441	0.4491	0.5576	0.3791	0.1026	0.2343	2.7903	3.0856
Prob.	0.1488	0.7734	0.1198	0.7989	0.7567	0.8273	0.95	0.8895	0.2478	0.2138
TFR	GDI	GII	LFPR	EYS	LE	GDI	GII	LFPR	EYS	LE
Chi-square	0.0753	0.8178	0.4965	0.4965	2.1170	0.6938	2.3829	4.5262	2.7271	2.0695
Prob.	0.7837	0.3658	0.4811	0.4811	0.1457	0.7069	0.3038	0.104	0.2557	0.3553
LE	GDI	GII	LFPR	EYS	TFR	GDI	GII	LFPR	EYS	TFR
Chi-square	0.5526	1.2117	3.8124	0.2031	0.2572	2.4360	1.0869	2.4131	2.3111	1.8404
Prob.	0.4573	0.271	0.0509	0.6523	0.6121	0.2958	0.5807	0.2992	0.3149	0.3984
	MEDIUM					**LOW**				
GDI	GII	LFPR	EYS	TFR	LE	GII	LFPR	EYS	TFR	LE
Chi-square	4.1987	3.1099	1.5865	0.1720	1.1225	3.0751	0.3195	1.9464	0.2489	0.3881
Prob.	0.1225	0.2112	0.4524	0.9176	0.5705	0.2149	0.8524	0.3779	0.883	0.8236
GII	GDI	LFPR	EYS	TFR	LE	GDI	LFPR	EYS	TFR	LE
Chi-square	0.6698	1.5788	1.4240	2.3739	3.8455	1.8554	0.9253	0.7359	4.0025	0.8024
Prob.	0.7154	0.4541	0.4907	0.3051	0.1462	0.3955	0.6296	0.6922	0.1352	0.6695
LFPR	GDI	GII	EYS	TFR	LE	GDI	GII	EYS	TFR	LE
Chi-square	3.0707	0.2387	0.3628	3.4143	4.0271	0.8217	1.1625	0.3205	2.3490	2.1343
Prob.	0.2154	0.8875	0.8341	0.1814	0.1335	0.6631	0.5592	0.8519	0.309	0.344
EYS	GDI	GII	LFPR	TFR	LE	GDI	GII	LFPR	TFR	LE
Chi-square	2.1854	1.9145	0.2936	0.9188	4.4856	0.0009	2.4738	2.2974	0.4110	0.7565
Prob.	0.3353	0.384	0.8634	0.6317	0.1062	0.9996	0.2903	0.3171	0.8142	0.6851
TFR	GDI	GII	LFPR	EYS	LE	GDI	GII	LFPR	EYS	LE
Chi-square	0.1049	0.8969	0.1586	1.3569	0.3971	0.5230	0.1268	0.9861	0.4206	0.0762
Prob.	0.9489	0.6386	0.9238	0.5074	0.8199	0.7699	0.9385	0.6108	0.8103	0.9626
LE	GDI	GII	LFPR	EYS	TFR	GDI	GII	LFPR	EYS	TFR
Chi-square	1.3239	0.5567	0.7794	1.9689	2.6427	0.0101	1.9958	0.3567	0.9133	0.2381
Prob.	0.5158	0.757	0.6773	0.3736	0.2668	0.92	0.1577	0.5503	0.3392	0.6256

Table 5. Cross-section Dependency Test Results

VERY HIGH								
Test	Breusch-Pagan LM		Pesaran scaled LM		Bias-corrected scaled LM		Pesaran CD	
GDP	10858.25	0.0000	180.5843	0.0000	179.5243	0.0000	95.922	0.0000
GDI	12366.56	0.0000	209.3154	0.0000	208.2554	0.0000	60.7678	0.0000
GII	22566.06	0.0000	441.0556	0.0000	440.0756	0.0000	148.1606	0.0000
LFPR	2246.168	0.0000	16.5373	0.0000	15.4773	0.0000	6.6207	0.0000
EYS	21637.04	0.0000	385.9040	0.0000	384.8440	0.0000	136.9771	0.0000
TFR	11531.54	0.0000	193.4095	0.0000	192.3495	0.0000	20.7173	0.0000
LE	31143.91	0.0000	566.9954	0.0000	565.9354	0.0000	175.6686	0.0000
PANEL	9890.491	0.0000	162.1500	0.0000			90.0698	0.0000
HIGH								
GDP	1449.28	0.0000	46.9192	0.0000	46.4192	0.0000	32.2174	0.0000
GDI	3446.89	0.0000	128.4713	0.0000	127.9713	0.0000	51.8546	0.0000
GII	4304.395	0.0000	171.4599	0.0000	170.9799	0.0000	56.6415	0.0000
LFPR	1289.64	0.0000	40.4019	0.0000	39.9019	0.0000	9.7631	0.0000
EYS	5456.22	0.0000	210.5018	0.0000	210.0018	0.0000	72.3025	0.0000
TFR	3709.27	0.0000	139.1828	0.0000	138.6828	0.0000	41.4921	0.0000
LE	5151.72	0.0000	198.0706	0.0000	197.5706	0.0000	69.3891	0.0000
PANEL	1358.07	0.0000	43.1957	0.0000			30.0598	0.0000
MEDIUM								
GDP	517.2616	0.0000	20.8235	0.0000	20.4635	0.0000	17.4168	0.0000
GDI	2374.68	0.0000	127.0050	0.0000	126.6450	0.0000	47.4530	0.0000
GII	2401.206	0.0000	128.5214	0.0000	128.1614	0.0000	41.7253	0.0000
LFPR	623.97	0.0000	26.9236	0.0000	26.5636	0.0000	1.9829	0.0474
EYS	2563.93	0.0000	137.8236	0.0000	137.4636	0.0000	35.7066	0.0000
TFR	3325.80	0.0000	181.3769	0.0000	181.0169	0.0000	57.0593	0.0000
LE	2592.74	0.0000	139.4705	0.0000	139.1105	0.0000	47.4227	0.0000
PANEL	493.0645	0.0000	19.4402	0.0000			16.2311	0.0000
LOW								
GDP	34.9861	0.0283	2.1581	0.0309	2.0181	0.0436	2.8811	0.0040
GDI	254.0545	0.0000	35.9611	0.0000	35.8211	0.0000	14.0619	0.0000
GII	217.3058	0.0000	36.9358	0.0000	36.8158	0.0000	12.5449	0.0000
LFPR	122.5010	0.0000	15.6619	0.0000	15.5219	0.0000	0.6857	0.4929
EYS	472.3060	0.0000	69.6380	0.0000	69.4980	0.0000	21.6986	0.0000
TFR	485.4260	0.0000	71.6625	0.0000	71.5225	0.0000	22.0139	0.0000
LE	364.0965	0.0000	52.9409	0.0000	52.8009	0.0000	17.2495	0.0000
PANEL	37.5600	0.0145	2.5553	0.0106			2.2844	0.0223

H_0: No cross-section dependence

Table 6. CIPS Unit Root Test Results

Variable	Constant				Constant and Trend				Result
	Level		First Difference		Level		First Difference		
	t-stat.	Prob.	t-stat.	Prob.	t-stat.	Prob.	t-stat.	Prob.	
GDP	-2.0638	< 0.10	-5.7935	< 0.01	-2.5197	>= 0.10	-4.9085	< 0.01	I(1)
GDI	-2.0059	>= 0.10	-5.1132	< 0.01	-2.1060	>= 0.10	-5.1750	< 0.01	I(1)
GII	-1.8645	>= 0.10	-4.5012	< 0.01	-2.5049	>= 0.10	-2.9091	< 0.01	I(1)
LFPR	-1.7974	>= 0.10	-4.5741	< 0.01	-2.0345	>= 0.10	-4.4390	< 0.01	I(1)
EYS	-1.9049	>= 0.10	-3.2081	< 0.01	-2.3736	>= 0.10	-3.5549	< 0.01	I(1)
TFR	-1.9218	>= 0.10	-3.4837	< 0.01	-2.3477	>= 0.10	-3.4559	< 0.01	I(1)
LE	-1.9289	>= 0.10	-5.3645	< 0.01	-2.0862	>= 0.10	-5.4385	< 0.01	I(1)
HIGH									
GDP	-1.5748	>= 0.10	-5.9600	< 0.01	-2.2138	>= 0.10	-5.9545	< 0.01	I(1)
GDI	-1.5559	>= 0.10	-5.2496	< 0.01	-2.5339	>= 0.10	-5.3546	< 0.01	I(1)
GII	-1.9082	>= 0.10	-4.6589	< 0.01	-2.2086	>= 0.10	-4.9130	< 0.01	I(1)
LFPR	-2.0169	>= 0.10	-5.1193	< 0.01	-1.9776	>= 0.10	-5.2057	< 0.01	I(1)
EYS	-1.8204	>= 0.10	-3.8863	< 0.01	-1.4245	>= 0.10	-4.0517	< 0.01	I(1)
TFR	-2.1285	< 0.10	-3.4590	< 0.01	-1.9367	>= 0.10	-3.8567	< 0.01	I(1)
LE	-1.7332	>= 0.10	-3.9229	< 0.01	-1.5615	>= 0.10	-4.4598	< 0.01	I(1)
MEDIUM									
GDP	-2.1112	>= 0.10	-6.2603	< 0.01	-2.0376	>= 0.10	-6.4018	< 0.01	I(1)
GDI	-2.0658	>= 0.10	-5.2925	< 0.01	-1.8001	>= 0.10	-5.6312	< 0.01	I(1)
GII	-1.6839	>= 0.10	-4.8116	< 0.01	-2.4883	>= 0.10	-4.7785	< 0.01	I(1)
LFPR	-1.9585	>= 0.10	-4.5189	< 0.01	-2.1340	>= 0.10	-4.4897	< 0.01	I(1)
EYS	-2.3181	>= 0.10	-3.4055	< 0.01	-2.3419	>= 0.10	-3.5871	< 0.01	I(1)
TFR	-1.7904	>= 0.10	-2.7315	< 0.01	-2.3251	>= 0.10	-3.8033	< 0.01	I(1)
LE	-1.8054	>= 0.10	-3.2055	< 0.01	-2.3357	>= 0.10	-3.3309	< 0.01	I(1)
LOW									
GDP	-2.0360	>= 0.10	-6.2774	< 0.01	-1.7087	>= 0.10	-6.1397	< 0.01	I(1)
GDI	-2.0605	>= 0.10	-5.4816	< 0.01	-2.3470	>= 0.10	-5.8741	< 0.01	I(1)
GII	-1.3347	>= 0.10	-4.9886	< 0.01	-1.7830	>= 0.10	-4.9844	< 0.01	I(1)
LFPR	-1.8949	>= 0.10	-4.7460	< 0.01	-2.2974	>= 0.10	-4.8939	< 0.01	I(1)
EYS	-1.5279	>= 0.10	-3.2956	< 0.01	-2.4035	>= 0.10	-4.2060	< 0.01	I(1)
TFR	-2.3860	>= 0.10	-2.6292	< 0.01	-2.3860	>= 0.10	-3.6507	< 0.01	I(1)
LE	-1.9378	>= 0.10	-2.3985	< 0.05	-2.0067	>= 0.10	-2.9599	< 0.05	I(1)

H_0: Unit Root

Table 7. Heteroscedasticity and Autocorrelation Tests Results

Heteroscedasticity				
	VERY HIGH	**HIGH**	**MEDIUM**	**LOW**
Statistic	512.8720	474.7625	905.0608	38.3026
p-value	0.0000	0.0000	0.0000	0.0000
Autocorrelation				
LMp-stat	95.5184	2.2895	4.9497	4.9949
p-value	0.0000	0.1302	0.0261	0.0254
LMp*-stat	126.6908	6.3454	9.4896	7.6760
p-value	0.0000	0.0118	0.0021	0.0056

test, one of the second-generation unit root tests. The test results are shown in Table 6.

The analysis of the table containing the results of CIPS, a test that considers cross-section dependence, reveals that the probability values of the dependent and independent variables exceed the critical value in all four country groups. Consequently, all variables are hypothesized to contain a unit root at the level. After this finding, first-order differences of the variables were taken, and it was determined that the series of the variables became stationary after the differencing process. In this context, it is established that the variables within the model in all four country groups are I(1) in the fixed/fixed and trended cases.

In estimating panel data, it is imperative to first detect any variance and autocorrelation problems in the model. Ideally, estimators that are capable of resolving these issues should be preferred. As presented in Table 7, the test results for detecting heteroscedasticity indicate that the variance of the error terms is not constant. Similarly, the test results for detecting autocorrelation suggest that the error terms depend on each other.

Upon analysis of the table containing the results of heteroscedasticity and autocorrelation, it is evident that there is a heteroscedasticity problem, as the probability value is smaller than the critical value in the models for very high, high, medium, and low states. In autocorrelation detection, LMp-stat is acknowledged for providing consistent results for large samples, while LMp*-stat is recognized for its efficacy in smaller samples. Therefore, this study's findings indicate the presence of an autocorrelation problem in the models for the four country groups.

EMPIRICAL FINDINGS

Gender-responsive economic growth is analyzed using a panel data analysis method in four states classified under the Human Development Index. The relationship between economic growth, the gender development index, and the gender inequality index is investigated. The first cointegration test is employed to ascertain a long-run relationship between the dependent and independent variables, followed by estimating long-run coefficients. The Durbin-Hausman test results are presented in Table 8.

Table 8. Durbin Hausman Cointegration Tests Results

	Dh_g	p-value	Dh_p	p-value
VERY HIGH	3.052	0.001	2.505	0.006
HIGH	4.774	0.000	2.599	0.005
MEDIUM	8.357	0.000	9.876	0.000
LOW	4.980	0.000	14.482	0.000

Tablo 9. Equation Results

Dependent Variable: GDP		BA-OLS			CUP-FMOLS		
Group	Variables	Coef.	t-stat.	Prob.	Coef.	t-stat.	Prob.
VERY HIGH	GDI	1.083	6.690	0.000	1.057	6.529	0.000
	GII	0.929	4.822	0.000	0.837	4.342	0.000
	LFPR	2.373	7.189	0.000	2.363	7.158	0.000
	EYS	1.158	4.006	0.001	1.139	3.941	0.001
	TFR	2.165	6.713	0.000	2.650	8.218	0.000
	LE	-2.711	-5.017	0.000	-2.074	-3.838	0.001
HIGH	GDI	2.781	15.993	0.000	1.253	7.202	0.000
	GII	-0.909	-3.862	0.001	-0.511	-2.173	0.042
	LFPR	1.776	6.525	0.000	1.072	3.937	0.001
	EYS	-3.494	-17.416	0.000	-1.679	-8.372	0.000
	TFR	-1.585	-5.596	0.000	-0.877	-3.094	0.006
	LE	0.875	4.063	0.001	0.747	3.466	0.002
MEDIUM	GDI	6.767	18.154	0.000	5.050	13.547	0.000
	GII	-1.828	-7.059	0.000	-1.237	-4.778	0.000
	LFPR	3.824	8.527	0.000	3.051	6.804	0.000
	EYS	-1.182	-4.928	0.000	-1.003	-4.180	0.000
	TFR	0.972	4.829	0.000	0.740	3.676	0.001
	LE	-4.492	-11.354	0.000	-3.319	-8.387	0.000
LOW	GDI	2.851	6.321	0.000	2.784	6.172	0.000
	GII	-3.962	-3.763	0.001	-4.239	-4.026	0.001
	LFPR	8.182	4.588	0.000	8.129	4.559	0.000
	EYS	-3.867	-6.804	0.000	-3.837	-6.751	0.000
	TFR	-4.001	-3.428	0.003	-3.693	-3.164	0.005
	LE	1.999	4.817	0.000	1.937	4.667	0.000

Upon examination of the Durbin-Hausman cointegration test results presented in Table 8, it is evident that a cointegration relationship is observed in all four country groups. However, given that the probability values are lower than the critical value, it can be concluded that the utilization of more advanced long-run estimators, such as BA-OLS and CUP-FMOLS, is more reliable for coefficient estimation when compared to the use of FMOLS-DOLS estimators. In this context, the results of the BA-OLS and CUP-FMOLS tests, which are preferred for long-run coefficient estimation, are presented in Table 9.

The bias-adjusted OLS (BA-OLS) model has been developed to address the limitations of the standard OLS approach by correcting for bias and enhancing the results' reliability. This model functions as a long-run estimator, addressing the potential bias that may emerge in autocorrelation in OLS. The CUP-FMOLS (Continuously Updated Fully Modified OLS) method is a long-run coefficient estimation technique that employs correction for autocorrelation and heteroscedasticity problems to generate more reliable results. Continuous updating in CUP-FMOLS ensures the generation of more precise results than traditional long-run estimators.

The findings of the BA-OLS and CUP-FMOLS tests demonstrate a high degree of similarity within the very high-country group. The results from both tests indicate a positive correlation between GDP and the GDI, GII, LFPR, EYS, and TFR variables, while a negative correlation is observed between GDP and LE. In this context, it is evident that GDI and GII, which are gender-related indices, contribute to economic growth in this country group. A similar correlation is observed between labor force participation, education, and fertility rates, positively impacting economic growth. However, it is notable that life expectancy negatively affects economic growth in this group.

The BA-OLS and CUP-FMOLS results are consistent in high states, with the GDP positively correlated with the GDI, LFPR, and LE variables. In contrast, GII, EYS, and TFR are negatively correlated. However, only one gender-related index (GDI) has an increasing effect on economic growth in these states. In this group of states, the expected schooling level, the fertility rate, and the gender inequality index have a negative impact on economic growth. Therefore, it can be concluded that an increase in gender inequality has a negative effect on economic growth.

In the medium country group, as in the high states, GDI has been observed to affect economic growth positively. In this group, LFPR and TFR variables positively correlate with GDP, i.e., they have been shown to increase economic growth. Conversely, GII, EYS, and LE variables have been demonstrated to decrease economic growth in the selected years in both estimation results.

The findings for the low-country group demonstrate comparable outcomes to those of the high-country group. Both estimators yield consistent results within this country group, with GDP and GDI, LFPR, and LE variables exhibiting a positive relationship. In contrast, GII, EYS, and TFR variables demonstrate a negative relationship.

In summary, within the very high country group, GDP has been found to be positively correlated with GDI, GII, LFPR, EYS and TFR variables; LE is negatively correlated. In the high country group, GDP demonstrates a positive correlation with GDI, LFPR, and LE variables; conversely, GII, EYS, and TFR variables demonstrate a negative correlation. In medium countries, GDP has been found to be positively related to GDI, LFPR, and TFR variables; conversely, GII, EYS, and LE variables have been found to be negatively related. In the low country group, GDP is positively related to GDI, LFPR, and LE variables; GII, EYS, and TFR variables are negatively related.

A general evaluation of the estimation results indicates that GDI and LFPR are comparable to economic growth across all groups. In this context, GDI and LFPR, which positively impact economic growth, demonstrate consistency across all country groups. The observed positive relationship between GDI and economic growth aligns with the findings reported by Jonsson (2011). The findings reveal that the gender development index and women's labor force participation rate are significant factors in achieving gender-responsive economic growth. The analysis demonstrates that while the shifting socio-economic structure and level of democratization influence the impact of other variables in different states, GDI and LFPR exhibit an upward trend in economic growth, irrespective of these structural changes. Conversely, GII, which is indicative of gender inequality, has a negative effect on economic growth. This finding supports the conclusions of Mandegar and Olsson (2023) and Khakimova (2024) and indicates that reducing gender inequality is a crucial factor in achieving sustainable economic growth.

DISCUSSION

The present study investigated the hypothesis that gender-responsive economic growth is associated with different levels of human development in country groups. The study revealed several significant findings. The initial finding pertains to gender inequality indices and life expectancy within the very high country group. A matter of particular significance in this group of countries is the negative effect of life expectancy on economic growth. This phenomenon can be elucidated through the theoretical framework of the law of diminishing returns. It can be argued that the quality of social security and health services has reached a level where they are no longer able to positively impact life expectancy, due to the attainment of a state of saturation. A similar correlation has been identified in a study by Kunze (2014), who attributed this negative relationship to inheritance effects. This finding is also consistent with the findings of Zhang and Zhang (2005) regarding the declining marginal contribution of life expectancy to economic growth.

Another noteworthy situation is the positive relationship between gender inequality and economic growth in this group of countries. This relationship is not anticipated. In this context, it is hypothesised that economic growth in these countries with institutionalised market systems may be more sensitive to technological infrastructure or the development of the service sector than to gender equality.

A particularly salient finding of the study is the broadly negative correlation between GII and GDP. This indicates that in societies characterised by high levels of gender inequality, the potential contributions of women are constrained, which has a deleterious effect on economic growth. As demonstrated in the studies by Jütting et al. (2008) and Dijkstra & Hanmer (2000), gender-based discrimination in social institutions has the capacity to exert a detrimental effect on economic growth, via the inequalities women face in core areas such as education, health, and the labor force.

Research indicates a positive correlation between the LFPR and GDP, suggesting that enhancing women's participation in the labor force is a potential driver of economic growth. Research conducted by Akhtar et al. (2023), Tsani et al. (2013), and Urama et al. (2022) also demonstrates that an increase in the participation of women in the labor force has a positive effect on economic dynamism. However, certain regional studies (e.g., Thaddeus et al., 2022, in Sub-Saharan Africa) have identified a potential negative relationship between these variables. This occurrence can be attributed to various factors, including the sectors in which women are employed, the quality of the labor force, and the prevalence of informality.

It is evident that the relationship between EYS and economic growth is more complex and context responsive. The findings in the extant literature and in this study demonstrate positive relationships in some country groups and negative relationships in others. This finding indicates that the impact of education on economic growth is dependent not only on the quantity of educational resources available, but also on the quality of these resources and their alignment with the demands of the labor market. Research conducted by Khakimova (2024) and Barro & Lee (1994) emphasises that the impact of education on economic growth in the short term may be limited or occur through indirect channels. In particular, in economies with weak education infrastructure or where human capital investment does not correspond to productivity, education may not have an impact on economic growth.

The relationship between TFR and GDP, however, varies considerably and depends on the demographic transition processes of country groups. As demonstrated in the research conducted by Brander & Dowrick (1994) and Li (2016), elevated levels of fertility have been observed to enhance economic growth in specific nation groups. Conversely, in other instances, these high fertility rates have been shown to constrain growth, primarily by diminishing the level of investment allocated to each child. In this context, the relationship between fertility rates and economic growth should be evaluated in conjunction with population structure, human capital levels, and the social policy environment.

As demonstrated by the study, the relationships between gender equality, education, demographic structures, and economic growth are non-linear and context-sensitive. Consequently, when establishing development strategies, policymakers should take into consideration not only absolute indicators but also country-specific structural factors and social norms.

CONCLUSION AND POLICY RECOMMENDATIONS

Women's empowerment has become a prominent issue in policy-making and academic discourse, with gender inequality emerging as a significant area of concern. Recognizing gender equality as a fundamental development element has created a 'smart economy.' The UNDP has emphasized gender issues, acknowledging that ensuring equal opportunities between the sexes is crucial in driving economic growth. A notable shift in perspective has been observed in human development reports, transitioning from a focus on economic growth to a more gender-focused approach. This evolution is characterized by introducing two gender-related criteria, GDI and GEM, in the 1995 Human Development Report. After this, in 2010, following deliberations on the limitations of the GDI in identifying gender inequality, the GII was established, thereby effecting a shift in focus to the welfare losses caused by inequality.

The discussions surrounding the importance of women's empowerment and the dissolution of gender inequalities in economic growth and development have necessitated examining the relationship between gender-related indices and economic growth. In this study, the relationship between the gender development index and the gender inequality index, as well as both gender-related indices and economic growth in four country groups classified within the scope of human development, is analyzed. The analyses conducted within the scope of the study have yielded findings that are believed to contribute to the existing literature on the subject. The study's most significant finding is that the relationship between gender-related indices and economic growth has been established for all four country groups. The gender development index has been shown to exert an increasing effect on economic growth in high, medium, and low states, categorized according to human development levels. Conversely, the gender

inequality index has been demonstrated to decrease economic growth in other country groups, except in very high states. These findings provide robust evidence that gender plays a key role in economic growth and explain why it is considered within the scope of a 'smart economy' in the literature.

The hypothesis that practices and policies aimed at ensuring gender equality will adversely impact economic growth is contradicted by the research findings. The findings demonstrate that the gender development index is positively correlated with economic growth, irrespective of the socio-economic and democratic levels of states. Similarly, the findings indicate that an increase in the gender inequality index, that is, a more significant number of obstacles faced by women in accessing opportunities compared to men, is negatively correlated with economic growth. Consequently, it is recommended that the efficacy of gender-responsive policies be augmented to facilitate realizing the economic growth goal.

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A Qualitative Research on the Development of Shopping Tourism in Türkiye

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ABSTRACT

Shopping directly affects consumers' tourism activity. People participate in tourism activities for sightseeing purposes and buy products from cheaper destinations than the region they live in. This study examined qualitative approaches to developing tourism in destinations with shopping potential. 34 people were interviewed within the scope of the study. In line with the analysis, 4 themes, 7 categories, and 77 codes were determined. According to the study results, the most emphasized code in the category of Türkiye's place in shopping tourism was affordability. Academic and sectoral recommendations were presented in the conclusion part.

Keywords: Shopping Tourism, Shopping Tourism In Türkiye, Shopping Destinations.

JEL Classification Codes: L80, L83, M31, O2, R11

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INTRODUCTION

In 2019, 1.5 billion individuals worldwide engaged in the tourism industry before the COVID-19 pandemic. It is not reliable to depend on 2020 data since the COVID-19 pandemic, which erupted in Wuhan, China, drove several nations to shut down their borders, impose restrictions, and implement full lockdowns. The growth rate of tourism slowed down in 2019. The tourism movement grew by 6% worldwide in 2017 and 2018 and by 3.8% in 2019 (UNWTO, 2021). The tourism sector grew at a slower rate in 2019 compared to previous years because of some negative factors including the Brexit process, Thomas Cook's bankruptcy, the global financial crisis.

Given that one-sixth of the world's population engages in tourism, it was observed that the industry impacted numerous business fields, both directly and indirectly. Following 2020 and 2021, the pandemic's diminished global impact in 2022 led to the normalization of tourism trends. While 963 million people travelled around the world in 2022, the total spending was 1 trillion $12 billion. When Türkiye's tourism statistics were studied, it was found that the country almost attained the pre-pandemic high of 52 million visitors in 2019, with 51 million 387 thousand visitors in 2022. In 2022, tourist spending was $901 per person. In 2023, the total number of visitors increased to 56.7 million, while spending increased to $952 per person (MCT, 2024).

One of the alternative tourism types is "shopping tourism", defined by the World Tourism Organization as 'the visit of people outside of their area of residence to purchase products' (UNWTO, 2021). The Grand Bazaar in Istanbul, the Spice Bazaar, and the Historical Kemeraltı Bazaar in Izmir are some of the bazaars in Türkiye frequently visited by tourists. According to a study conducted in 2020 by the General Directorate of Investment and Enterprises of the Ministry of Culture and Tourism of the Republic of Türkiye, shopping expenditures constitute 20% of total tourism income (MCT, 2020). Due to the COVID-19 pandemic, Türkiye's tourism activity decreased significantly in 2020 compared to 2019 as it did in the rest of the world. In 2020, when roughly 12 billion USD in tourism-related spending was made, food and beverage, retail, and package tour costs were the expenses that brought in the most money. Visiting tourists primarily bought clothing and footwear, souvenirs, other expenses, carpets, and rugs. 2 million 126 thousand 261 (4.1%) of the 51 million 860 thousand 42 visitors who came to Türkiye in 2019—the year the

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epidemic had not yet begun—came for shopping (TURKSTAT, 2020). This rate was 4.9% in 2023 (TURKSTAT, 2024). In addition, it was found that visitors coming for shopping purposes mainly visited in the second quarter of the year (April, May, June). However, there was a homogeneous distribution in the year's first, third, and fourth quarters (Figure 1).

Figure 1. Annual distribution of visitors coming for shopping tourism (2022-quarterly)

Source: Data was taken from TURKSTAT, and the authors created figures.

Figure 1 illustrates the year-round activity of tourists who visit Türkiye for shopping. The "seasonality" of tourism, or the fact that it is restricted to a particular time of year, is one of Türkiye's largest problems. The third quarter of the year (July, August, and September) saw a 40% increase in tourists to Türkiye. Numerous negative effects are brought on by this circumstance, including regional intensity, the formation of excessive tourism, difficulties with the infrastructure in tourist areas, etc. All studies stressed that alternative tourism forms would replace Türkiye's regional and seasonal tourism approach. When the numbers were looked at, shopping tourism may be seen to disperse this intensity.

Türkiye's border gates continue to see a significant influx of shoppers. Tourist entries for shopping purposes in Turkey are from Bulgaria in Edirne, from Greek islands in Izmir and Muğla, and from Georgia in Artvin. Bulgaria leads the way when it comes to shopping purposes. According to the Ministry of Culture and Tourism data, Bulgaria took second place after Russia in 2020, with 1.2 million visitors under pandemic conditions (MCT, 2020).

95% of foreign visitors to Türkiye from Bulgaria enter through the Kapıkule border gate. 5 million 731 thousand 717 people entered Türkiye through the Edirne Kapıkule Border Gate in 2019. The number of visitors coming to Türkiye from Bulgaria in the same year was approximately 2.3 million. The number of visitors from Bulgaria to Türkiye in 2019 increased by 14.5% compared to the previous year. Tourists from Bulgaria constituted 5% of the total number of foreign visitors in 2019. Excluding the pandemic period, it was seen that the number of visitors coming to Türkiye from Bulgaria in 2022 reached 2.9 million (TURKSTAT, 2023). This indicates that Türkiye is a vital shopping destination for Bulgarian citizens.

2,155,994 tourists visited Izmir in 2022. Approximately 1.5 million of the incoming tourists were foreigners, while the rest were domestic tourists and Turkish citizens residing abroad. The most foreign tourists visiting Izmir were from Germany (530,754) and England (158,661). The number of tourists coming to Izmir from Greece in 2022 was 22,311. Port of Çeşme is one of the border gates through which tourists come to Izmir by sea. Arrivals from the Port of Çeşme in 2020, 2021, and 2022 were provided in Figure 2 (Izmir MCT, 2022).

As seen in the figure above, the COVID-19 pandemic, which severely impacted the world in 2020 and 2021, also negatively affected tourism movements. With the normalization in early 2022, an approximation to 2019 figures was observed. 5,145 foreign tourists entered the port of Çeşme in 2020, only 944 in 2021, and 68,319 in 2022. The majority of foreign tourists coming to Çeşme port were Greek citizens. The main reason was the

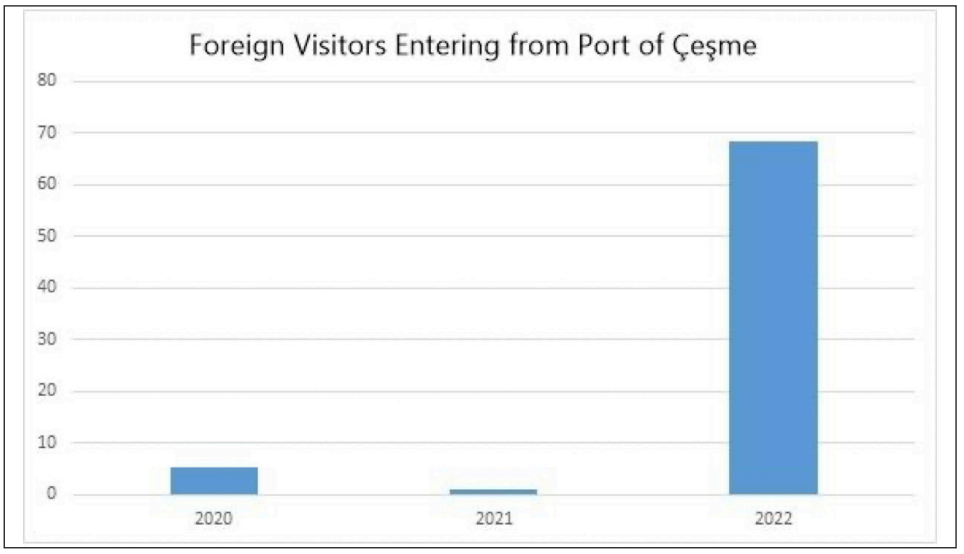

Figure 2. Foreign visitors entering from port of Çeşme

Source: Data was taken from Izmir MCT, and the authors created a figure.

reciprocal ferry services from the Greek island of Chios, which is approximately 45 minutes away from Çeşme, especially in summer. There is intense passenger traffic between Çeşme and Chios Island by these ferries. While visiting, Greek tourists who come to Çeşme by ferry from the island of Chios also visit Izmir and Izmir's historical Kemeraltı Bazaar for shopping purposes. At the same time, the fact that the currencies of Greece (Euro) and Bulgaria (Leva) are valuable in Türkiye enables visitors to shop more (Izmir MCT, 2022).

This study's primary goal is to investigate, via a qualitative lens, the dynamics of cross-border shopping tourism in Türkiye and to add to the body of knowledge by offering perspectives that can guide destination development plans. The scope of this study was planned in three stages. First, questions were asked of visitors coming to Türkiye from the Edirne border for shopping purposes. The second target group was foreign visitors from Chios Island who visited the port of Çeşme and the historical Kemeraltı Bazaar of Izmir. In the third and last group, data was collected from tradesmen serving in the most visited bazaars for shopping tourism in Edirne and Izmir.

When the literature was examined, it became clear that the qualitative approach to shopping tourism was lacking. This situation supports the originality of the study. Moreover, suggestions for growing Türkiye's shopping tourism potential were included in the study's conclusion section. Shopping tourism is a type in which per capita expenditures are higher than mass tourism. This study is essential in supporting the creation of shopping tourism destinations, providing results and bringing forward new suggestions to identify the deficiencies of current shopping tourism destinations. This study, whose data was collected in Izmir and Edirne, should be carried out across the country, compared with successful destinations in shopping tourism worldwide, and Türkiye's current shopping potential should be developed.

The study's primary objectives were to assess the current state of shopping tourism, which is crucial to the growth of destinations, to identify the types of tourism that can be developed through shopping tourism, and to highlight the shared expectations and issues that arise between tourists and local businesspeople in this sector. The study also aims to reveal;

- The activities that need to be done to develop shopping tourism in destinations (advertising, promotion, use of social media),
- Expectations of tourists visiting the region from the businesses they shop at,
- Perception of businesses towards shopping tourism and tourists,
- Considering shopping tourism as an alternative to prevent Türkiye's tourism from being limited to specific regions and seasons,
- Threats and opportunities for Türkiye's shopping tourism,
- Systematic studies of chambers of commerce, local

governments, and the state to develop shopping tourism.

This study focuses on strategies for the growth of shopping tourism, which generates higher expenditures than mass tourism. Data was gathered from the two parties that make up shopping tourism (customers and sellers) following the study's aim. Research questions were developed by reviewing pertinent studies in the literature that matched the research's topic and goal. The following inquiries were made by the participants as part of the study:

- What are the expectations of shopping tourism and tourists from the destination?
- What is the contribution of shopping tourism to the destination?
- How should shopping tourism destinations be planned?
- How can existing shopping destinations be made more successful?
- What are the expectations of tourists and businesses in shopping tourism?
- What are the problems of businesses serving in shopping tourism destinations?
- What is Türkiye's place in shopping tourism?
- What are Türkiye's problems regarding shopping tourism?
- Can the development of shopping tourism be an alternative to "seasonality" and "regional intensity", which are Türkiye's main tourism problems?

THEORETICAL and CONCEPTUAL FRAMEWORK

Few studies have tried to examine the economic impact of shopping tourism from a theoretical perspective, despite the fact that the body of research on the subject is expanding. To help close this gap, this study takes a qualitative approach backed by theories of travel motivation. Travel motivation theories seek to explain why people travel. One prominent framework is the travel motivation theory, which identifies two primary motivational factors: push and pull factors (Lee, 1966; Dann (1977). Push factors are internal desires or needs that "push" a person to travel, originating from within the individual. These can include a need for escape from daily life, seeking relaxation, social interaction, self-discovery, or prestige (Yuan & McDonald, 1990; Kim et al., 2003). On the other hand, pull factors are external attributes of a destination that "pull" a person toward it. These might include the destination's unique attractions, cultural events, natural beauty, recreational opportunities, or a reputation for quality services. A person's decision to travel often results from the interplay between these two forces: an internal push to satisfy a need, and an external pull from a destination's appeal (Turnbull & Uysal, 1995). This study addresses shopping tourism within the scope of push and pull factors. Push factors include the geographical proximity of Izmir and Edirne to tourist-sending countries, the desire to discover new cultures, and acquiring new experiences; while pull factors include various shopping opportunities, affordability, cultural, historical, and physical values.

Numerous research has been conducted on the topic of "Why do people travel?" (Dann, 1981; Papatheodorou, 2001; Otoo & Kim, 2018). From the inception of the tourism phenomenon to the present, the question's answer has been given in various ways. According to a 1964 survey, there are 18 reasons why people choose to travel. Even though shopping was not one of the study's 18 reasons, it seemed inevitable that when the same individuals were asked what they did while traveling, shopping would be the top response (Kent, Shock & Snow, 1983).

Shopping tourism was first studied in the early 1980s. Over the past roughly 40 years and up to the present, various research studies have been carried out addressing shopping tourism (Table 1). Examining the studies revealed that they were primarily conducted using quantitative approaches. A detailed review of studies related to shopping tourism can be seen in Table 1.

Examining the literature revealed that most of the studies used quantitative methods. Most studies focused on subjects like visitor motivation, crowd, experience, and compliance. The findings demonstrate that the phenomenon of shopping boosted tourism. It was emphasized that factors such as correct planning, original products, reasonable prices, information flow, and promotion would enable destinations to stand out in shopping tourism. The number of studies on cross-border shopping was quite limited. It was solely focused on a specific part of some research.

The development of conceptual or theoretical models that explain shopping tourism behavior has been hampered by the prevalence of quantitative approaches in the literature.

Table 1. Shopping tourism themed researches

Study	Method	Subject	Findings
Kent vd., 1983	Quantitative	Why isn't shopping one of the main reasons people travel?	- Shopping contributes tremendously to the destination economy. - The strong tourist attraction feature of shopping should be used in destinations. - Shopping is becoming one of the main essential components of the tourism industry.
Swinyard, 1993	Quantitative	Mood, involvement, and quality of shopping intention	- Mood does not have any direct effect on shopping intention. - The level of involvement moderates the effect of mood on intention.
Heung & Cheng, 2000	Quantitative	Determination of factors affecting tourists' satisfaction during shopping	- The quality of service personnel has a great impact on tourists' shopping experience. - The second most important factor is the product value.
Turley & Milliman, 2000	Literature Review	Determining the effects of the environment on shopping behavior	- Environment variables have a significant impact on shopping behavior. - It was emphasized that environmental studies needed to be increased and that there was a gap in the literature on this subject.
Turner & Reisinger, 2011	Quantitative	Evaluation of differences in shopping satisfaction of domestic tourists classified according to a developed theoretical framework	- There is a definite sequential causal relationship leading to shopping satisfaction. - Shopping is an all-encompassing activity in domestic travel. - The most crucial point that domestic tourists attach to the product they buy is to buy the best product at the most affordable price, that the product reminds them of their travels, and that it is also exclusive.
Yüksel, 2004	Quantitative	Evaluation of shopping experiences of domestic and foreign visitors	- The two groups differ significantly in their shopping preferences. - Service evaluations of domestic visitors were seen as more negative than those of international visitors.
Eroğlu vd., 2005	Quantitative	Determining the effects of crowds on the shopping experience	- The crowd in the environment slightly affects the shopping values of tourists. It was especially emphasized that this effect was not too much. - In the second study evaluated within the scope of the research, it was determined that the shopper's emotions had a mediating effect on the perceived crowd. When these emotions come into play, the crowd of people in the environment positively affects shopping satisfaction.
Hsieh & Chang, 2006	Quantitative	Determining the motivational sources that affect tourists' shopping	- The main motivations driving tourists to shop are seeking novelty, exercising, and experiencing local culture and costumes.
Kikuchi & Ryan, 2007	Qualitative	Evaluation of street markets as tourist attraction centers	- In the study comparing the European and Asian groups, it was emphasized that the European group wanted to get the return (value) for the product they paid more for, while Asians paid more attention to the general ambiance.
Burt, 2007	Review	Review of the book on shopping tourism written by Timothy (2005)	- The book focuses on the importance of shopping tourism in the context of holidays and tourism. - It was emphasized that it was a source that answers why the tourist buys, what s/he buys, and where s/he buys it.
Tosun vd., 2007	Quantitative	Evaluation of perceived tourist satisfaction based on local shopping culture, employee service quality, product value, physical characteristics of the business, payment methods, and reliability factors.	- Shopping is one of the most important attractions for visiting a destination. - The most crucial determinant in the success of shopping tourism destinations is providing adequate information flow to tourists. This will also benefit the economic development of the destination. - The most important factor that pushes tourists to shop is the originality of the products.
Yüksel & Yüksel, 2007	Quantitative	Determining the effect of shopping risk perception on tourists' satisfaction, feeling, and loyalty intention	- It was observed that tourists shop more in areas where they feel safe. - As risk perception increases, satisfaction and loyalty intention decrease.

Jones, 2010	Quantitative	Determining whether shopping behavior differs across cultures	- In the study comparing two groups, the main difference is the perceived shopping satisfaction in spatial crowds. - The positive relationship between shopping satisfaction and values is higher in one group than the other.
Byun & Mann, 2011	Quantitative	Determining the effects of overcrowding in shopping areas and businesses on tourists	- When the perceived crowd of people mediates perceived shopping competition, tourists' hedonic shopping value is triggered and tourists have positive feelings towards shopping and business.
Henderson vd., 2011	Literature Review	Determining the relationship between shopping and tourism	- Tourism and shopping are concepts that should be evaluated together. - Vital factors in the success of a shopping destination are product variety and quality. - The support of the state and local governments is very important in the development of shopping destinations.
Baker & Wakefield, 2012	Quantitative	Determining how consumer shopping compliance affects perceived stress, crowd, and excitement	- Control and intimacy strongly influence social shopping compliance. - Causal relationships between consumers' shopping motivation, shopping compliance, and emotional reactions to stress and excitement were revealed.
Saayman & Saayman, 2012	Literature Review	Determining the effects of shopping on tourism in developing regions	- Shopping is one of the most important reasons why international tourists in the researched region prefer that destination.
Wong & Wan, 2013	Scale Development (Quantitative)	Investigating tourists' shopping satisfaction and examining its dimensionality	- The created scale can be used to determine the regions where tourists are satisfied and unhappy. - The main factor affecting tourists' shopping satisfaction is ease of transportation.
Choi vd., 2015	Literature Review	Evaluation of the process in shopping tourism	- The definition of shopping tourism remains unclear. - While some studies distinguish shopping tourism from tourist shopping, some studies use these concepts interchangeably. - The concept of cross-border shopping is quite common among people living in countries that border each other.
Lee & Choi, 2020	Quantitative	Determining the asymmetric effects of shopping tourism features in shopping destinations	- Shopping tourism qualities are categorized as must-have, hybrid, and value-added.

This study attempts to advance a more theoretically informed understanding of cross-border shopping tourism by using a qualitative approach. The concept of shopping tourism has frequently been approached descriptively in the literature; however, recent scholarship emphasizes the need for stronger analytical frameworks. According to Timothy (2005), shopping tourism should be regarded as an integral part of the tourism experience, not only in economic terms but also in relation to cultural and spatial dynamics. Similarly, Jansen-Verbeke (1991) conceptualizes shopping tourism as a magic concept for the tourism industry, highlighting accessibility, retail diversity, socio-emotional values, and destination image as key analytical dimensions. Choi, Heo, and Law (2015) have framed shopping tourism as an area of significant progress in tourism studies, identifying gaps in measurement, visitor motivation, and destination attributes. Likewise, Lee and Choi (2020) classify destination attributes into must-have, hybrid, and value-added categories, revealing their asymmetric effects on overall tourist satisfaction. These analytical perspectives suggest that shopping tourism can be systematically examined under three interconnected dimensions such as motivational, spatial/environmental and planning. The motivation dimension is the primary driver of shopping-related travel. The spatial/environmental dimension is the physical environment, accessibility, and retail mix. Planning is the strategic integration of shopping into destination development. By incorporating these perspectives, this study aims to move beyond descriptive accounts and contribute to the conceptual advancement of shopping tourism.

METHODOLOGY

This study focuses on business owners who operate in shopping destinations and foreign tourists who travel to Türkiye for shopping. Due to time and financial restrictions, the study was only conducted in the Edirne and Izmir regions. From a broader standpoint, carrying out research with high-budget projects or research assistance across the country or even abroad, employing

comparative mixed methods may produce different outcomes.

Many studies emphasized that shopping tourism has been studied extensively from the perspective of tourists but has not been evaluated from the retailer's perspective (Heung & Cheng, 2000; Hsieh & Chang, 2006; Choi, Heo & Law, 2015). The fact that people living in countries that border each other change countries for shopping purposes (with ease of transportation) helps the economic development of destinations. This shopping activity is observed in Türkiye, which borders nations such as Georgia, Bulgaria, Greece, Iran, and Syria.

This study's focus is on Bulgarian shoppers who visit Türkiye in Edirne, Greek shoppers who travel from Chios Island in Greece to the Kemeraltı Bazaar in Izmir, and the businesses that tourists in Edirne and Izmir visit. When the literature was examined, it was seen that the concept of shopping tourism was not adequately addressed in qualitative terms. The study aims to fill this gap in literature. The study's originality is that it simultaneously examines the two main heroes of shopping tourism (seller and buyer). Conducting the survey qualitatively aims to fill the literature gap and reveal new themes on the subject thanks to the inductive approach of qualitative research.

This study was conducted using a phenomenological design within qualitative research methods. The main purpose of the study is to examine the effects of shopping tourism on destination development and to elucidate the mutual expectations and problems experienced by visitors and local business owners. Accordingly, the research aims to achieve a comprehensive understanding of participants' lived experiences, articulated in their own words.

This study was conducted using qualitative methods, in which data was collected in a natural environment and were more successful in behavioral modeling and revealing human behavior. The study was implemented using the case study technique, one of the qualitative research methods. The group determined to collect data was identified using the criterion sampling technique, one of the purposeful sampling methods. Data was collected by audio recording with the participants' permission, and then analysis and coding were carried out. Data were gathered through semi-structured interviews and on-site observations. The visitor interview protocol encompassed questions addressing shopping experiences, expectations, motivations for destination choice, and interactions with local vendors. Interviews with shopkeepers, on the other hand, concentrated on customer profiles, sales practices, adaptations to accommodate tourists, and the challenges faced in the course of business. The use of multiple qualitative techniques enhanced both the credibility and the richness of the collected data. The opinions of academicians and industry representatives who were experts in their fields were taken to test the validity and reliability of the prepared interview form. Data was collected from the participants via individual (in-depth) interview methods using the interview form. The collected data was first analyzed and divided into codes, categories, and themes. The content analysis method was used to create themes.

When the literature was examined, it was seen that the subject had been studied many times with quantitative methods and the results were repetitive. This study discussed the topic from a qualitative aspect, with its unexplained points. Firstly, the audio recordings obtained from the interviews were transcribed. Written interview data was transferred to the MAXQDA 2022 program. In comparison to hand-held analyses, the MAXQDA program offers a more methodical study of data due to its Turkish interface, extensive use of visual analytic tools, and ability to be employed in mixed research methodologies in addition to basic statistical studies (Kuckartz and Rädiker, 2019).

The qualitative data were analyzed using a thematic analysis approach, supported by the MAXQDA software. Thematic analysis was adopted as it enables the identification, examination, and reporting of patterns within qualitative data, thereby facilitating a deeper understanding of participants' perspectives.

In the first stage, interview recordings and relevant documents were transcribed verbatim, after which preliminary codes were generated through open coding. Subsequently, these codes were refined and systematically clustered into themes and subcategories in accordance with the research questions, ensuring both analytical rigor and consistency with the study's objectives.

The Code Matrix function was employed to compare the distribution and intensity of codes across the four document groups (İzmir– International, İzmir–Local, Edirne– International, Edirne–Local). This comparative approach enabled the identification of key distinctions, such as the specific problems highlighted in the shopping experiences of international tourists in contrast to those reported by local visitors. In addition, the Code Map function was utilized to visualize interrelationships among codes, thereby uncovering clusters of expectations and problems that exhibited stronger associations. The varying thickness of the connecting

lines reflected the strength of these relationships, offering an additional analytical dimension that enriched the interpretation of the findings. After the codes were created in the MAXQDA program; the hierarchical code-sub-code model, statistics of the sub-codes, and code cloud analyses were extracted and added to the report for easier understanding and explanation of the data and the generated codes.

RESULTS

The study was conducted in two different cities and groups. These groups were 7 domestic participants and 9 foreign participants from İzmir; 8 domestic participants and 10 foreign participants from Edirne. These participants were coded between İZYE1 and İZYE7, from İYA1 to İYA9, EYE1 to EYE8 and EYA1 to EYA10 (Table 2). Participants were selected using criterion sampling, a purposeful sampling technique, to ensure that they met the study's inclusion criteria as active actors in shopping tourism. Data was obtained through semi-structured interviews, which were conducted and recorded by the researcher. In total, 34 interviews were carried out between June and September 2023 in Edirne and İzmir. Each interview lasted approximately 30–45 minutes

Table 2. Participant Profiles

Participant Code	Age	Gender	Occupation	Interview Duration (min)
İYA1	29	Female	University student	35
İYA2	41	Male	Small business owner	36
İYA3	35	Female	Civil servant	28
İYA4	52	Male	Retired	29
İYA5	26	Male	Sales assistant	32
İYA6	47	Female	Housewife	38
İYA7	38	Male	Tourism sector worker	27
İYA8	33	Female	Bank employee	42
İYA9	58	Female	Housewife	43
İZYE1	44	Male	Shop owner	40
İZYE2	36	Female	Salesperson	42
İZYE3	28	Male	Market vendor	41
İZYE4	50	Male	Textile shop owner	38
İZYE5	32	Female	Boutique owner	41
İZYE6	39	Female	Jewelry seller	27
İZYE7	55	Female	Handicraft seller	32
EYE1	46	Male	Grocery store owner	31
EYE2	34	Female	Clothing vendor	30
EYE3	29	Male	Café worker	38
EYE4	57	Female	Souvenir shop owner	43
EYE5	42	Male	Market vendor	36
EYE6	31	Female	Sales assistant	33
EYE7	48	Male	Butcher	37
EYE8	53	Female	Textile seller	29
EYA1	24	Female	Student	35
EYA2	39	Male	Farmer	36
EYA3	46	Female	Civil servant	40
EYA4	35	Male	Driver	35
EYA5	62	Female	Retired	28
EYA6	51	Male	Self-employed professional	37
EYA7	44	Female	Housewife	37
EYA8	24	Male	University student	29
EYA9	37	Female	Civil servant	40
EYA10	64	Male	Retired	36

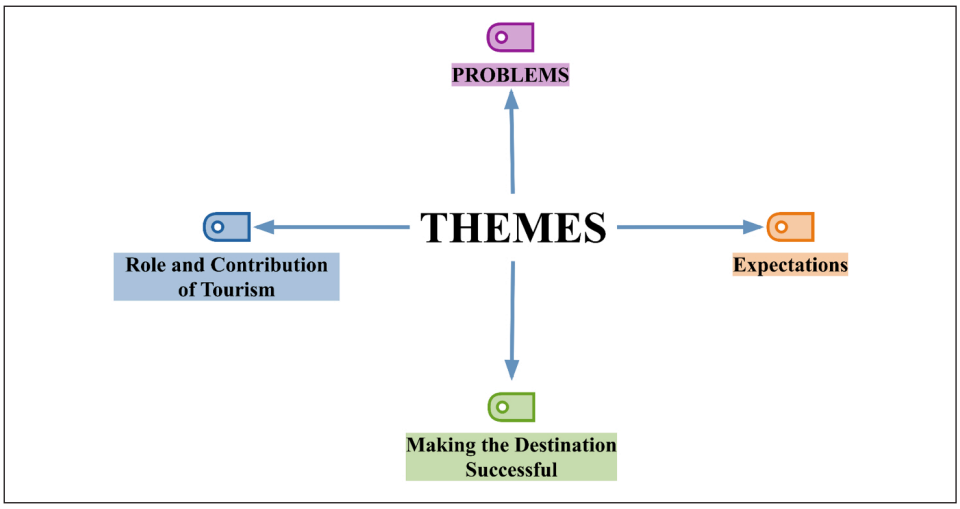

Figure 3. Themes

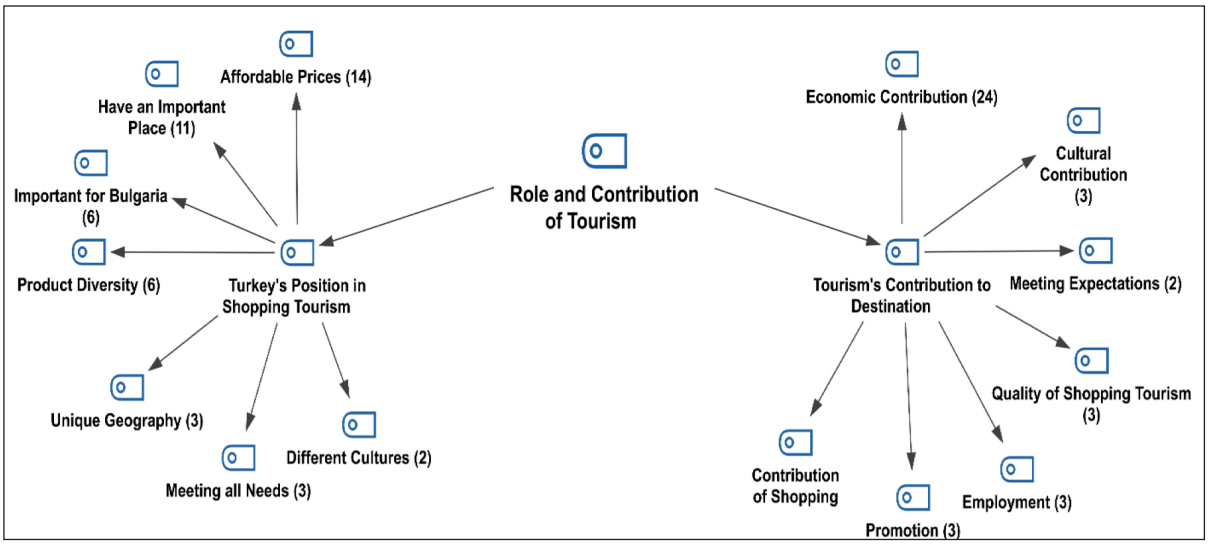

Figure 4. The place and contribution of tourism hierarchical code sub-code model

and took place either at participants' workplaces (shops, stands, or marketplaces) or at mutually agreed-upon public settings. All interviews were audio-recorded with participants' consent. The demographic profile of the participants reflected a diverse group in terms of age, gender, and occupation. Among the 34 interviewees, 18 were female and 16 were male. The age range extended from 22 to 64 years, with the majority clustered between 30 and 50 years. Approximately one-third of the participants were retailers or shop owners directly involved in shopping tourism, another third were service sector employees (e.g., sales staff, market vendors), and the remainder were consumers from Bulgaria and Greece with various professional backgrounds. The average interview duration was approximately 38 minutes.

Data was collected within the framework of 4 themes. These themes are presented in Figure 3. The themes are as follows; the place and contribution of tourism, making the destination successful, expectations, and problems.

The theme of the role and contribution of tourism and the categories created under the theme was provided in Figure 4. 7 codes were made in the context of the first of the codes under the theme of the role and contribution of tourism, the category of Türkiye's Position in Shopping Tourism. The codes created in the context of the answers given to the participants when they were asked about Türkiye's position in shopping tourism were coded as; "affordable prices" 14 times, "have an important place" 11 times, "product diversity" 6 times, "important for Bulgaria" 6 times, "unique geography" 3 times, "meeting all needs" 3 times, "hosting different cultures" 2 times.

Information on the sub-codes of the category of Türkiye's place in shopping tourism was included in Figure 5. Accordingly, participants responded regarding the codes as; 14 of the participants responded to

Figure 5. Türkiye's position in shopping tourism

"affordable prices", 11 of them to "have an important place", 6 of them to "product diversity", 6 of them to "important for Bulgaria", 3 of them to "meeting all needs", 3 of them to "unique geography", 2 of them to "hosting different cultures".

- Affordable prices;

"Previously, we were coming for shopping, not for tourism and the sea, and that was because it was so cheap." (EYA3)

- Have an important place;

"Türkiye has always been an important destination in shopping tourism." (İYA4)

"I think it is awesome. There is a great deal of product diversity in Türkiye." (İYE1)

- Product diversity;

"There is a great deal of product diversity in Türkiye, but the market is not scattered around. They lack conveying the beauty of their country. Here in Edirne, they may serve the products specific to this region and other provinces." (EYA7)

- Important for Bulgaria;

"In my opinion, Türkiye's place in shopping tourism is important, especially for Bulgaria." (EYA4)

- Meeting all needs;

"There are lots of shopping areas from old markets. The largest bazaar in Europe. We can say that Türkiye is a kind of shopping paradise." (İYA7)

Unique geography;

"I think it is a very important place. Because it has a unique geography." (İYA1)

- Different cultures;

"Türkiye hosts different cultures from both Asia and Europe. It has both for shopping." (İYA9)

Another category under the theme of the place and contribution of tourism is "the contribution of tourism to the destination". Participants' responses regarding the contribution of tourism to the destination were coded as; "economic contribution" 20, "promotion" 3, "cultural contribution" 3, "employment" 1, "shopping tourism is of high quality in Türkiye" 3, "contribution of shopping" 2, "meets their expectations" 2 times.

Information on the sub-codes of the contribution of tourism to the destination category was included in Figure 6. Accordingly, 20 of the participants responded to the code 'economic contribution', 3 to the 'cultural contribution', 3 to 'promotion', 3 to the code 'Shopping tourism is of high quality in Türkiye', 2 to the code 'meets their expectations', 2 to the code 'contribution of shopping' and 1 to the code 'employment'.

- Economic contribution;

"I expect that Edirne's shopping tourism will bring in a substantial amount of foreign currency." (EYA8)

"The purpose of the customer's visit is very important. It's shopping tourism, but if people come here just for shopping, it doesn't contribute to Edirne in other aspects. They solely spend the money. They do the shopping and go back." (EYE7)

"I think it is a lifeline in the economic crisis. So, normally, as tradesmen, we have been going through difficult times

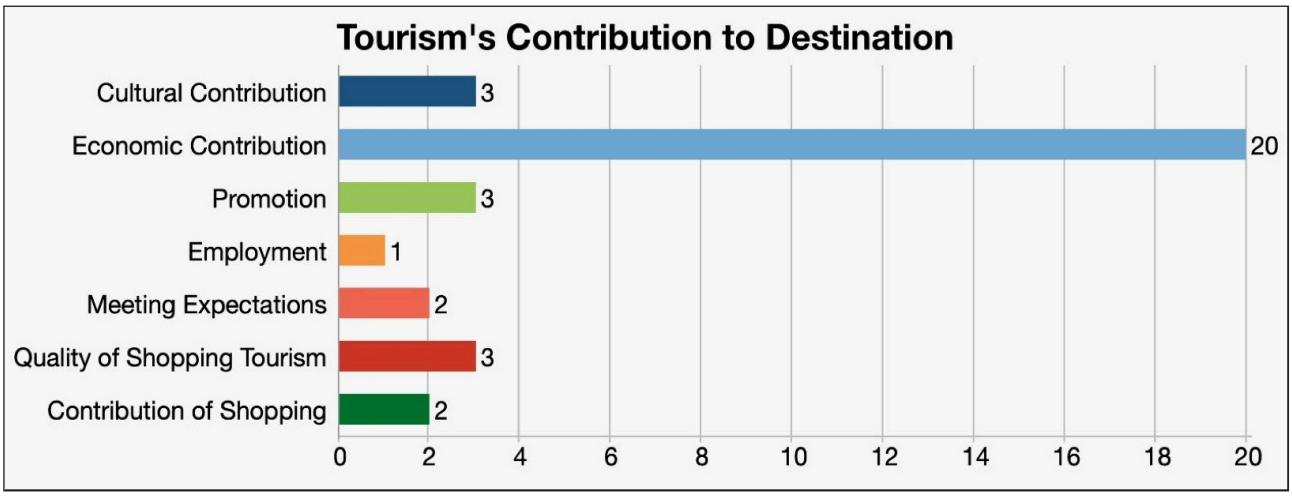

Figure 6. Contribution of tourism to the destination

for the last two to three years. A lifeline for that matter. It's just an expectation like everyone else." (İZYE5)

- Cultural contribution;

"First of all, it contributes to culture. Even we, while working here, can learn many things about their culture. Likewise, it is a very serious source of income from an economic perspective." (İZYE4)

- Promotion;

"It has a contribution for promotional purposes. For example, Edirne has various kinds of soaps on television and in the press today. Various kinds of soaps, such as lemon and olive oil, are produced in various molds. Thus, this is for promotional purposes. As I mentioned, Edirne Kavala Cookie is famous everywhere in Türkiye. This way it contributes." (EYE2)

- Shopping tourism is of high quality in Türkiye;

"Shopping tourism is sufficient and there are enough products, so it has a contribution." (EYA3)

"Shopping tourism is sufficient in Edirne." (EYA5)

Another theme created within the framework of the participants' statements is making the destination successful. Participants' opinions on making the destination successful were collected under this theme. The codes created within the context of this theme and the frequencies of the codes are shown in Figure 5.

- Building Trust;

"We show our goodwill, give them confidence, provide them with our phone number if necessary, and they contact us. When they go back to their own country, they

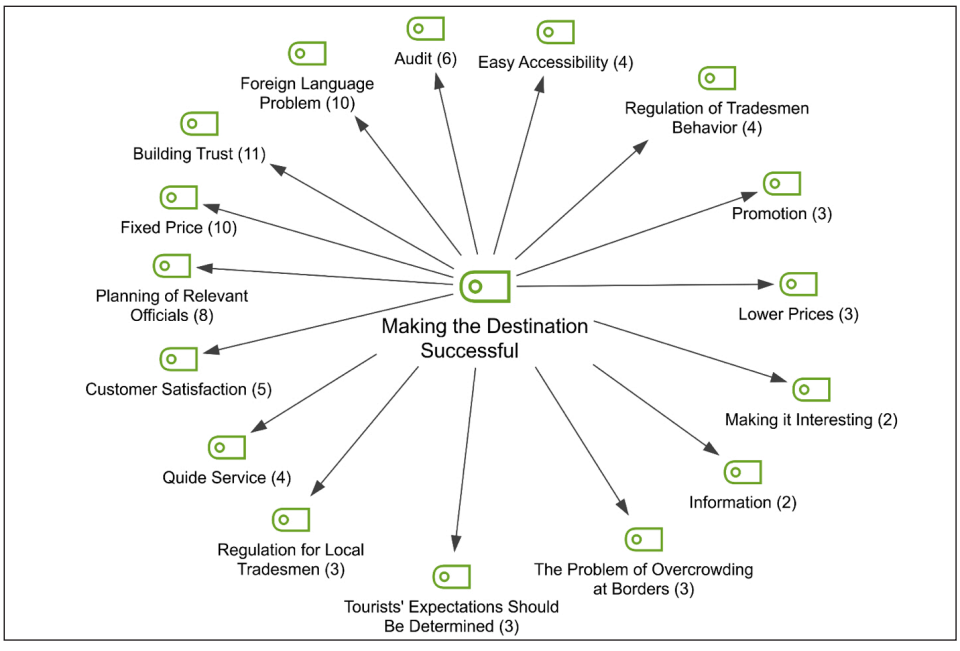

Figure 7. Making the destination successful hierarchical code sub-code model

call us and ask for products. They reserve the goods they wish to buy. Trust is essential in this regard. If they trust, they come again. Most of our customers are like that. They come every year and stop by. They bring their friends. Trust is very important. We try to help every customer." (İZYE1)

- Fixed price;

"We should be able to make flat-rate purchases. They sell us for higher prices than usual and this is very bad. We enter a store, the same product is more expensive or cheaper, this situation must be corrected. When one seller is winning, the other should also win." (EYA6)

- Foreign Language Problem;

"For example, people in the food and clothing industry should pay attention to promotions and campaigns. Additionally, knowing English will make the destination more attractive for tourists." (İYA5)

- Planning of Relevant Officials;

"I think success can be achieved with a common plan if people who want to take this tourism move forward create the suitable atmosphere." (EYA7)

- Audit (Inspection);

"It needs to be put in order. This is probably under the control of the municipality, the governor's office, those who deal with food tourism, the provincial directorate of food and agriculture, the provincial directorate of health, the municipal police, or the police teams. These authorities should conduct inspections on sellers. Moreover, great attention should be paid to hygiene in the places to be visited. Welcoming the customer and sending the customer off requires attention. The toilet is a huge problem in Edirne. Traffic and parking are also big problems, and these problems need to be solved." (EYE7)

Participants' expectations from shopping tourism were gathered under the theme of expectations. In the theme context, participant responses were divided into two categories: tourists' and tradesmen's expectations. When the tourists' expectations category was examined, the most recurring code was the reasonable price code. Statements regarding tourists' expectations are as follows:

- Reasonable Price;

"First of all, it's crucial to provide infrastructure-related opportunities, easy crossing from the border for me and those who come with me, easy access to shopping malls and low prices." (EYA9)

"My first expectation is the low price and then the friendly attitude of the sellers." (İYA2)

"When I think about it as a storekeeper... Quality and cherishing the customers. For example, I have a business in Bulgaria. I came here to buy my product because the prices were more favorable. Then, I sell it back there." (EYA6)

- Product Quality;

"Generally, tourists prefer branded products. As you can see, we do not have any branded products. That's why we generally appeal to domestic customers. However, tourists especially show excessive demand for counterfeit products. Instead of going there and paying 6-7 thousand euros, they buy it from us for 300-400 liras. Apart from that, they want to see more historical places. They want to experience more traditional things. That's why they prefer the Kızlar Ağası Inn." (İZYE4)

- Easy crossing of the border;

"The border should be controlled because we wait for an hour or two, and there are huge queues." (EYA5)

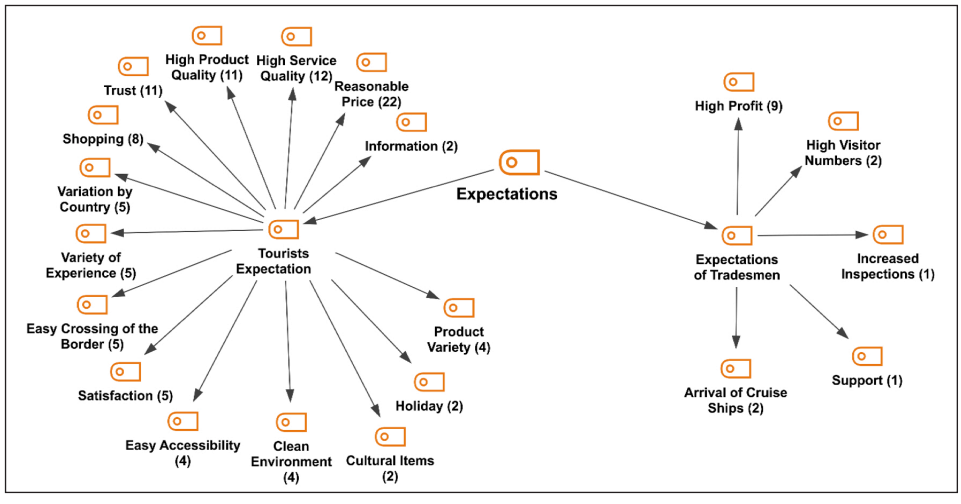

Figure 8. Expectations hierarchical code sub-code model

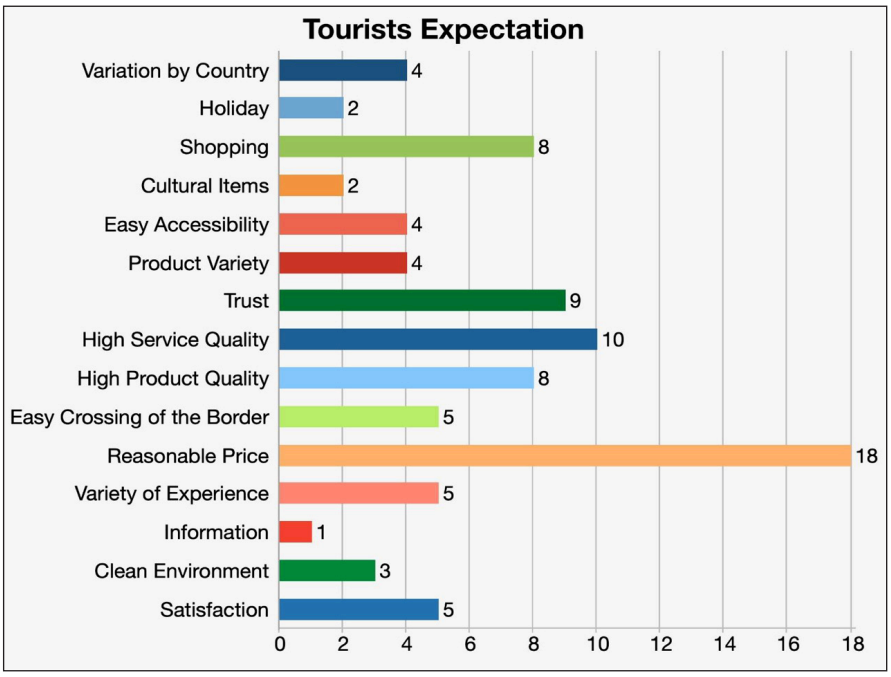

Figure 9. Statistics of tourists' expectations sub-codes

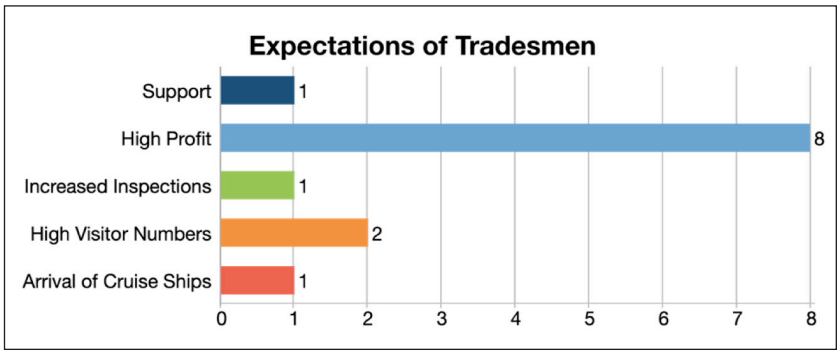

Figure 10. Statistics of tradesmen's expectations sub-codes

- Trust;

"As a tourist, I expect honesty from the seller where I buy products." (EYA7)

When the expectations of the tradesmen were examined, it was observed that the codes were in the direction of increasing earnings. The prominent statements of the participants regarding the expectations of the tradesmen are as follows;

"Now tourists want good deals, so that's O.K. The attitude of quality work at low prices can naturally lead to higher turnover and, thus, higher profits. Businesses expect abundant profits. Tourists expect to be satisfied with the products they purchase when they return home." (EYA10)

"I think these ships should get here. Those big cruise ships need to enter here because all the tradesmen liven up on the day those cruise ships arrive. In other words, those who eat and buy shoes, especially these counterfeiters in Kemeraltı, do more business at that time, but there is a point that disturbs us very much. There are approximately 80-100 hazanci, or hanutçu, who wander around here and there, aiming to take money from tourists by showing them around They disturb everyone. In other words, if a tourist buys a product from us for 100 liras, they buy it for 150 liras because of them." (İZYE3)

The participants' problems regarding shopping tourism were grouped under the theme of the issues. The theme was divided into 3 separate categories (the problems of tourists, and tradesmen, can shopping tourism be a solution to tourism problems) in terms of statements.

When the problems of tourists were examined, the most repeated codes were language problems, the negative behavior of tradesmen, and high prices. The prominent statements of the participants regarding this category are as follows:

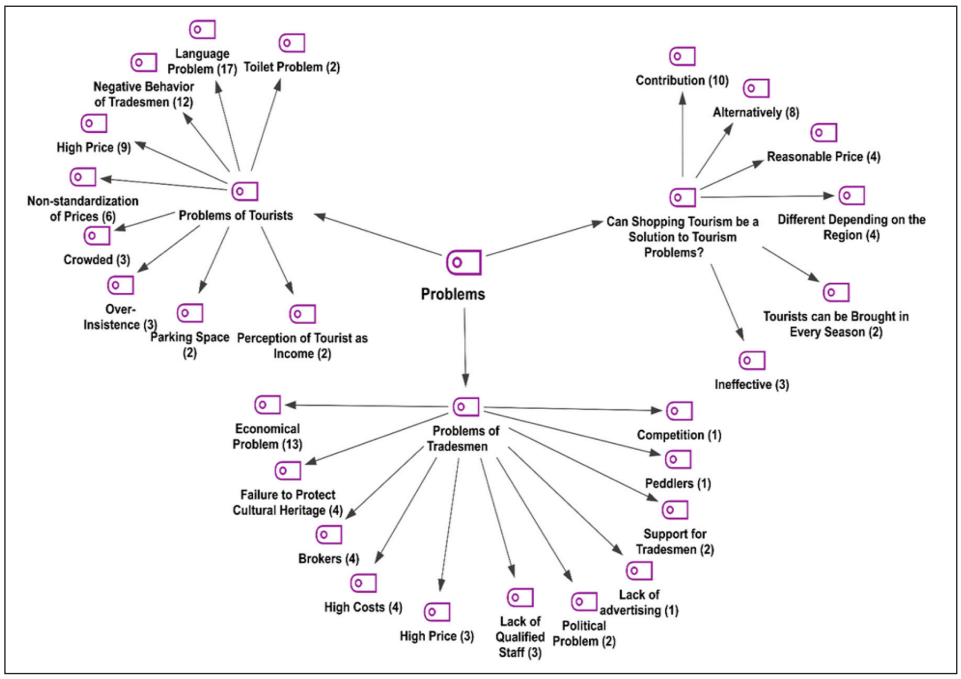

Figure 11. Problems with hierarchical code subcode model

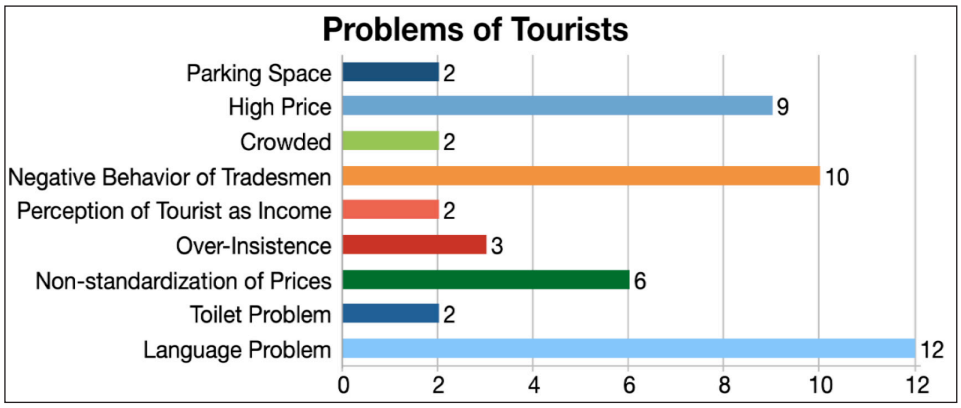

Figure 12. Statistics of tourists' problems sub-codes

"Language problem. The number of people who speak English and Bulgarian is low." (EYA2)

"I think there is a language barrier. This is very normal but sometimes very difficult. Maybe it would be easier if there was a little more English." (İYA9)

When the category of tradesmen's problems was examined, it was seen that the main problem of the tradesmen was economic problems. The prominent expressions in the tradesmen's problems category are as follows:

"Compared to surrounding provinces, Edirne is a city with chain markets and stores. Therefore, due to the chain stores, much of the income from shopping here does not stay in Edirne. I wouldn't say that the local tradesmen phenomenon is about to end, we can say that it is already over." (EYE3)

"Heavy expenses, rent, insurance. We used to have lunch for 10 TL a day, but now I pay 50-60 TL for lunch. It's a serious monthly expense." (İZYE4)

Another category is "Can Shopping Tourism Be a Solution to Tourism Problems". Participants' opinions on whether shopping tourism can be an alternative to seasonality and regional intensity, among Türkiye's main tourism problems, were gathered under this category. When the codes were examined, most participants thought there might be an alternative solution to these problems. The prominent statements in the context of this category are as follows:

"I think it can. Today, summer and winter are not a matter of issue when shopping. Yet, there isn't every product from every region, for example." (EYA8)

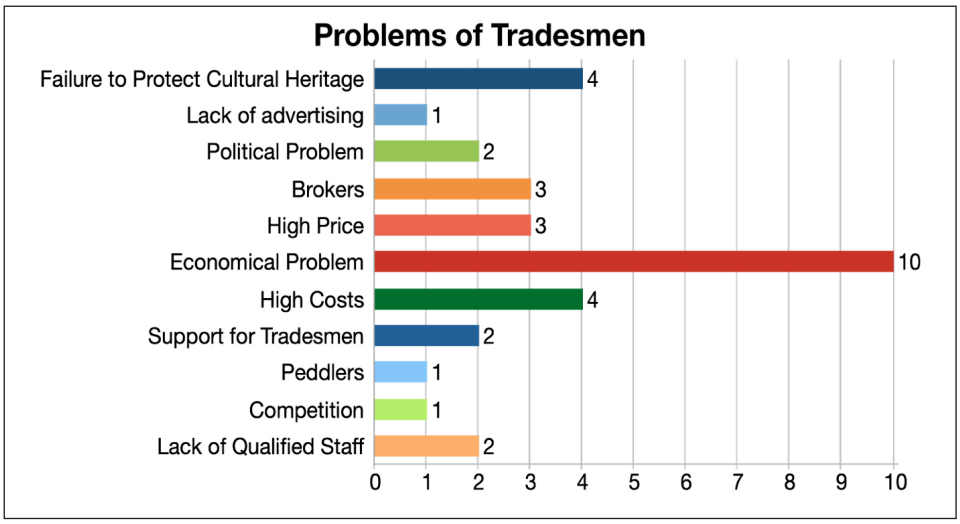

Figure 13. Statistics of sub-codes on tradesmen's problems

"There is no season for shopping. As for the region, if there were such easy transportation, I would go shopping in other regions." (EYA6)

These findings suggest that, for the development of shopping tourism, it is crucial to meet the shared expectations of both visitors and local residents while addressing the challenges encountered. Additionally, international tourists tend to focus on the overall tourism contribution of the destination, whereas local residents emphasize the destination's success and economic benefits. Figure 14 illustrates the interrelations between the themes.

The code map visualizes the relationships among the themes identified in the study. The analysis indicates that the code "Reasonable Price" occupies a central position and stands out as the element with the greatest number of connections (22). This indicates that, in the context of shopping tourism, visitors' primary expectation is directly related to price levels.

The code Reasonable Price demonstrates strong connections with other critical codes, including Good Service (12), Trust (11), Quality Product (11), and High Profit Expectations of Businesses (9). This network of relationships suggests that visitors are not solely concerned with low prices, but evaluate

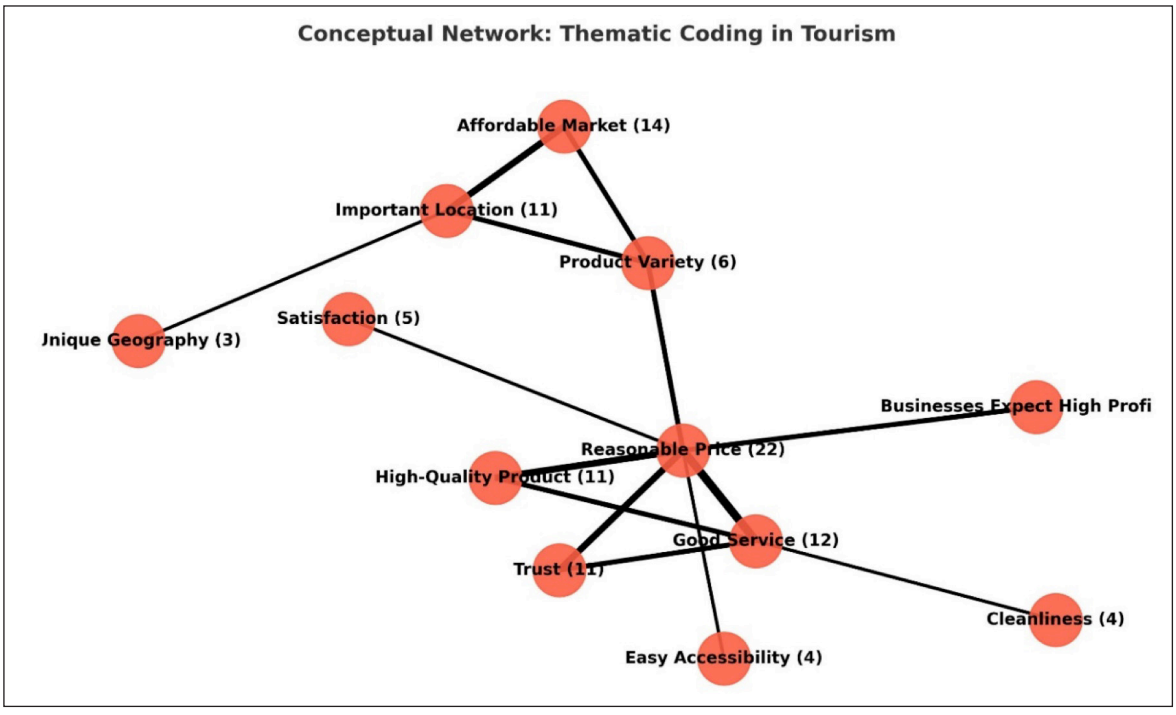

Figure 14. Interrelations between the themes

Table 3. Thematic coding framework

Participants / Codes	Role and Contribution of Tourism	Making the Destination Successful	Expectations	Problems	Total
İzmir International	28	16	31	32	107
İzmir Local	15	21	21	26	83
Edirne Local	18	27	34	34	113
Edirne International	24	17	31	34	106
Total	85	81	117	126	409

price in conjunction with quality, service, and trust. Additionally, Satisfaction (5), Product Variety (4), and Accessibility (4) are also linked to Reasonable Price. This indicates that the shopping experience is not limited to economic considerations alone; factors such as hygiene, accessibility, and variety also support perceptions of pricing.

Overall, the code map demonstrates that Reasonable Price serves as a pivotal focal point in shopping tourism, shaping visitors' expectations regarding trust, quality, service, and variety. This finding highlights that destinations aiming to develop shopping tourism should focus not only on pricing strategies but also on complementary factors such as service quality, product diversity, and accessibility.

The final part of the results section includes the code matrix of the study. The code matrix analysis illustrates how perspectives on shopping tourism are distributed across the four document groups (İzmir–International, İzmir–Local, Edirne–Local, Edirne– International). Table 3 highlights both the most prominent codes and the differences between groups.

The code matrix includes a total of 409 references. The most prominent theme is problems, while the least emphasized is making the destination successful. In the İzmir– International group, role and contribution of tourism is the most prominent, whereas in the Edirne–Local group, making the destination successful stands out. The themes of expectations and problems are balanced across all groups.

A total of 85 references were coded under role and contribution of tourism, with the highest intensity observed in the İzmir– International (28) and Edirne–International (24) groups. This indicates that international visitors tend to evaluate shopping tourism primarily within the broader context of the destination's overall tourism contribution. In contrast, local groups demonstrated relatively lower awareness of this contribution.

Making the destination successful theme accounted for 81 references, with the Edirne–Local group showing the highest emphasis (27) and İzmir– International group showing a more limited focus (16). This finding suggests that local visitors in Edirne place greater emphasis on the potential of shopping opportunities to make the city more attractive from a tourism perspective. In İzmir, international visitors appear to associate the success of the destination with more general factors rather than shopping specifically.

With 117 references, expectations was the second most frequent category. The distribution across the four groups was relatively balanced (İzmir– International 31, İzmir–Local 21, Edirne–Local 34, Edirne– International 31). This indicates that expectations are a shared theme for both international and local visitors in the context of shopping tourism. The particularly high value for the Edirne–Local group suggests that residents have clearly defined expectations regarding shopping tourism.

Problems had the highest number of references at 126. This shows that the most frequently mentioned dimension in shopping tourism pertains to problems encountered. The distribution was balanced across groups (İzmir– International 32, İzmir–Local 26, Edirne–Local 34, Edirne– International 34), indicating that both local and international visitors commonly highlight problems, pointing to this as a key area that needs to be addressed for sustainable shopping tourism development.

CONCLUSION and IMPLICATIONS

A total of eight countries has geographical boundaries with Türkiye. Shopping tourism occurs on the borders of Greece and Bulgaria in the west of Türkiye and on the borders of Georgia and Iran in the east. This study aimed to expand shopping as an asset to tourism for the regions of Izmir and Edirne. The current state of shopping tourism in both locations and what could be done to improve it was discussed.

Figure 15. Code cloud

In the analysis, the most emphasized code in the "Türkiye's place in shopping tourism" category was "reasonable prices". Similarly, in the studies of Timothy and Butler (1995), it was emphasized that low product prices create an attraction for shopping tourism. Since Bulgaria and Greece are European Union countries, their price levels are higher than those of Türkiye. The high price levels have turned the citizens of these countries into shopping tourists for border countries.

In the contribution to the destination category, the most emphasized code by both buyer and seller participants was "economic contribution". The development of shopping tourism travel packages was recommended for economic contribution to the destination due to the significant foreign exchange revenues obtained from tourism (Saayman & Saayman, 2012; Wu, Li, &Song, 2012). Timothy and Butler (1995) emphasized that cross-border shopping increased profits. The 'expectations' category indicates that the sellers would primarily like to increase their sales; therefore, they want the number of tourists to increase. It has been determined that one of the biggest challenges facing sellers is economic problems, such as rents and expenses. The intense economic problems after the Türkiye pandemic affected local people's expenditure levels. Thus, shopping tourism has become an important market for local producers.

In the category of making the shopping tourism destination successful, it was observed that the participants especially focused on the problem of trust in shopping, price instability, and the sellers' barrier to foreign languages. The participants prioritized reasonable prices, service quality, trust, and quality products in the expectations theme. Swanson and Horridge (2006) revealed that perceived shopping characteristics such as aesthetics, uniqueness, location, promotion, and sales partners affected the travel motivations of shopping tourists. To increase the attractiveness of shopping areas for tourists, Jansen-Verbeke (1991) proposed specific criteria such as clustering of a wide variety of shops, food and beverage, entertainment and other activities and attractions in a particular area; good accessibility and parking, pedestrian priority over vehicles, a positive image, attractive design (aesthetics) accessibility at leisure (e.g. on Sundays), hospitality (visitor orientation, adequate information, identification of symbolism), social-emotional value and liveliness or animations with surprises.

In the Expectations category, it was determined that the seller participants primarily wanted to increase sales and anticipate an increase in tourists. In the category of Problems, the main issues that tourists emphasized as problems were the foreign language barriers of the sellers, their negative behaviour, and price instability. In the study examining the complaints of tourists about the Grand Bazaar in Istanbul, Türkiye's largest tourist market, complaints about high prices, poor quality and counterfeit products, negative behaviour of sellers, and crowding became prominent (Erşahin and Demirkol 2020). Obviously, supervision and training are required to solve these highlighted problems, so the cooperation of public and non-governmental organizations is necessary.

It was observed that the main problems of the sellers were economic, namely rents and expenses. Due to the nature of shopping tourism, it can be considered natural that the most used word cloud was economic contribution and reasonable-affordable price.

Shopping tourism's economic contributions are well-documented, but a broader perspective encompassing planning, policy, sustainability, and socio-cultural outcomes also warrants attention. Henderson et al. (2011), in their study on Singapore, demonstrate that

effective shopping tourism requires not only retail development but also state support, spatial organization, and integration into national tourism policy. Similarly, Tosun et al. (2007) emphasize that the success of shopping destinations depends on comprehensive planning, reliable information provision, and visitor security, rather than economic factors alone. From a sustainability perspective, Saayman and Saayman (2012) highlight the potential of shopping tourism to enhance not just economic but also socio-cultural sustainability in developing regions. Wu, Li, and Song (2012) further argue that shopping-related consumption can stabilize tourism economies against fluctuations, provided it is embedded within long-term policy frameworks.

The socio-cultural impacts of shopping tourism are equally significant. Swanson and Horridge (2006) show that the aesthetics, authenticity, and symbolic meanings embedded in shopping experiences shape tourists' identities and motivations. Yu and Littrell (2005) find that handicraft shopping, in particular, contributes to cultural sustainability and reinforces local identity. In addition, Eroğlu, Machleit, and Barr (2005) demonstrate how spatial crowding influences not only satisfaction but also the use and perception of local spaces, underlining the importance of spatial practices in shaping tourist experiences. In this light, shopping tourism emerges as more than a simple economic activity: it is also a vehicle for identity formation, cultural heritage preservation, and the re-functionalization of urban public spaces. Therefore, future planning should integrate shopping tourism into broader tourism development strategies, with policies that simultaneously target economic benefits, cultural sustainability, and local community well-being.

Sectoral İmplications

It could be seen that shopping tourism destinations that have developed spontaneously due to economic conditions are not ready for shopping tourism, and no plans have been made for this situation in Edirne and Izmir. The historical Kemeraltı Bazaar in Izmir is more suitable for tourist shopping than Edirne. Since Izmir is a port city, it has been open to foreign trade and is an important destination for local and foreign tourists. For this reason, tradesmen in Izmir are more successful in hosting tourists, as well as in product variety, quality, and attractiveness. There is a need for planning in Edirne regarding shopping venues, products, additional services, and foreign language education. In this respect, the joint efforts of local governments and non-governmental organizations are important.

It was determined that the participants generally believed that shopping tourism would solve the seasonal tourism problem. It was identified that shopping tourism takes place all year round. Thus, density in destinations continues at the same level. If tourism destinations could also be shopping tourism destinations, seasonality problems could be reduced. Izmir is a tourist destination for culture, history, faith, fairs, congresses, cruises, cities, and holidays (sea, sand, sun) for both domestic and foreign tourists, while Edirne is a historical tourism destination for domestic tourists. With shopping tourism, both destinations will be able to host tourists throughout the year.

The results of the study showed that the participants had problems with trust, price instability, and foreign language issues. Based on this result, businesses can be trained on ethical values, determining the right price policy, and foreign languages to adopt a higher-quality service approach. Creating shopping destinations in regions with shopping tourism potential is recommended through joint efforts between local authorities and the government.

Limitations and Future Research Agenda

Only two Turkish cities where cross-border shopping tourism is common, Izmir and Edirne, are included in this study. As a result, its conclusions cannot be applied to other nations with comparable dynamics or to all areas of Türkiye. The study used a qualitative approach, which limited the capacity to draw more general statistical conclusions but permitted in-depth insights. To improve generalizability, future studies can use a mixed-method approach that blends extensive quantitative data with qualitative insights.

The emphasis on just one stakeholder group per city is another drawback. Future research could improve the analysis by incorporating additional stakeholders, such as tourism organizations, NGOs, or local governments. To give a more global perspective, future research might also look at the comparative dynamics of shopping tourism in Türkiye and its neighbors. Researchers could also look into how the expectations and experiences of shopping tourists are impacted by digitalization, mobile payments, or e-commerce platforms. Additionally, future research that examines participants in shopping tourism from a demographic perspective may offer more individualized results; therefore, studies focusing on demographic factors such as age, occupation, and experience could be conducted.

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Bibliometric Analysis of Performance Measurement in Digital Supply Chains

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ABSTRACT

Performance measurement is crucial for digital supply chains to stay competitive and optimize operations. Digital supply chains are more complex and involve global operations compared to traditional ones. This study identifies current research gaps and highlights the need for further scholarly investigation into performance measurement in digital supply chains. Despite the importance of the topic, bibliometric analysis using VOS Viewer reveals a lack of studies in this area. The research also suggests potential directions for future exploration and aims to contribute to the existing literature on the understanding and application of performance measurement in digital supply chains.

Keywords: Digitalization; Supply Chain Management, Performance Measurement, Bibliometric Analysis, VOS viewer.

JEL Classification Codes: M11, 033

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INTRODUCTION

Performance measurement make a difference business accomplishing productivity, viability, and competitiveness in their supply chain operations (Zekhnini et al., 2021). Performance measurement permits businesses to screen different angles of the digital supply chain (DSC), for example, arrange preparing times, stock levels, and shipping costs. By checking these measurements, organizations can distinguish inefficiencies/bottlenecks and empower them to create data-driven choices to kill squandering by optimizing the supply chain (Brau et al., 2023). Also, Performance measurement in DSCs permits companies to track conveyance times and arrange precision and item accessibility (Ye et al., 2022). Moreover, DSCs create endless sums of information, and performance measurement gives real-time perceivability into organizations' operations.

Observing supply chain performance (SCP) in DSCs is essential for businesses to identify cost-saving opportunities. With precise performance measurement, companies can analyze information on transportation, stock carrying costs, and provider measurement to recognize ranges where they can diminish costs without compromising quality (Brau et al., 2023). Also, performance measurement makes a difference in identifying vulnerabilities and potential dangers within the supply chain, permitting businesses to execute hazard moderation techniques and increment supply chain flexibility (Zekhnini et al., 2021). Performance measurement in businesses incorporates handling checking and guarantees persistent advancement. In outline, performance measurement has numerous benefits for DSCs.

The issue of performance measurement in DSCs may be a subject that's too inquired about within the writing and gives distinctive points of view. With the effect of digitalization, assessing supply chain measurement is more comprehensive than conventional measurements. However, it is done more comprehensively and dynamically through data analytics, artificial intelligence (AI), and other digital tools. In this setting, different research studies, in expansion to measuring variables such as straightforwardness, speed, adaptability, and proficiency within the supply chain, offer diverse approaches to how digital innovations can be coordinated into measurement assessments. These differences provide analysts with diverse perspectives to better understand the dimensions of DSCs and to develop performance measurement criteria suited to continuously evolving technologies. Also, the significance of performance measurement in DSCs has expanded altogether, particularly after the widespread COVID-19. The pandemic has caused critical disturbances

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and instabilities in supply chains, highlighting the requirement for supply chain supervisors to set up more adaptable and strong frameworks (Ye et al.., 2022). In this setting, digital advances play an essential part in checking the measurement of supply chains in genuine time, responding rapidly in times of emergency, and minimizing dangers. Therefore, in the post-pandemic era, improved approaches and tools for performance measurement of DSCs are essential to increase operational efficiencies, make supply chain networks more robust, and prepare better against future uncertainties.

Although performance measurement has been an ongoing issue for years, since DSCs are a concept that has emerged recently, they differ from traditional supply chains in the issue of performance measurement. Therefore, this study provides an understanding of performance measurement in DSCs, thereby expanding both practical and theoretical knowledge. Hence, this study aims to conduct a detailed literature review to examine performance measurement studies in DSCs and to reveal the research gap.

First, a literature review of performance measurement in DSCs is provided. Then, the research methodology is explained in detail in Section 3. Then, implementation and results are given. Future research trends are discussed in Section 5, and a conclusion is provided.

LITERATURE REVIEW OF PERFORMANCE MEASUREMENT in DSCS

As mentioned, many studies on performance measurement in traditional supply chains exist. Be that as it may, with globalization and quick advancements in digital technologies (DT), supply chains have gotten more complex and delicate. Supply chains have become dynamic frameworks that work locally and universally, including numerous stakeholders and information streams. This change has driven the insufficiency of conventional strategies in performance measurement and the need to create unused, more modern approaches. At the same time, companies have begun to receive the DSC concept and hones to ensure the resiliency of their supply chains and survive within the competitive environment.

Worldwide emergencies, particularly the widespread COVID-19, have emphasized the significance of advanced advances to guarantee supply chains' versatility and survival within the competitive environment. Companies have started to embrace the advanced supply chain concept and hones to extend operational effectiveness, minimize dangers, and make their supply chains more adaptable and resilient. DSCs give focal points such as real-time execution observing, proactive decision-making, and quick adjustment by advertising coordinates frameworks bolstered by information analytics, fake insights, and robotization. These modern approaches not only increment the effectiveness of supply chains but also empower businesses to pick up a competitive advantage and be more resilient in times of emergency.

When the studies in the literature are examined, literature review studies on performance measurement in DSCs come first (Büyüközkan & Göçer, 2018; Rasool et al.., 2022; Zekhnini et al.., 2021; Ageron et al.., 2020). When primary studies, such as those of Büyüközkan and Göçer (2018), are examined, fundamental limitations and expectations in the DSC are defined, and research gaps in the literature are identified. Ageron et al. (2020) conducted a literature review examining current developments, research opportunities, and challenges in DSC management. Rasool et al. (2022) conducted a detailed literature study to understand current practices in DSCs and reveal research gaps.

In addition to systematic literature evaluations, numerous studies have been discovered to identify the variables influencing DSC performance or to establish the connection between digitalization and performance. Among the applications made, there are methods such as the structural equation model (Choudhury et al.., 2021), exploratory factor analysis (Ye et al.., 2022), case study (Liu et al.., 2022), multi-criteria decision-making techniques (Mubarik and Khan, 2024), survey (Sharma et al., 2022). If the studies are examined chronologically, Ukko et al. (2020) studied the basic relational mechanisms of performance measurement in DSCs. AlMulhim (2021) examined the connection between business performance and smart supply chains. Fernando and colleagues (2021) study aimed to investigate the connection between DSC performance and business-based intelligent operations.

Saryatmo and Sukhotu (2021) aimed to investigate the impact of the DSC's operational performance on quality, productivity, and cost reduction. Similarly, Sharma et al. (2022) surveyed to investigate whether DSC networks affect sustainability performance in manufacturing companies. Liu et al. (2022) aimed to investigate the factors affecting smart supply chain innovation performance and provide technology recommendations to improve smart SCP. As a result of the multiple case analysis, it was found that the cost of technology implementation affects the performance of smart supply chains. It has been revealed that improvements at the management level will also improve the performance of smart supply chains.

Ye et al., in 2022, aimed to investigate whether firms with digital technology asset allocation achieved better SCP during COVID-19 than firms with lower levels. Lee (2022) surveyed to determine the relationship between DSC, SCP, and organizational performance. This research revealed that the independent variables of the DSC (digitalization, supply chain management, and technology implementation) positively affect organizational performance.

Shahadat et al. (2023) surveyed to explore the potential of DTs to increase SCP. Moreover, Lee and colleagues (2024) paid Particular attention to operational performance in relation to the function of smart technologies. The findings showed that smart technologies fully mediate the relationship between performance and digital transformation, emphasizing the need for manufacturing companies to focus on supply chain integration of smart technology to enhance operational performance.

As mentioned before, although performance measurement in DSCs is a relatively new topic, this field has serious research potential. Therefore, identifying the common points in these studies is likely helpful as a reference for future research. In this context, bibliometric analysis was carried out for performance measurement in DSCs.

RESEARCH METHODOLOGY

A thorough literature review was conducted to investigate the studies on DSCs in the literature. This literature review, which was carried out in WOS and SCOPUS databases, covers the 2020-2024 period, when the importance of DSCs increased, especially after COVID-19, and the research volume in this field expanded. Starting from 2020, the pandemic has led to the acceleration of digital transformation and the emergence of new performance measurement methods in DSCs, making the literature in these periods particularly valuable. Therefore, studies conducted in 2020 provide up-to-date and critical information in evaluating the performance of DSCs.

In the implementation phase of the study, as shown in Figure 1, searches were carried out in WOS and SCOPUS databases in accordance with the keywords presented in the next section. The literature review resulted in results regarding "number of articles by years, "categorization by document types," and "categorization by subject areas."

The VOS Viewer program performed bibliometric analysis in the next stage. Bibliometric analysis provides a systematic examination of data in academic literature and thus guides understanding of scientific developments, trends, and relationships (Arruda et al., 2022). This type of analysis is usually performed using software such as VOS Viewer. VOS viewer is a particularly effective tool for visualizing relationships between scientific articles, authors, and keywords (Kumar et al., 2024). The software visualizes data using network graphs, clustering methods, and time series, making it easy to identify important connections and trends in research areas (Arruda et al., 2022). For example, relationships between keywords in the literature and collaborations between authors can be revealed through VOS viewer. Lastly, future research directions on performance measurement in DSCs are suggested based on the results obtained.

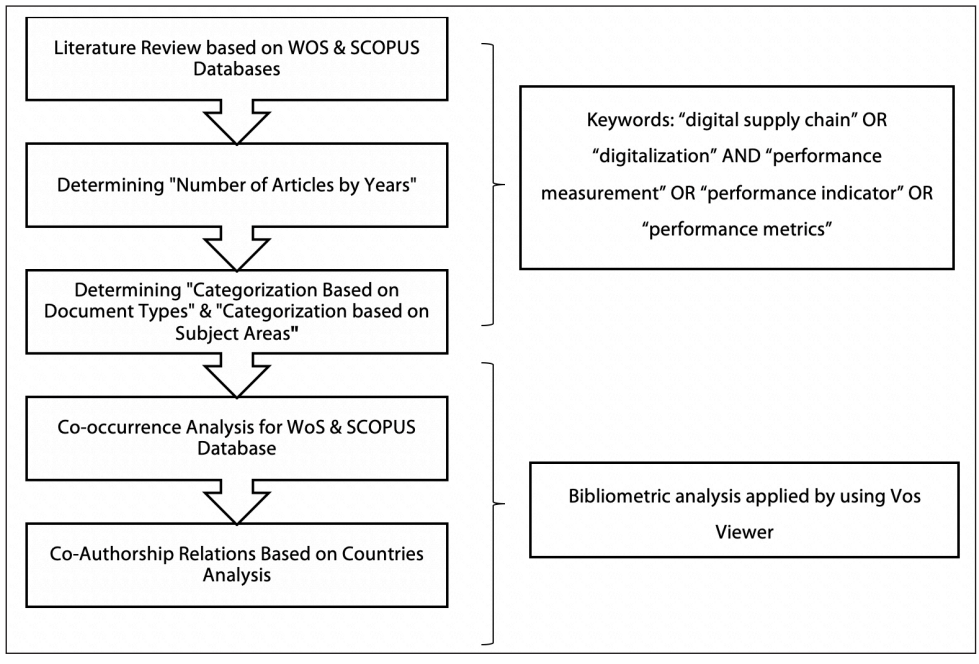

Figure 1. Flow of Research Methodology

IMPLEMENTATION and RESULTS of the CURRENT RESEARCH TRENDS

The keywords were determined as "digital supply chain" OR "digitalization" AND "performance measurement" OR "performance indicator" OR "performance metric." Studies conducted in English were scanned using the title, abstract, and keywords. 308 studies were found in the SCOPUS database and 16 in the Web of Science database. Duplications that emerged when two databases were compared were eliminated. After eliminating duplications, 318 studies were found, including WOS and SCOPUS databases. The distribution of these studies by years is shown in Figure 2.

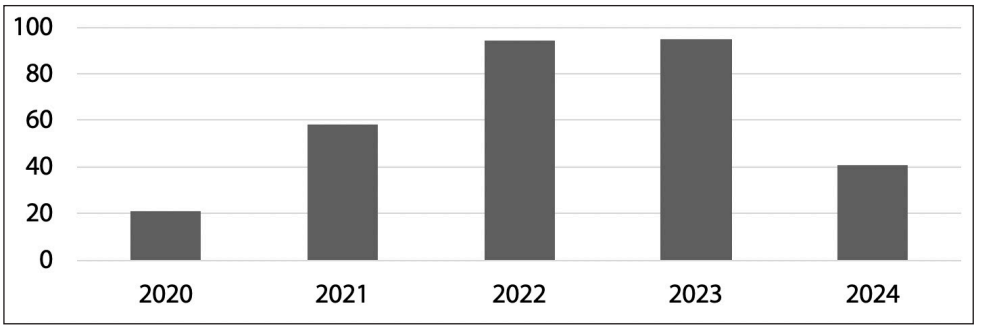

Figure 2. Number of Studies Conducted on Performance Measurement in DSC by Years

When the type of studies conducted as a result of the literature review were examined, it was seen that studies in the form of papers, articles, review articles, book chapters, early editions, et al. (technical notes, letters to the editor) were conducted for WOS and SCOPUS databases (Figure 3).

In addition, when the field of studies on this subject is considered, it is seen that most studies are in engineering, second in business, management, accounting, and finance, and third in computer science (Figure 4). The remaining areas of work are environmental science, social sciences, management science, decision sciences, mathematics, operations research, and other (telecommunications, arts, biotechnology, applied microbiology, energy fuels, information science, library science, music, optics, transportation, chemistry, physics, materials science).

As mentioned before, bibliometric analysis is a method that involves quantitatively measuring and evaluating academic publications. This analysis aims to provide information about scientific research's prevalence, impact, and trends. VOS viewer is software used to perform such analyses and was used in this study. The Vos viewer map illustrated in Figure 5 was generated using 20 of the most significant co-occurrences selected from the 1006 keywords identified across the 318 studies. Table 1 shows 12 keywords with occurrences and total link strengths.

This map shows keywords as circles, and colors indicate clusters representing closely related items (Arruda et

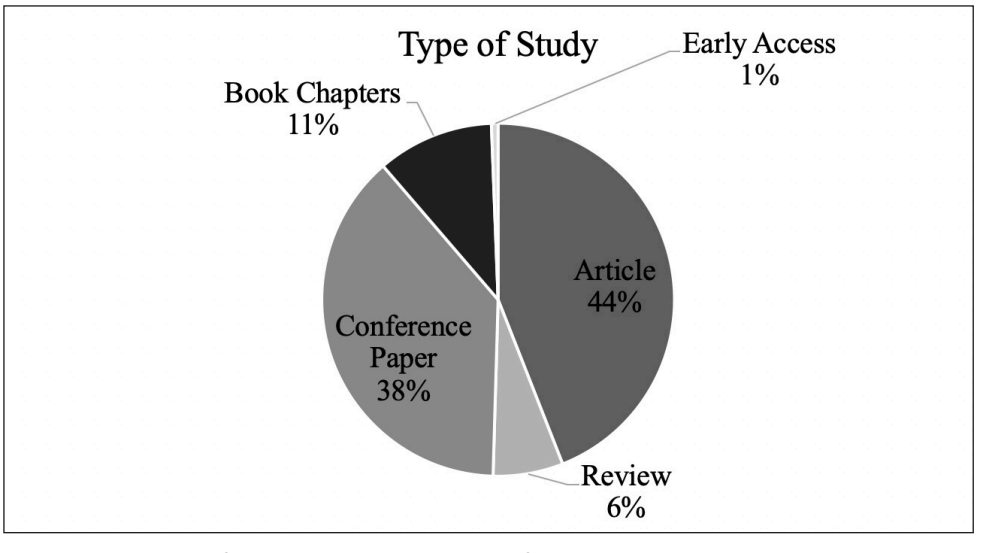

Figure 3. Types of Studies Conducted on Performance Measurement in DSC

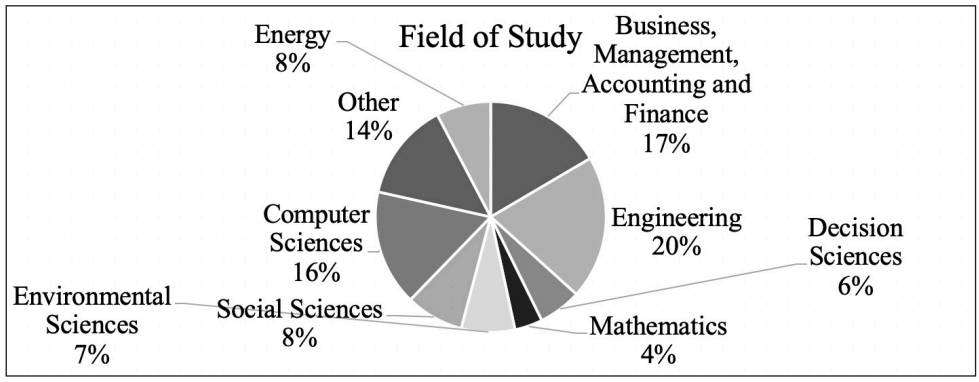

Figure 4. Areas of Studies Conducted on Performance Measurement in DSC

Table 1. Occurrences and Total Link Strengths of Selected Keywords

Keywords	Occurrences	Total Link Strength
Digitalization	69	44
Industry 4.0	31	21
Performance Measurement	23	19
Artificial Intelligence	10	15
Digital Transformation	14	13
Sustainability	11	10
Machine Learning	11	9
Efficiency	8	7
Automation	5	6
Performance Indicators	7	7
Reliability	6	5
Internet of Things	5	3

al., 2022). The size of each circle reflects the keyword's weight, while the lines between the circles show their interrelationships. The closeness of the circles to each other indicates the strength of these relationships (Kumar et al., 2024).

As shown in Figure 5, keywords are separated into five clusters: red, blue, green, yellow, and purple. The weakest cluster is purple, with one item. The crowded clusters are green and red, with three items of each. Moreover, the strongest cluster is green.

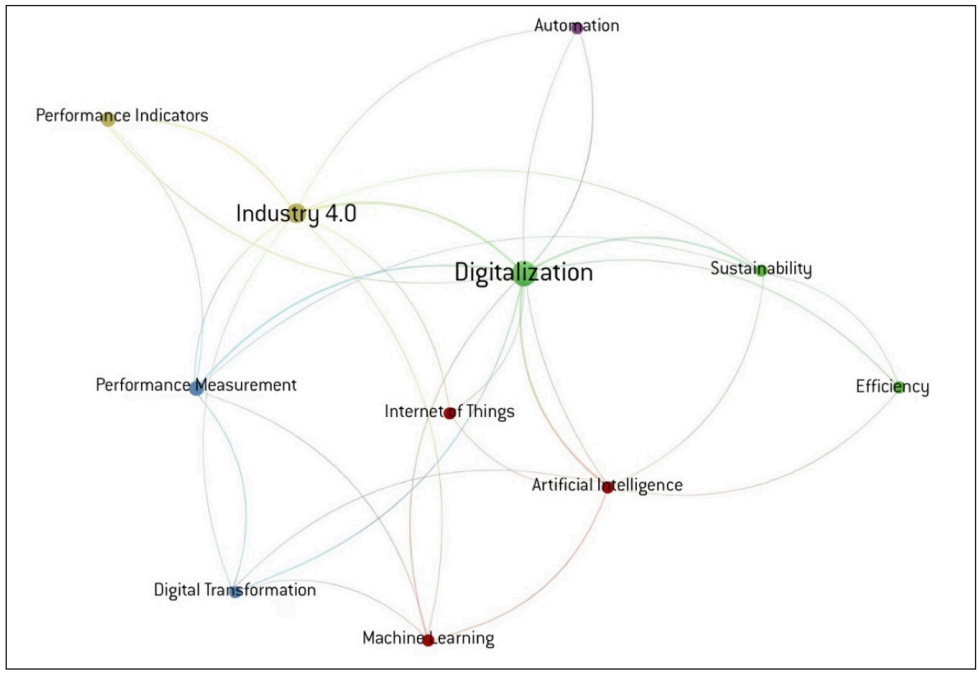

Figure 5. Co-occurrence Analysis for Selected Keywords

By considering each cluster, the purple cluster consists of an "automation" item, and it is directly related to "Industry 4.0" and "digitalization." Moreover, the blue cluster covers "performance measurement" and is directly related to "performance indicators," "digitalization," "Industry 4.0", "machine learning," "sustainability," and "digital transformation." Secondly, in the blue cluster, the "digital transformation" item is related to "machine learning," "digitalization," "Industry 4.0", "artificial intelligence," and "performance measurement."

The yellow cluster comprises "performance indicators" and "Industry 4.0" items. These items generally relate to digitalization and DTs: the Internet of Things (IoT), machine learning, etc. Moreover, the red cluster covers DTs and tools like machine learning, AI, and the IoT. They are directly related to the digitalization process. Lastly, the green cluster is the strongest with the highest interactions' "digitalization" item. This cluster has critical links to performance measurement under the digitalization process.

When considering the co-authorship relations based on countries, organized in a way that there are 10 studies and 10 citations per country, 12 countries out of 82 countries have conducted joint studies on the specific subject of the study.

As shown in Figure 6, the Russian Federation has the most significant number of papers about this issue. Then, Germany, Italy, India, and the United Kingdom followed the Russian Federation. Moreover, according to the number of citations, the order is reorganized: India, Italy, United Kingdom, Germany, etc. However, according to the total link strength, Germany has more links for collaboration with other countries.

The data obtained show that since performance measurement and digitalization have become extremely important worldwide and almost every country has an opinion on this issue, it is a subject that provides excellent opportunities for joint work between countries. However, when the studies conducted in recent years are examined, performance measurement issues in DSCs should be given more importance, both in terms of the number of studies and the content of the studies. The subsequent section explores potential future research directions derived from these findings.

DISCUSSIONS & CONCLUSION

Recently, the rapid development of DTs and the increasing complexity of supply chains have increased the importance of performance measurement. Effective performance measurement systems are needed for companies to gain competitive advantage, maximize operational efficiency, and meet customer expectations. With the concept of DSCs, traditional chains have been left in the background, and DSCs have started to include more complex operations. This has also led to the emergence of performance measurement. To ensure sustainability in a competitive environment, companies

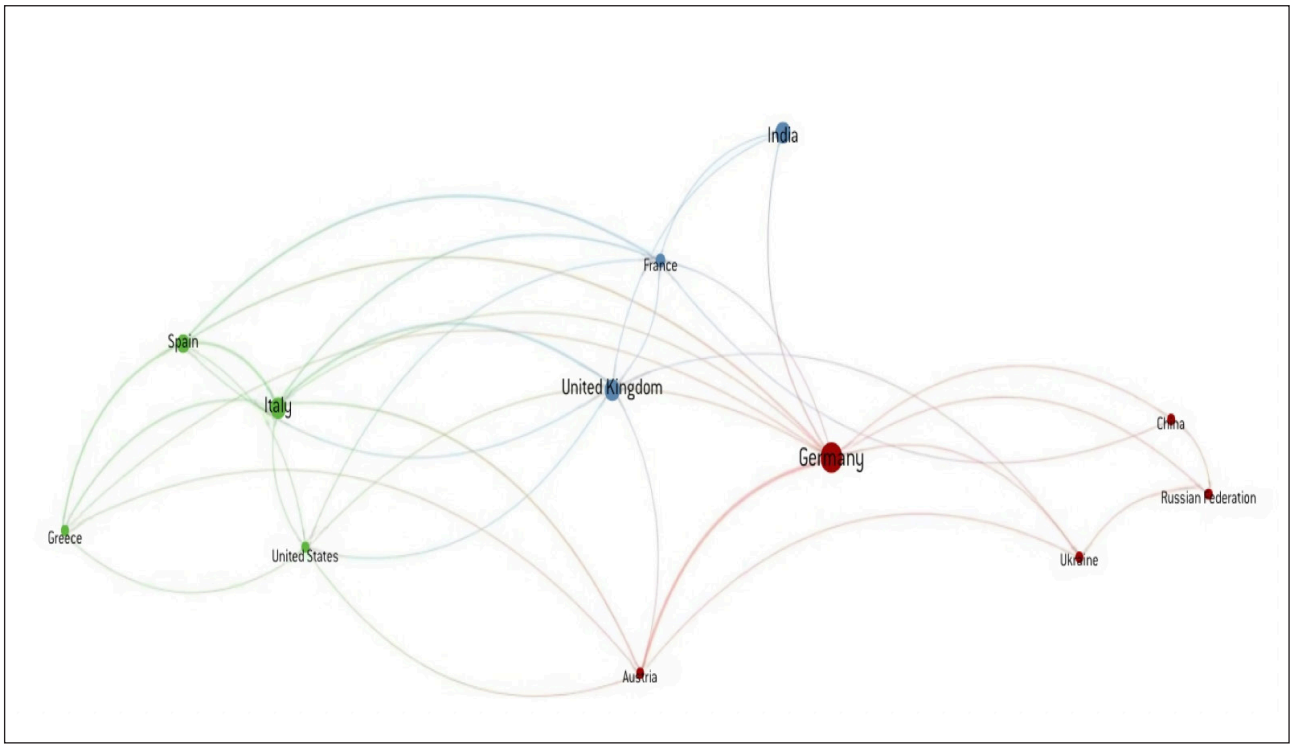

Figure 6. Co-Authorship Relations Based on Countries

must progress in performance measurement in DSCs.

In this context, studies in the literature emphasize the importance of performance measurement in terms of DSCs. For example, Büyüközkan and Göçer (2024) emphasize that performance measurement is essential for DSCs. Similarly, Gopal et al. (2024) argue that digital technology and tools can create a domino effect on SCP. In addition, Dixit et al. (2024) state that performance measurement plays a critical role in overcoming the challenges in DSCs. However, this study goes a step further by identifying significant gaps, such as the lack of in-depth research on the impacts of DTs like AI and data analytics on performance measurement, a point also emphasized by Gopal et al. (2024) and Dixit et al. (2024). In other words, although DSCs and especially performance measurement in these processes are critical, the lack of detailed studies in this area is striking. Therefore, it aims to reveal the need for academic studies on performance measurement in DSCs by revealing research gaps. As a result of the bibliometric analysis carried out with Vos Viewer, it has been revealed that the subject is vital, but the studies conducted are limited. In addition, when the content of the studies conducted is examined, new research areas are suggested for future studies.

As a research gap, when the studies on performance measurement in DSCs are examined, it is observed that there are no studies in the current literature that deeply examine the effects of DTs and the deficiencies in the detailed connections of these studies with the supply chain; this gap requires further research to understand the effects of technologies such as data analytics and AI on performance measurement, especially in DSCs. In addition, there needs to be more information on global perspectives and the resilience of DSCs during crisis periods, indicating the need for more comprehensive studies in these areas. Finally, more comprehensive analyses of the effectiveness and accuracy of performance measurement metrics are important to improve existing methods and obtain more accurate results.

In detail, some critical future research areas are suggested as follows:

Impacts of DTs: Studies need to be conducted that examine the impacts of DTs on supply chains in depth. In particular, the impacts of data analytics, artificial intelligence, and other digital tools on performance measurement have yet to be sufficiently investigated. This disparity shows that more in-depth study is required to comprehend how DTs affect supply chains' overall performance, adaptability, and efficiency. For instance, greater details are required on how artificial intelligence boosts supply chains' predictive capabilities or how data analytics enhances decision-making procedures.

Shortcomings in Supply Chain Connections: Existing studies have failed to adequately detail the connections of DTs with various components of supply chains. More in-depth analyses are required to understand the impacts of DTs on different stages and functions of supply chains. In specific, more research is vital on the connections between different stages of the supply chain and digital interactions in these stages.

Global Perspectives and Crisis Periods: Limited information is available on the resilience of DSCs during crises on a global scale. For example, larger and more comprehensive studies should be conducted to understand better the impact of major global crises, such as pandemics, on the resilience and flexibility of DSCs. Such analyses can reveal how supply chains are managed during crises and what role DTs play in these processes.

Performance Measurement Metrics: More extensive analyses should be conducted on the effectiveness and accuracy of performance measurement metrics. Developing more effective and reliable performance measurement methods requires detailed evaluations of the adequacy and accuracy of existing metrics. This may require new metrics or revisions of existing metrics to more accurately evaluate and improve the performance of supply chains.

In addition to this, to enhance the practical relevance of the study, it is crucial to offer specific policy and practical implications that can guide both policymakers and stakeholders in the implementation of effective performance measurement systems in DSCs. Policymakers can play a pivotal role by encouraging investment in digital technologies such as AI and data analytics, which are essential for improving the adaptability and efficiency of supply chains. Governments can also foster public-private partnerships to facilitate the exchange of knowledge and best practices in integrating these technologies. Additionally, policies that promote the standardization of performance measurement metrics across industries can ensure a more cohesive and accurate evaluation of DSCs globally. From a business perspective, organizations should focus on adopting

and continuously refining performance measurement tools that capture real-time data across all stages of the supply chain, enabling better decision-making and crisis management. Businesses can also benefit from engaging in cross-sector collaborations to address challenges such as global disruptions and supply chain resilience. By aligning policy efforts with business practices, stakeholders can build more robust, flexible, and sustainable DSCs that are equipped to thrive in a rapidly evolving digital landscape.

In summary, DSC performance metrics must be considered, a holistic view must be addressed, and potential gaps must be analyzed to understand them. Furthermore, aligning various DTs and tools involved in performance measurement in DSCs is extremely important. This study aims to broaden the business perspective and conduct a study that can provide insights into related literature.

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Marketing and Social Media Management in Healthcare: A Bibliometric Analysis (2015-2024)

Faruk YILMAZ[1]

ABSTRACT

This study presents a bibliometric analysis of peer-reviewed articles from the Web of Science (2015–2024) to examine the evolution of marketing and social media management in healthcare. Three search strategies "topic-based", "title-focused", and "Türkiye-specific" identify publication trends, collaboration networks, and thematic shifts. Results indicate a 16.44% annual growth in publications, driven by digital transformation and pandemic-related studies. The United States, the United Kingdom, and China lead in research output, while Türkiye, despite ranking among the top 20 contributors and increasing its academic engagement, shows limited international collaboration (6.5%). Topic-based searches emphasize "social media," "COVID-19," and "public health," while refined searches highlight "marketing," "branding," "health communication," and "patient satisfaction." "Twitter," "Facebook," and "YouTube" play key roles in patient engagement and information dissemination. By mapping thematic shifts, this study uncovers global trends, regional collaborations, and also includes a country-level perspective by examining Türkiye as a case example, underscoring the evolving role of social media and communication strategies in healthcare marketing.

Keywords: Healthcare Marketing, Social Media, Bibliometric Analysis.

JEL Classification Codes: I11, M31, M37

Referencing Style: APA 6

INTRODUCTION

The digital transformation of healthcare has revolutionized the delivery and promotion of health services, integrating advanced communication technologies to enhance patient engagement, institutional branding, and service accessibility (Djakeli, 2023; Usuemerai et al., 2024; Senyapar, 2024). Digital marketing and social media platforms such as Facebook, Twitter, Instagram, YouTube, and LinkedIn have become indispensable in shaping patient-provider interactions, improving public health awareness, and fostering institutional trust (Moorhead et al., 2013; Ventola, 2014; Gupta, Tyagi & Sharma, 2024). These platforms not only enable real-time communication but also serve as critical tools for managing health misinformation, enhancing patient education, maintaining reputational integrity, and fostering trust in healthcare systems (Patrick, Venkatesh & Stukus, 2022; Senyapar, 2024; Tang, Ren & Zhang, 2018).

Beyond their direct role in health communication, these platforms now function as continuous feedback mechanisms, allowing healthcare organizations to collect and analyze patient opinions in real time. This capability helps institutions identify emerging needs, refine service delivery models, and align their marketing strategies with evolving public expectations (Gupta, Tyagi & Sharma, 2024). As a result, digital presence has transitioned from being a supplementary communication tool to a fundamental determinant of competitiveness in healthcare markets. Moreover, the capacity to track and interpret patient engagement data has accelerated the shift toward evidence-based marketing approaches, enabling targeted interventions that enhance both satisfaction and loyalty without increasing operational complexity (Patrick, Venkatesh & Stukus, 2022).

Despite the increasing academic interest in healthcare marketing and social media, a comprehensive bibliometric analysis mapping its scholarly evolution remains scarce. Existing studies predominantly examine how social media influences public health initiatives and campaigns (Dash et al., 2023), patient decision-making processes (Benetoli, Chen & Aslani, 2018), and digital marketing strategies (Sohel, Farzana, Rashid & Ali, 2024), yet they often lack a systematic assessment of global publication trends, citation networks, and emerging research themes.

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This study addresses the identified gap through a bibliometric analysis of healthcare marketing and social media management literature (2015–2024) from the Web of Science database. The period was deliberately selected, as scholarship in this field expanded considerably after 2015, whereas earlier research remained relatively limited and dispersed. Three search strategies were employed: (1) a comprehensive topic-based query (titles, abstracts, keywords), (2) a title-focused refinement to prioritize core contributions, and (3) a country-specific filter to assess Türkiye's regional research focus. While the first two strategies provide a comprehensive overview of global research patterns, the Türkiye-specific search was included as a secondary analysis to illustrate how a single country's contributions align with, or diverge from, broader global trends. By methodically analyzing publication trends, collaboration networks, and thematic shifts, this study highlights the evolving role of marketing and social media management in healthcare delivery. The analysis provides a foundation for developing evidence-based digital engagement strategies and offers actionable insights for researchers, practitioners, and policymakers navigating the ethical and operational complexities of digital healthcare.

CONCEPTUAL BACKGROUND

The Evolution of Marketing and Social Media in Healthcare

The integration of marketing principles and social media into healthcare is a transformative response to the digital age. Over the past two decades, social media platforms—initially designed for social interaction—have evolved into critical tools for health promotion, health communication, patient engagement, and institutional branding (Moorhead et al., 2013; Musso et al., 2020; Senyapar, 2024). This shift reflects broader societal changes, where digital interactions now shape patient expectations, health literacy, and trust in healthcare systems (Ventola, 2014; Musso et al., 2020; Tang et al., 2018).

Recent analyses highlight that this transformation has not been uniform across regions or healthcare systems. High-income countries frequently adopt social media to reinforce brand identity, disseminate research outputs, and strengthen corporate communication, whereas developing regions often focus on fundamental awareness campaigns and low-cost health promotion initiatives (Senyapar, 2024; Djakeli, 2023). This variation underscores the necessity of developing digital strategies adapted to local needs, avoiding uniform solutions that may not suit all settings. Furthermore, the ability of institutions to adapt to changing technological trends has become a significant factor determining their effectiveness in engaging diverse populations and ensuring equitable access to information.

Traditional healthcare marketing relied on print media, television, and direct outreach. However, the rise of digital platforms has enabled personalized, real-time interactions. For example, Facebook and Twitter are used for targeted health campaigns, while YouTube serves as a hub for patient education (Gough et al., 2017; Neely et al., 2024). The COVID-19 pandemic accelerated this shift, with platforms like Instagram and LinkedIn emerging as key channels for disseminating guidelines and combating misinformation (Farsi, 2021; Cinelli et al., 2020).

The evolution of healthcare marketing through social media is closely linked to related fields. Communication studies show how message framing and audience segmentation influence patient responses, while digital transformation research highlights the technological infrastructure that enables real-time engagement. Health policy perspectives further explain the role of regulation, governance, and ethical oversight in digital healthcare communication. These interdisciplinary links indicate that healthcare marketing should be seen not as a separate area but as a field shaped by technological, behavioral, and policy dynamics (Djakeli, 2023; Musso et al., 2020; Ventola, 2014).

Applications of Social Media in Healthcare Marketing

Social media has emerged as a transformative force in healthcare marketing, enabling institutions to address diverse challenges while fostering patient engagement and institutional credibility (Gupta, Tyagi & Sharma, 2013; Usuemerai et al., 2024; Gupta et al., 2024). Its applications span several key areas, each contributing uniquely to modern healthcare delivery.

One of its primary roles is patient education and empowerment. Platforms like Facebook, Instagram, Reddit, and PatientsLikeMe provide spaces where individuals managing chronic conditions such as diabetes or mental health disorders can share experiences, access evidence-based resources, and find community support (Moorhead et al., 2013; Musso et al., 2020). Additionally, YouTube channels hosted by medical professionals offer instructional videos on various medical procedures and health management strategies, bridging gaps in health literacy and fostering patient autonomy (Neely et al., 2024).

Another critical application is crisis communication, where social media's speed and reach are both an asset and a challenge. During the COVID-19 pandemic, platforms like Twitter and Facebook became essential for disseminating real-time updates on infection rates, vaccine availability, and public health guidelines. However, they also facilitated the spread of misinformation about unproven treatments and conspiracy theories (Patrick et al., 2022; Cinelli et al., 2020). Addressing this challenge requires a combination of technological and educational strategies. AI-powered tools have been increasingly employed to detect and limit the spread of false health information, while media literacy education has been recognized as a crucial component in strengthening public resilience against misinformation. By equipping individuals with critical thinking skills and promoting responsible digital engagement, these initiatives help mitigate the risks associated with misleading content (Washington, 2023). This integrated approach highlights the importance of balancing technological interventions with educational efforts to ensure more effective crisis communication in healthcare.

Beyond its public health applications, social media has become a key tool for building institutional credibility and fostering trust among stakeholders (Chaudhri, Oomen, Pridmore & Joon, 2021). Prominent healthcare systems—including the Johns Hopkins Medicine, Cleveland Clinic, and Mayo Clinic—utilize platforms such as Facebook, Twitter, LinkedIn, TikTok, and Instagram to connect with and engage a wide range of audiences. These platforms serve as channels for showcasing workplace culture, staff achievements, and medical innovations while also fostering collaboration among employees and stakeholders. Additionally, social media is widely used in public health campaigns to increase awareness on issues such as preventive care and health promotion (Dash et al., 2023; Musso et al., 2020). By combining relatable content with evidence-based messaging, healthcare institutions enhance their digital presence, strengthen patient trust, and build long-term community relationships (Djakeli, 2023).

Social media further strengthens healthcare marketing by improving patient adherence through personalized interventions (Usuemerai et al., 2024). For example, mobile apps and platforms like WhatsApp deliver customized medication reminders and lifestyle guidance, directly enhancing treatment compliance and health outcomes (Tabi et al., 2019). Moreover, the dynamic capabilities of social media allow healthcare institutions to respond to evolving demands. During the COVID-19 pandemic, hospitals leveraged social media to rapidly disseminate information on evolving regulations and patient care adaptations, reinforcing its role as an essential communication tool within modern healthcare systems (Lim, 2016; Farsi, 2021). Ethical practices remain central to these efforts, with institutions anonymizing patient data and adhering to privacy regulations like GDPR and HIPAA to maintain public trust (Ventola, 2014; McGraw & Mandl, 2021; İri, 2024).

In summary, social media has become an essential driver of innovation and equity in healthcare, especially in underserved regions (Moorhead et al., 2013). Its role in marketing extends to education, crisis response, and trust-building. However, challenges such as misinformation and ethical concerns require strategic solutions to maximize its potential for patient-centered care (Lim, 2016; Jeyaraman et al., 2023).

METHODOLOGY

The methodological design centers on a bibliometric approach, structured to capture publication trends, collaboration patterns, and thematic shifts within healthcare marketing and social media research. It focuses on identifying key trends, influential contributors, and emerging themes to address gaps in the literature and guide future research. Accordingly, the study is designed to explore the following research questions:

- RQ1. How have publication trends and growth rates in marketing and social media management in healthcare research evolved globally between 2015 and 2024?
- RQ2. How do the contributions and collaboration patterns of countries differ across regions?
- RQ3. What are the dominant thematic priorities in marketing and social media management in healthcare, and how have these themes evolved over time?
- RQ4. What distinguishes Türkiye's research contributions in marketing and social media management in healthcare from global trends?

A bibliometric approach was adopted, combining structured search strategies, data validation, and multidimensional analysis.

Data Source and Search Strategies

The Web of Science (WoS) database was selected to ensure a systematic and high-quality selection of

peer-reviewed journal articles. The analysis covered publications from January 1, 2015, to December 31, 2024. The 2015–2024 timeframe was selected because research on healthcare marketing and social media increased significantly during this period, while earlier studies remained relatively limited. To maintain academic rigor, only articles were included, while non-empirical works such as editorials, commentaries, and conference proceedings were excluded. The dataset was refined through a three-stage search strategy, as illustrated in Figure 1.

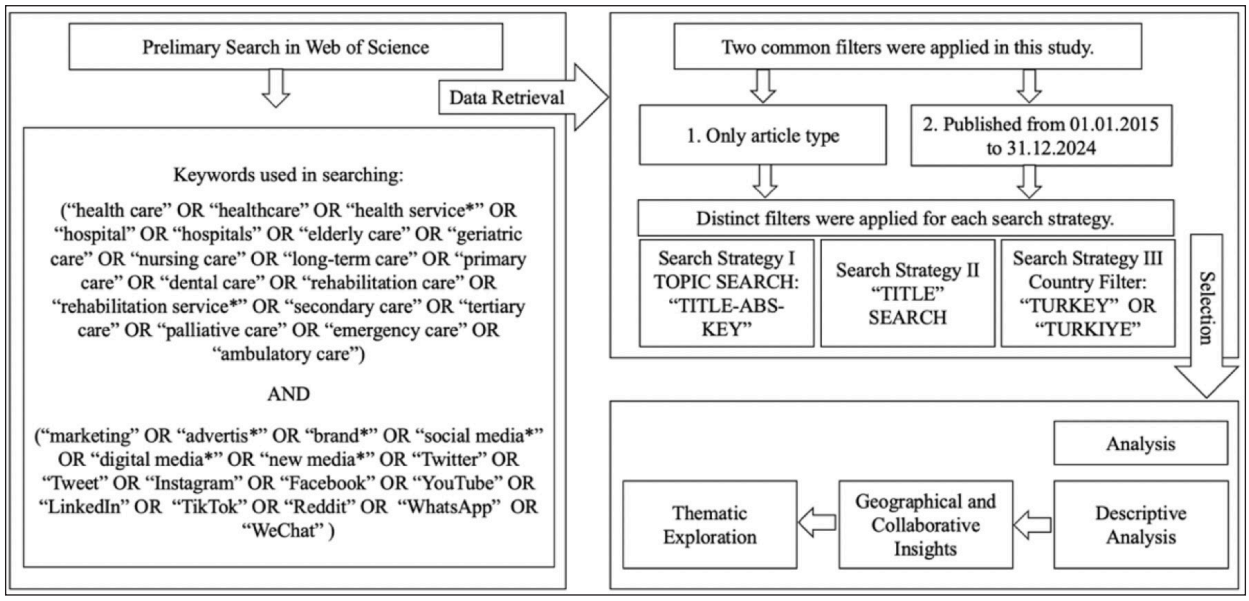

Figure 1: Research Strategy and Study Flowchart

As outlined in Figure 1, a sequential screening process ensured methodological transparency. The first stage (Topic Based Search) involved querying the TITLE-ABS-KEY field in WoS, covering terms related to marketing (e.g., "marketing," "advertis*," "brand*," "social media*," "Twitter," "Youtube") and healthcare (e.g., "healthcare," "health care," "health service*"). Filters for the publication period and document type were applied, yielding an initial dataset of 17,092 articles. The second stage (TITLE SEARCH) improved thematic relevance by limiting the search to the TITLE field, reducing the dataset to 662 articles with a clear research focus. The final stage (Country Filter) refined the first-stage search results by applying the country identifiers "TURKEY" and "TURKIYE," identifying studies specific to Türkiye and resulting in a final dataset of 602 articles.

Data Cleaning and Preprocessing

All metadata fields under WoS's "Custom Selection" tab were exported to ensure comprehensive data extraction. Records were processed in BibTeX format using the Bibliometrix package in RStudio (Aria & Cuccurullo, 2017). To align with the predefined study period (2015–2024), articles assigned a formal publication year of 2025 (despite being indexed as "early access" in 2024) were identified and removed. Additionally, despite initial filtering, non-article document types (e.g., letters, book reviews, editorials, commentaries) that inadvertently passed through the automated WoS filters were manually identified and excluded to ensure dataset purity. Following these steps, the final dataset comprised 16,607 articles in the first stage (Strategy I), 631 articles in the second stage (Strategy II), and 595 articles in the third stage (Strategy III).

Analytical Framework

This study used a multidimensional bibliometric approach to examine the evolution and impact of marketing and social media management in healthcare. The analysis was structured around three key dimensions:

Descriptive Analysis: Publication trends, authorship patterns, and citation metrics were analyzed to map the field's growth and scholarly impact, including annual productivity and collaboration networks.

Geographical and Collaborative Insights: International contributions were examined to identify global and regional trends, with a focus on collaboration dynamics. Co-authorship patterns were analyzed to position Türkiye within the broader research landscape.

Thematic Exploration: Keyword co-occurrence and temporal analyses were used to identify dominant topics and emerging research priorities. Thematic clusters were categorized as core, niche, or evolving trends,

highlighting shifts in focus, such as the rise of digital platforms and the impact of COVID-19.

This study provides a structured overview of the evolution of marketing and social media management in healthcare over the past decade, offering valuable insights for academics and practitioners.

RESULTS

This bibliometric analysis produced three distinct datasets, each corresponding to a different search strategy. These datasets provide unique insights into the evolution of marketing and social media management research in healthcare from 2015 to 2024. The findings highlight notable variations in dataset size, citation metrics, and authorship patterns, demonstrating the influence of search scope on bibliometric outcomes. Table 1 summarizes key descriptive metrics, including document volume, citation impact, and collaboration trends across the three search strategies, offering a comparative perspective on how each approach contributes to understanding research trends.

Table 1. Descriptive Statistics of the Studies Included in the Bibliometric Analysis

Description	Search Strategy I	Search Strategy II	Search Strategy III
Timespan	2015:2024	2015:2024	2015:2024
Sources (journals, books, etc.)	4340	427	407
Number of articles (documents)	16,607	631	595
Annual growth rate	16.44%	11.43%	41.56%
Document's average age	4.16	4.69	3.26
Average citations per document	12.68	11.43	8.63
Total number of references used in the documents	501,865	24,173	16,789
Number of author's keywords	29,338	1,905	1,678
Number of authors	78254	2,609	2,666
Number of authors of the single-authored docs	930	58	43
Number of the co-authors per document	6.24	4.56	5.01
International co-authorships	25.16%	20.13%	15.29%

The results indicate substantial differences in dataset size, citation impact, and collaboration patterns across search strategies. The topic-based search (Search Strategy I) yielded the largest dataset, reflecting the widespread academic interest in marketing and social media within healthcare. The title-only search (Search Strategy II) produced a more focused dataset with a higher average document age (4.69 years), suggesting that studies on healthcare marketing and social media are more established. However, its citation impact (11.43 per document) and international collaboration (20.13%) were moderate. The country-specific search (Search Strategy III) exhibited the highest annual growth rate, underscoring the increasing research focus on healthcare marketing in Türkiye. Additionally, international co-authorship rates varied significantly, with Search Strategy I demonstrating the highest level of global collaboration, highlighting the extensive international engagement in this research area. Figure 2 illustrates the upward trend in healthcare marketing and social media research, as identified through the topic-based search (Search Strategy I) between 2015 and 2024.

The number of publications increased substantially from 657 in 2015 to 2,585 in 2024, indicating a growing academic and professional interest in the field. This steady rise reflects the increasing integration of digital marketing strategies and social media in healthcare. The acceleration in recent years underscores the field's dynamic nature. It highlights the need for continued exploration of emerging trends, evolving research priorities, and their implications for healthcare practice and policy.

An analysis of publication distribution across countries reveals substantial regional and institutional contributions to healthcare marketing and social media research. Figure 3 illustrates how corresponding author countries are distributed in terms of Multiple Country Publications (MCP) and Single Country Publications (SCP). A higher MCP ratio indicates stronger international collaboration, while a predominance of SCPs suggests a more localized research focus.

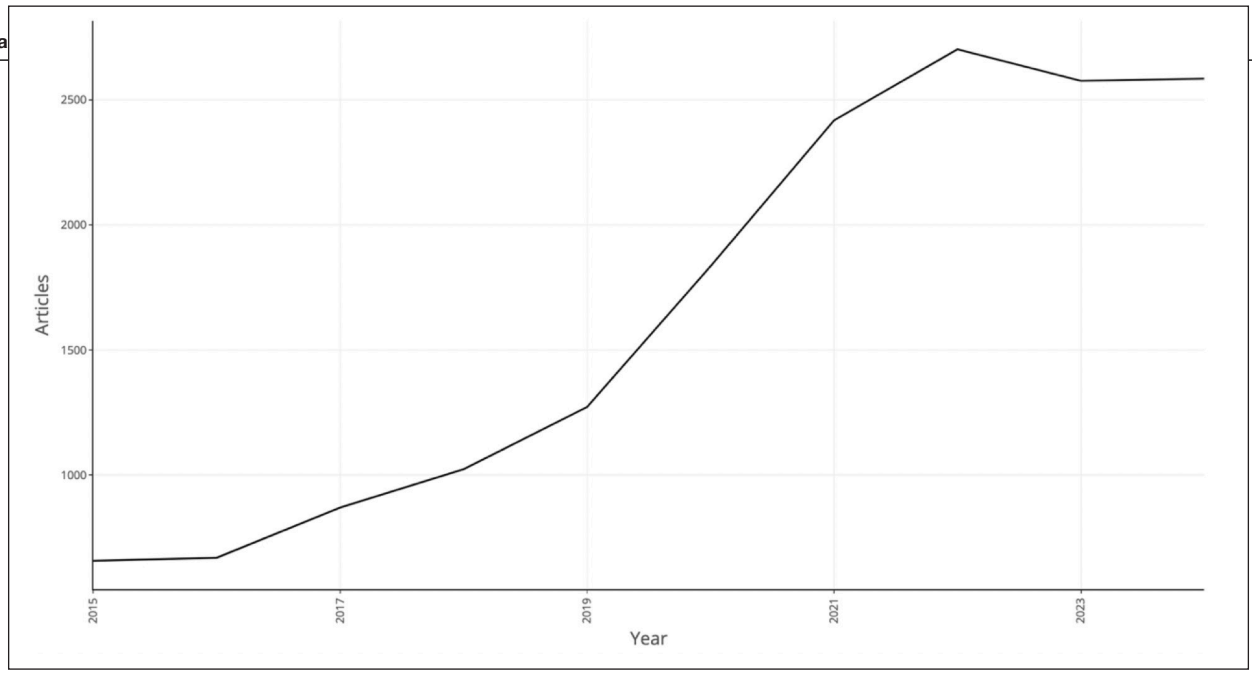

Figure 2: Annual Publication Trends Based on Search Strategy I (2015–2024)

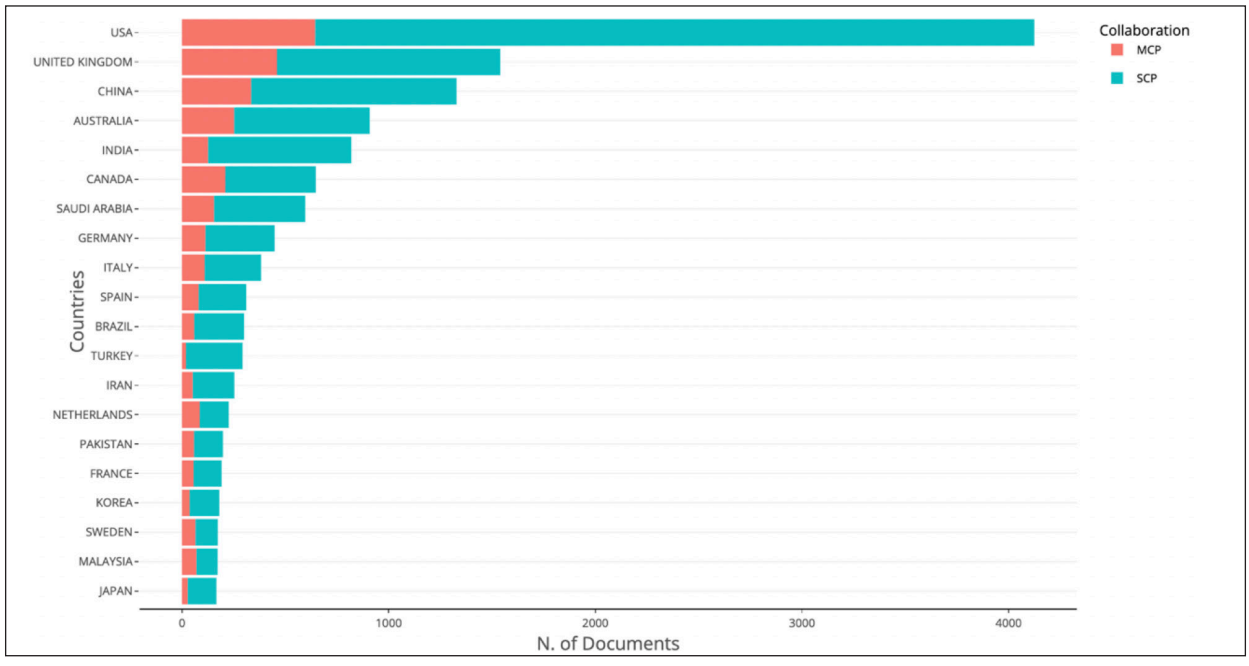

Figure 3: Corresponding Authors' Countries for Search Strategy I

As illustrated in Figure 3, the United States leads by a significant margin, with 4,124 publications, followed by the United Kingdom (1,540), China (1,328), Australia (908), India (819), and Canada (647). These figures highlight strong research engagement in marketing and social media management in healthcare, with notable contributions not only from English-speaking and high-income countries but also from China and India, reflecting their expanding academic influence in this field.

Türkiye ranks among the top 20 countries in publication volume but exhibits the lowest MCP ratio (6.5%) within this group. This suggests relatively limited international collaboration, presenting an opportunity to enhance global partnerships and increase the international impact of Türkiye's contributions to healthcare marketing research. Türkiye was not the primary focus of the analysis, yet its rapid growth rate (41.56%) and limited international collaboration (6.5%) provide a useful case example of how emerging research contexts contribute to, but also diverge from, global patterns.

The analysis further explores global collaboration patterns and thematic distributions in healthcare marketing and social media research. To provide a comprehensive visual representation of the connections between countries, author keywords, and research titles, Figure 4 is presented below.

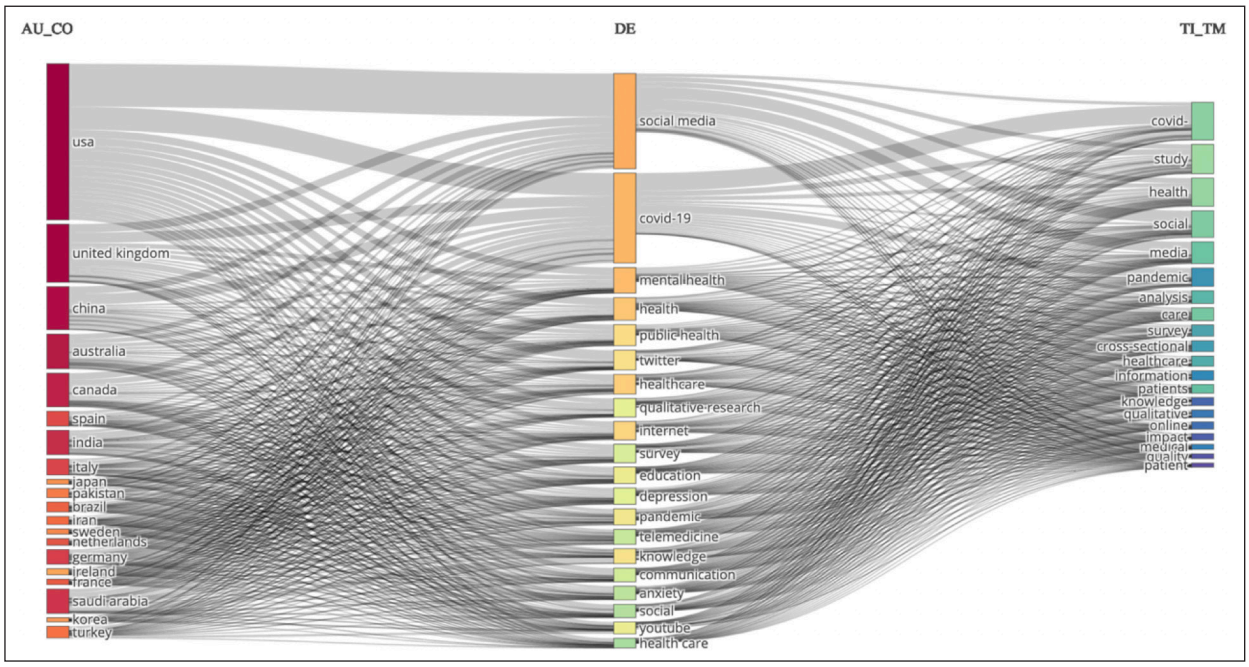

Figure 4: Three-Field Plot of Countries, Keywords, and Titles for Search Strategy I

The visualization highlights the U.S. and the U.K. as key contributors to international collaborations, while other countries exhibit more localized research patterns. Central themes such as social media, COVID-19, mental health, and public health dominate the scholarly discourse, reflecting the increasing role of digital platforms in healthcare communication. The title-based distribution further emphasizes the sector's shift towards patient engagement, evidence-based marketing approaches, and the growing use of online channels to enhance healthcare communication and information dissemination. These findings underscore the importance of strengthening global research networks and leveraging digital tools to improve public health outreach and patient-centered strategies.

To further explore the thematic focus of healthcare marketing and social media research across different search strategies, the following word cloud visualization provides a comparative perspective. By analyzing author keywords, we can identify the dominant themes that emerge in both broad and more targeted search approaches.

The broad search strategy (left) identifies "social media" (1,948) and "COVID-19" (1,722) as dominant themes, emphasizing the critical role of digital platforms in healthcare. Key topics such as "mental health" (463), "healthcare" (449), and "public health" (368) highlight a strong focus on health services and population well-being. The presence of "internet" (385), "twitter" (368), and "youtube" (303) underscores the influence of online networks in health-related interactions, while "education" (310), "marketing" (196), and "artificial intelligence" (147) reflect the increasing integration of technology in healthcare communication and decision-making.

The refined search (middle) narrows this focus, maintaining "social media" (220) and "healthcare" (60) as central topics while incorporating "marketing" (35), "Twitter" (41), and "Facebook" (28)—indicative of growing interest in digital engagement strategies. The inclusion of "service quality" (16), "patient satisfaction" (15), and "branding" (11) highlights a shift towards healthcare marketing and reputation management. Additionally, "machine learning" (9), "trust" (9), and "misinformation" (7) highlight emerging concerns regarding AI applications and content credibility in health communication.

Figure 5: Word Cloud of Author Keywords for Search Strategies I, II, and III (Left to Right)

The country-specific search (right) further refines this scope, emphasizing "YouTube" (119), "social media" (94), and "COVID-19" (88) while introducing "quality" and "reliability," suggesting a stronger focus on evaluating online health information. The prominence of "anxiety," "depression," and "mental health" underscores research on the psychological impact of digital content, while "patient education," "medical education," and "nursing" highlight the role of online learning in healthcare. Emerging topics such as "vaccine hesitancy," "artificial intelligence," and "ethics" reflect ongoing discussions on public trust and technological advancements in health communication. Overall, broad queries capture global trends, refined searches highlight digital marketing and engagement, and specific queries focus on platform-based content analysis and information credibility. This comparison underscores the evolving role of social media in healthcare communication, shaping trust, education, and public health strategies. Figure 6 further explores these trends over time, revealing shifts in research priorities.

on topics such as 'COVID-19,' 'misinformation,' 'content analysis,' and 'information,' reflecting heightened concerns about health communication and the spread of digital health content. Additionally, the increasing presence of "corporate communication" and "customer satisfaction" suggests a rising interest in institutional reputation management and the evaluation of patient experiences within healthcare marketing. The growing emphasis on analytical approaches highlights the need to critically assess online health interactions, as well as the wider influence of social media on healthcare-related conversations.

To further explore the interconnected themes within healthcare marketing and social media research, the following network visualization illustrates the co-occurrence patterns of author keywords (Figure 7). This provides a deeper understanding of how key concepts are linked, revealing dominant research clusters and emerging interdisciplinary connections.

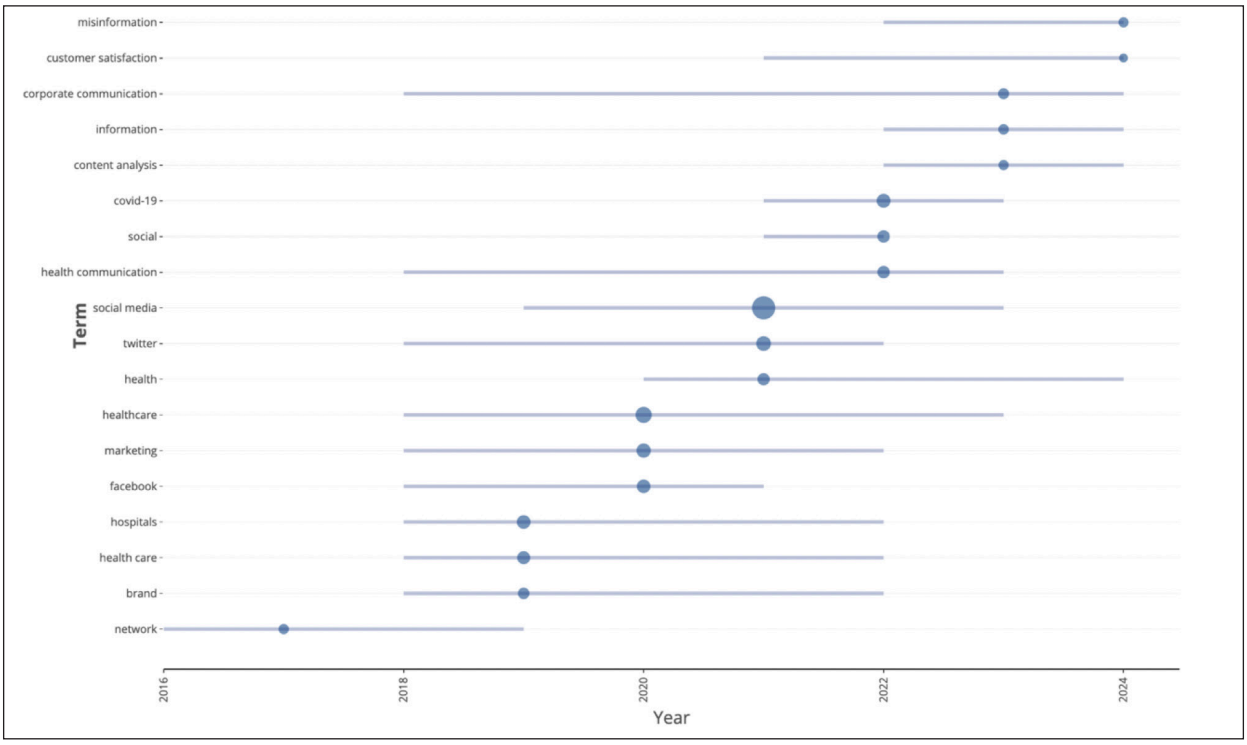

Figure 6: Trend Topics Over the Years Based on Search Strategy II

The evolving research landscape highlights a shift in thematic priorities over time. Earlier studies predominantly explored concepts such as "brand" and "network," while the growing influence of digital platforms led to an increasing focus on topics like "social media," "Facebook," and "Twitter." In recent years, research attention has significantly increased

The network analysis highlights "social media" as the central theme, strongly linked to key topics such as "health communication," "patient satisfaction," "marketing," and "misinformation." These connections highlight the increasing influence of digital platforms on healthcare communication, public perception, and patient engagement.

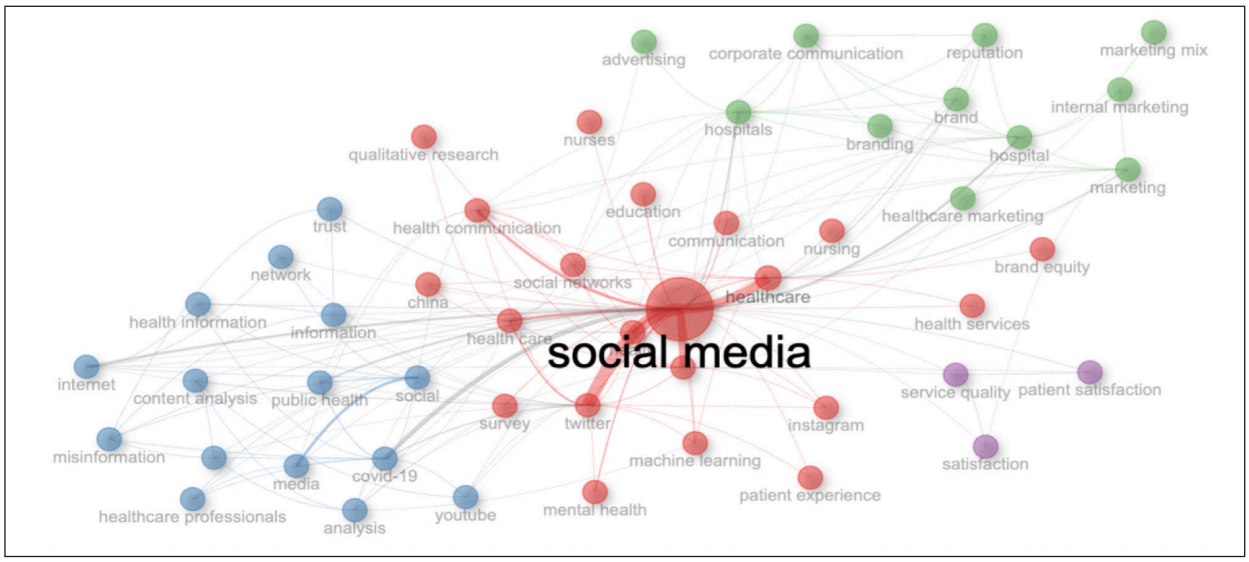

Figure 7: Co-occurrence Networks Based on Author Keywords for Search Strategy II

The analysis reveals distinct thematic clusters, including healthcare communication and nursing, public health and information dissemination, and healthcare marketing and branding. Topics such as "machine learning," "survey," and "qualitative research" suggest a methodological shift, incorporating both data-driven and interpretative approaches to analyze social media interactions in healthcare.

a structured overview of research trends, the following thematic map (Figure 8) categorizes key topics based on their centrality and development.

This thematic map provides a structured analysis of research trends in healthcare marketing and social media, categorizing them by relevance and development. Motor themes such as "COVID-19," "social," "internet," and "trust" emerge as dominant forces shaping the field, reflecting

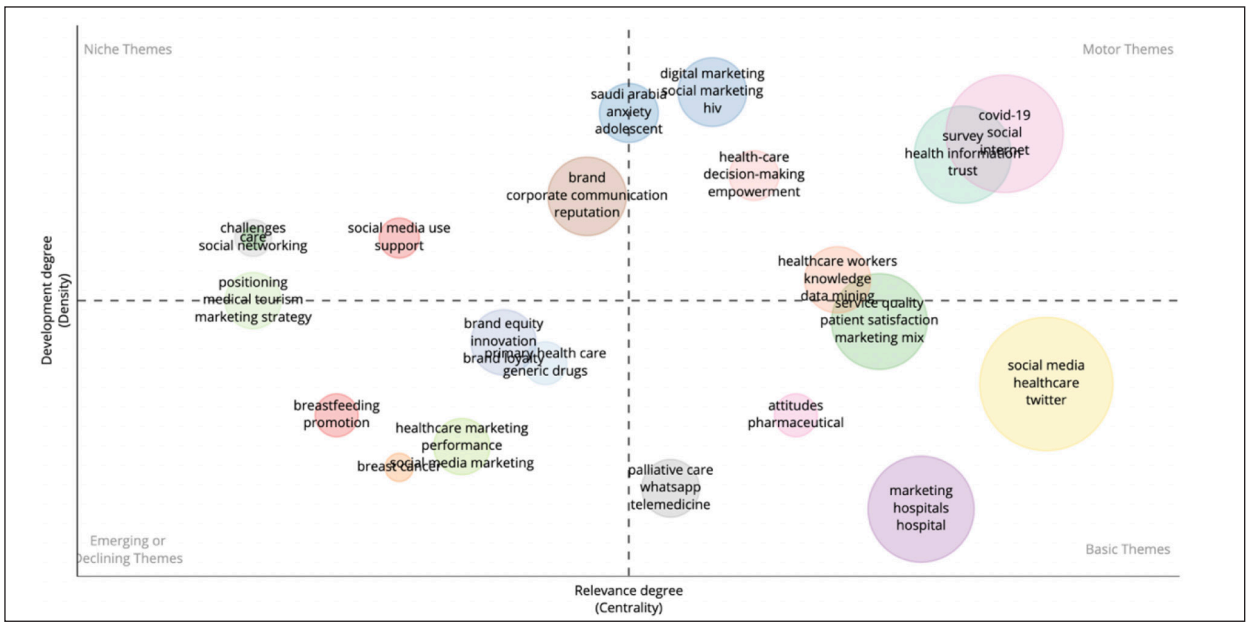

Figure 8: Thematic Map Based on Author Keywords for Search Strategy II

The network structure illustrates the interdisciplinary nature of studies which bring together communication, marketing, and aspects of public trust. These findings highlight the need for further interdisciplinary research to address both the opportunities and challenges within the evolving digital health landscape. To provide

their central role in contemporary healthcare discourse. Basic themes like "social media," "healthcare," "Twitter," "marketing," and "marketing mix" serve as foundational pillars, maintaining their relevance while continuing to evolve. Niche themes, including "brand," "corporate

communication," "reputation," "social media use," and "support," highlight specialized but well-developed topics, emphasizing the role of branding, reputation management, and digital engagement strategies in healthcare marketing. Notably, concepts such as "healthcare marketing," "social media marketing," and "brand equity" appear as emerging themes, indicating growing research interest in these areas. This classification underscores the dynamic and interdisciplinary nature of healthcare marketing research, emphasizing the growing impact of digital platforms and the necessity for continued exploration of evolving trends.

As research in healthcare marketing and social media continues to evolve, distinct thematic shifts have emerged over time. Analyzing trends across different periods provides valuable insights into how research priorities have developed, highlighting both the emergence of new focal areas and the persistence of core topics. Figure 9 presents a thematic evaluation based on author keywords, offering a structured perspective on the field's progression.

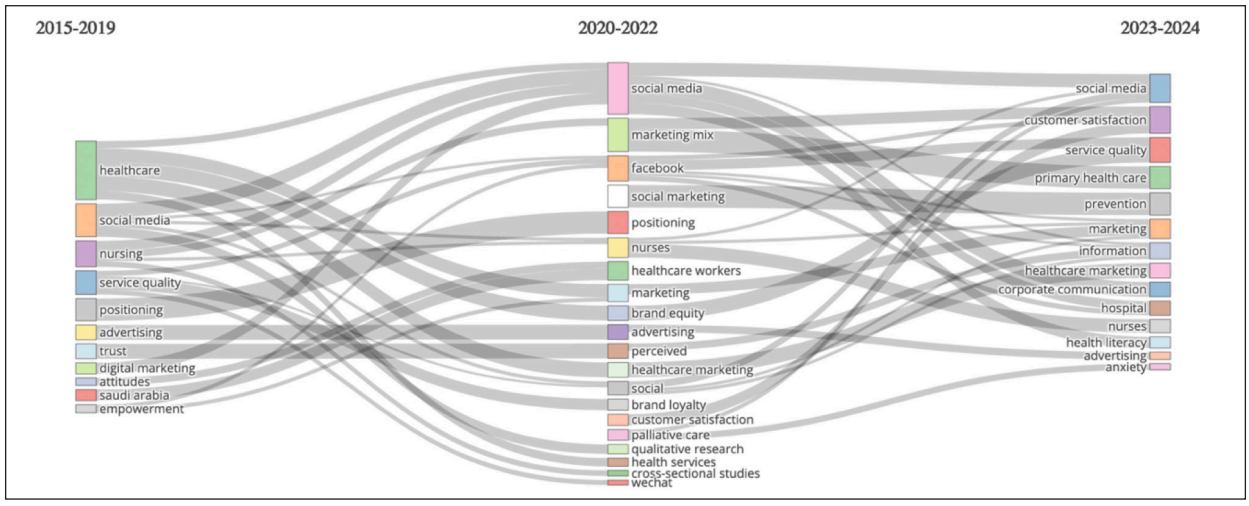

Figure 9: Thematic Evaluation by Periods Based on Author Keywords for Search Strategy II

Between 2015 and 2019, studies predominantly focused on foundational topics such as "social media," "healthcare," "advertising," and "digital marketing," alongside themes related to "service quality" and "positioning." In the subsequent period (2020–2022), the growing influence of "social marketing," "marketing mix," and "brand equity" reflected an increasing emphasis on digital engagement, strategic branding, and consumer perception in healthcare. By 2023–2024, themes such as "social media," "marketing," and "information" gained prominence, underscoring the deeper integration of digital platforms into healthcare communication and branding strategies. Additionally, "customer satisfaction" reflects a heightened focus on patient experience and service quality in digital healthcare, particularly in the post-COVID-19 period. The continued presence and evolution of "social media" and "marketing" across these phases underscore their central role in shaping digital health discourse and consumer engagement.

While global research trends offer a broad perspective on thematic shifts, analyzing them at the country level provides deeper insights into the sociocultural, economic, and policy-driven factors shaping research priorities. Türkiye, with its rapidly evolving healthcare system and digital transformation, has developed a distinct research focus at the intersection of social media and healthcare marketing. To explore these localized research patterns, Figure 10 presents a thematic map of studies conducted in Türkiye, categorizing dominant, emerging, and specialized themes that define the country's research landscape.

Figure 10 presents a structured thematic analysis of Türkiye's research landscape in marketing and social media within healthcare, highlighting key thematic clusters. Basic themes such as "COVID-19," "social media," "marketing," "advertising," "deep learning," and "machine learning" reflect a focus on data-driven strategies in healthcare marketing. These themes highlight the role of technology in patient engagement and brand positioning. Motor themes, including "artificial intelligence," and "ChatGPT," underscore the growing integration of AI-driven tools in healthcare communication and content evaluation. Niche themes such as "loyalty," "patient satisfaction," and "trust" highlight the importance of

consumer perceptions and service quality in shaping digital healthcare strategies. Additionally, emerging or declining themes like "complementary and alternative medicine" and "medical tourism" suggest evolving research interests influenced by healthcare policies and market dynamics. This thematic distribution shows how Türkiye's research landscape aligns with global trends while addressing region-specific challenges.

a more comprehensive mapping of healthcare marketing and social media research. By employing diverse bibliometric techniques, this analysis not only complements previous studies but also contributes a comprehensive outlook on the evolution of this research area. Furthermore, this study underscores how methodological choices influence bibliometric outcomes, reinforcing the importance of rigor in

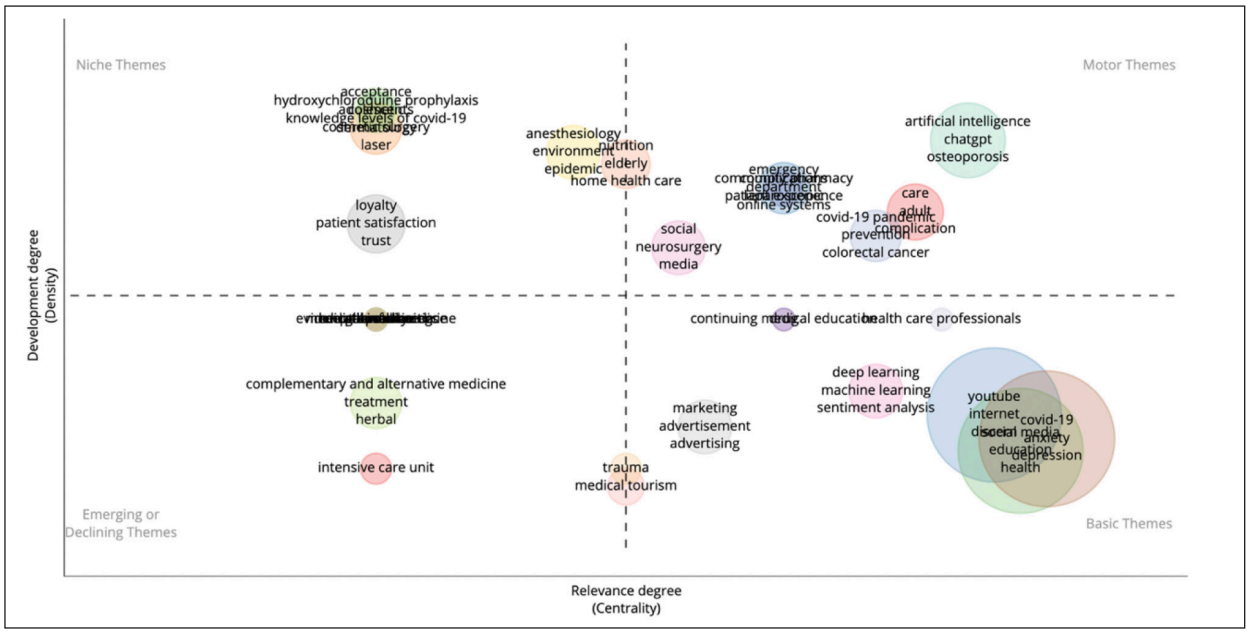

Figure 10: Thematic Map Based on Author Keywords for Search Strategy III

DISCUSSION AND CONCLUSION

This study utilizes a bibliometric approach to examine the development of healthcare marketing and social media research over the past decade, highlighting key publication trends, collaboration networks, and thematic priorities. Previous studies, such as those by Shrestha, Ferreira & Galti (2019), Rosidayani & Aini (2024), and Rościszewski, Stępień & Berniak-Woźny, (2024), have made contributions to understanding the role of social media in healthcare. Shrestha et al. (2019) highlight the opportunities and challenges of social media in healthcare communication, emphasizing the importance of reliable information dissemination. Similarly, Rosidayani & Aini (2024) provide valuable insights into hospital social media marketing, illustrating its growing significance in healthcare promotion. Rościszewski et al. (2024) further contribute by exploring primary healthcare marketing, identifying key research gaps in this area.

Building on these important findings, this study adopts a broader methodological approach by integrating three distinct search strategies, enabling research synthesis and offering a framework for future investigations.

The sharp increase in publications (657 in 2015 to 2,585 in 2024) highlights the growing influence of digital platforms in healthcare marketing and social media-driven communication. This pattern reflects the global shift toward patient-centered care, where social media serves as a critical bridge for enhancing health literacy, shaping public perceptions, and increasing institutional accessibility (Musso et al., 2020; Washington et al., 2023; Moorhead et al., 2013). Similarly, Dash et al. (2023) examined the role of social media in public health development through a bibliometric approach, emphasizing its significance in disseminating health-related information and influencing public engagement. At the same time, the predominance of COVID-19-related keywords (e.g., "misinformation," "content analysis") suggests that recent research has been largely shaped by pandemic-focused studies (Cinelli et al., 2020; Washington et al., 2023). While pandemic-related research has deepened our understanding of real-time health communication and social media engagement, it may have drawn attention

away from ongoing structural issues such as healthcare disparities in rural areas and the long-term effectiveness of digital health initiatives—concerns previously noted in the literature (Farsi, 2021; Jeyaraman et al., 2023). These findings emphasize the need for a more balanced research agenda that addresses both immediate crises and long-term challenges in healthcare marketing and social media engagement.

Several limitations should be noted. First, the analysis covers only the 2015–2024 period, excluding earlier works that may provide historical context. Second, reliance on the Web of Science database alone may have omitted relevant publications indexed elsewhere, such as Scopus or PubMed. Third, the application of bibliometric techniques exclusively, while valuable for mapping scholarly structures, limits the depth of interpretative insights. These constraints highlight opportunities for future research, including extending the timeframe, integrating multiple databases, and combining bibliometrics with surveys, interviews, or cross-country comparisons.

The analysis of collaboration patterns further reveals structural disparities in global research output. High-income countries continue to lead in both publication volume and international partnerships, whereas countries like Türkiye—despite being among the top 20 in research productivity—have relatively low global collaboration rates (6.5% MCP ratio). Nevertheless, Türkiye's remarkable annual growth rate (41.56%) underscores the growing scholarly focus on healthcare marketing and social media research, reflecting the field's dynamic evolution and expanding academic engagement (Ilgun & Ugurluoglu, 2019; Gumus, 2022). Although Türkiye was analyzed only as a secondary case, its rapid publication growth and relatively low collaboration levels exemplify how national research systems in emerging contexts both reflect and diverge from global trends. Such secondary perspectives enrich our understanding of broader global dynamics. To promote greater inclusivity in global research, policies should encourage cross-border collaboration and facilitate the integration of emerging economies into international research networks.

Shifts in research themes further illustrate the evolution of the field. While early research often examined the functionality of specific platforms, including widely used networks such as Facebook and Twitter, more recent research has centered on issues such as trust, corporate communication, and patient satisfaction (Gomes & Coustasse, 2015; Nabi, Zohora & Misbauddin, 2023). The increasing focus on "service quality" and "brand equity" reflects the growing role of digital tools in shaping patient-provider relationships and managing institutional reputation (Al-Hasan, 2024; Chaudhri et al., 2021, Senyapar, 2024).

The findings also reveal interdisciplinary implications. Patient attitudes and behaviors influence online interactions with healthcare professionals, highlighting the behavioral dimension of digital engagement (Benetoli, Chen & Aslani, 2018). Marketing studies underscore the importance of measuring patient perceptions and participation to strengthen loyalty, reflecting the value of data-driven approaches (Gumus, 2022). Governance considerations, including privacy, regulation, and ethics, further emphasize institutional accountability in digital health communication (McGraw & Mandl, 2021). Together, these insights demonstrate the interdisciplinary relevance of healthcare marketing research, integrating behavioral, analytical, and policy perspectives.

In addition to these findings, the broader implications of this study highlight the strategic importance of embedding digital literacy and organizational agility into healthcare marketing practices. As patients increasingly rely on online platforms for health-related decision-making, healthcare providers must move beyond viewing social media as a promotional channel and instead treat it as an integrated component of care delivery (Ventola, 2014). Developing responsive strategies that combine technological innovation with ethical safeguards can enhance the credibility and inclusiveness of healthcare communication (McGraw & Mandl, 2021). For instance, institutions that invest in training staff to manage digital interactions, monitor emerging health discourses, and evaluate the quality of online engagement are better positioned to strengthen trust and loyalty among diverse patient populations. Furthermore, aligning marketing efforts with policy frameworks and international guidelines may reduce disparities between countries with varying levels of digital infrastructure. This calls for a holistic approach in which marketing, communication, and public health perspectives are merged to achieve sustainable improvements in patient education, satisfaction, and long-term health outcomes. Future research could therefore expand on the intersection of digital ethics, cross-cultural engagement, and the integration of artificial intelligence in healthcare marketing, ensuring that digital transformation creates value for patients, professionals, and institutions alike.

Practically, healthcare managers can integrate social media monitoring into quality management, capture patient feedback, and deploy data-driven tools to enhance engagement and loyalty. Training staff in digital literacy ensures effective, responsible online communication. Policymakers should promote ethical digital engagement, safeguard patient data, and foster international collaboration to address disparities in digital health capacity.

In conclusion, this study reveals a marked evolution in healthcare marketing and social media research over the past decade, as reflected by rising publication numbers, changing thematic focuses, and varied international collaboration patterns. By acknowledging its limitations and outlining directions for future research, the analysis provides a roadmap for deepening the conceptual, methodological, and interdisciplinary scope of this field. At the same time, the practical recommendations ensure relevance for healthcare managers and policymakers seeking to align digital transformation with patient-centered, ethically grounded, and globally inclusive healthcare communication strategies.

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