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UNDERSTANDING THE RENEWAL OF VALUE CREATION ACTIVITIES IN AN ENVIRONMENT OF TECHNOLOGICAL TURBULENCES

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ABSTRACT

Purpose- In order to survive, enterprises need to adapt their existing capacities and capabilities to changes in the environment, organize to meet the demands of their stakeholders, and develop sustainable competitive strategies. Because of this necessity, enterprises are trying to make innovations in their value creation constructs. The main purpose of this study is to try to understand the renewal of value creation activities, which has a significant impact on business performance, in an environment of technological turbulences that lead to threats or opportunities for enterprises.

Methodology-This study examines value creation activities within the framework of the concepts of collective commitment between employees and organizational performance in the organization, through a model developed based on the findings in the relevant literature. The study was carried out in Turkey, which is trying to update its existing products and services according to the demands of its customers by using advanced technologies instead of improving technology. The data for the study were collected from the organizations that are involved in research and development activities and benefit from government incentives for this by using a questionnaire created originally.

Findings- According to the analysis, regardless of the lines of business, both collective commitment positively affects the renewal of value creation activities of the enterprise and the renewal of value creation activities positively affects the performance of enterprises. Although technological turbulences in the market strengthen the relationship between collective commitment and renewal of value creation activities in labor-intensive lines of business, this effect was not observed in technology-intensive lines of business.

Conclusion- As a result, it is understood that the perception of environmental factors such as technological turbulences as threats or opportunities and the renewal of value creation activities in enterprises are closely related. The findings of this research conducted in Turkey, which is influenced by both eastern and western cultures, will be important both for businesses operating in Turkey and in similar countries trying to get out of the developing country position.

Keywords: Value creation activities, collective commitment, technology-intensive business lines, labor-intensive business lines, emerging countries
JEL Codes: L20, L21, L25

1. INTRODUCTION

Under current conditions, innovation in products and services alone is no longer sufficient for businesses to cope with global competition. In order to survive, enterprises must also adapt their existing capacities and capabilities to changes in the environment, organize to meet the demands of their stakeholders, and develop sustainable competitive strategies. As a result, they are turning to new searches in terms of competition. These searches emerge as innovations in the value creation logic of enterprises, that is, in business models.

The business model generally describes how a business creates its value proposition, how it distributes the value it creates, and how it captures the value it distributes (Teece, 2010). Accordingly, in the related literature, the business model concept is mostly defined as “the whole of the activities of the enterprises to offer value, create value, distribute and capture the created value” (Amit and Zott, 2001; Bouncken and Fredrich, 2016; Chesbrough, 2010; Chesbrough and Rosenbloom, 2002; Teece, 2010). Although business model innovations are considered as a set of activities, value creation activities stand out as

the most important element in this whole, and researchers have attempted to define business model innovations through the concept of "value creation" (Massa, Tucci and Afuah, 2016; Teece, 2010; Wirtz, Pistoia, Ullrich and Göttel, 2016; Zott and Amit, 2010; Zott, Amit and Massa, 2011). Therefore, in this study, the renewal of the value creation construct, which is one of the most important elements of business model innovation, that is, "renewal of value creation activity", is discussed. In this study, the renewal of value creation activities, which have a significant impact on business performance, is empirically examined with a conceptual model created in the context of technological turbulences. This study will provide input that will clarify the workings of the renewal of value creation activities that are triggered by the opportunities as well as the environmental threats.

The data utilized in the study was collected in Turkey, which is a developing country; and one that has not been studied much in this regard. The bibliometric analysis performed by Klarin (2019) on 1400 articles shows that while businesses in developed countries focus on the use and commercialization of new technologies in different business lines, businesses in developing countries focus on updating their existing products/services by transferring new technologies from developed countries and renewing their value creation activities for their existing customers. In this case, technological turbulences arising from the changes in developed countries drive businesses in developing countries to more market-oriented value creation activities. Many of the businesses operating in Turkey, update their existing products and services according to the demands of their customers by using new technologies from developed countries instead of developing new and disruptive technologies (Klarin, 2019). In other words, they try to gain a sustainable competitive advantage by adapting the technology produced in developed countries in a market-oriented manner. Government incentives have also begun to play a larger role and have contributed to efforts to create a technology-oriented transformation, particularly in the last two decades. Moreover, technoparks and research centers have been established throughout the country to create a technology-oriented value-added product and service ecosystem. Given all of this, it stands to reason that the findings of this study will be important not only for Turkey but also for other developing countries that may share similar conditions or circumstances.

The remainder of this study is organized as follows. The next section introduces the theoretical framework and the development of the hypotheses. In the following section, the scales used in the research are explained and information about the data collection form, sample, and data collection method is given. Afterward, the findings are evaluated. Finally, the importance of the study in terms of related literature is mentioned.

2. THEORETICAL FRAMEWORK AND THE DEVELOPMENT OF THE HYPOTHESES

Today, technological developments belong to the factors that most affect the institutional environment that businesses find themselves in. Technological developments bring both opportunities and threats for enterprises by affecting customer preferences and creating uncertainties in the market (Hung and Chou, 2013; Trimi and Berbegal-Mirabent, 2012). Since the emergence of new technologies, in a sense, changes the rules of the game in terms of sectors, enterprises should determine alternative strategies to technological changes. Specifically, they should manage the value they offer in the best way. In order to achieve this, enterprises are trying to revise their value structures again, that is, innovate in their business models, and as a natural part of this process, they are innovating in value creation activities. Value creation activities can be defined as all of the scope, structure, and governance processes designed to create the innovations that the enterprise will offer (Amit and Zott, 2001).

Radical innovations in the value creation activities of enterprises stem from technological changes (Cooper and Edgett, 2010). While the obsolescence of technologies creates a disadvantage for the enterprise, the use of superior technologies provides new opportunities in terms of business performance and enables enterprises to gain benefits (García-Villaverde, Ruiz-Ortega and Ignacio Canales, 2013). Therefore, enterprises working with new technologies may have a greater chance to achieve new product success through technological innovations. Of course, in order to achieve this, it is necessary to be able to accurately predict and understand the technological changes in the market.

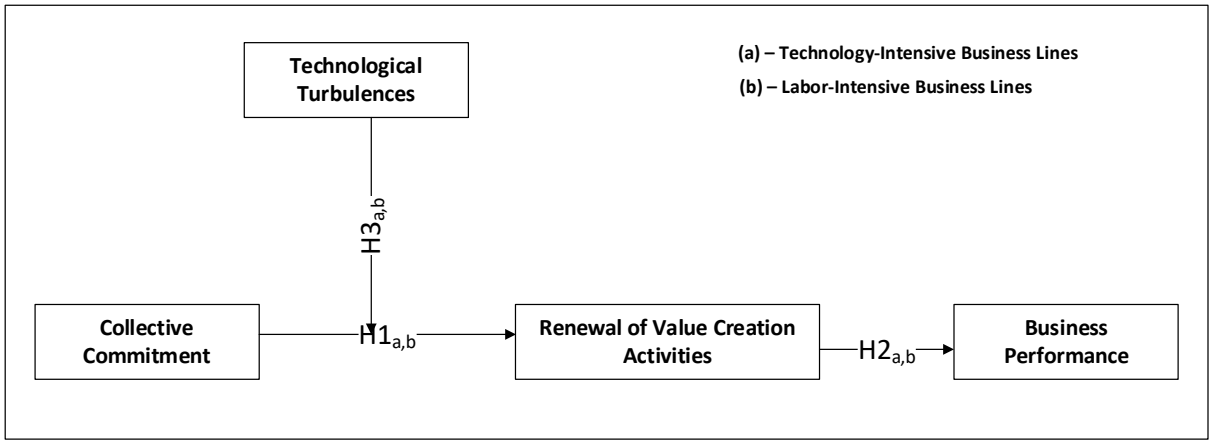
The rate of technological change and the degree of unpredictability in the market are expressed as technological turbulence (Jaworski and Kohli, 1993). As technological turbulences lead to changes in customer demands and market dynamics, rapid changes in technology also make the environment businesses find themselves in turbulent and unpredictable (Augusto and Coelho, 2009; Clauss, Abebe, Tangpong and Hock, 2019). A turbulent technological environment nullifies existing technologies and requires the development of new ones (Armstrong and Shimizu, 2007; Barberis, 2013; Jansen, Van Den Bosch and Volberda, 2006; Jegers, 1991; Saebi, Lien and Foss, 2017). Due to the rapid changes in technology, enterprises must constantly and quickly offer new value proposition to minimize the threat of obsolescence of existing products and services that they offer (Clauss et al., 2019; Jansen et al., 2006; Lumpkin and Dess, 2001). In other words, such an environment also brings with it a shorter cycle of technological innovation and product development (Atuahene-Gima, Li and De Luca, 2006; Chesbrough and Garman, 2009; Song at al., 2005). Businesses need to continuously and quickly update the value they offer to their customers and stakeholders through their products and services in order not to lose their competitiveness (Clauss et al.,

2019; Jansen et al., 2006; Lumpkin and Dess, 2001). In other words, technological turbulences create a moderation effect and bring the need to renew the value creation activities of enterprises (Teece, 2010).

In order to successfully carry out value creation activities in the face of environmental threats such as technological turbulences, it is not enough for enterprises to perceive these threats and take new strategic decisions; they also need to shape their own capabilities against the threats they perceive (Giudice and Maggioni, 2014; Teece, 2007). At the center of this shaping are the employees of the enterprise. In order to successfully renew these value creation activities in complex and dynamic environments where change is high, the decisions taken by top management should be supported and owned by all employees (Aspara, Lamberg, Laukia and Tikkanen, 2013; Chesbrough, 2010; Teece, 2007). In order to achieve this, there must be a mutual dialogue and empathy between the top management and employees within the organization, which is called "collective commitment" (Doz and Kosonen, 2010; Junni, Sarala, Tarba and Weber, 2015). In other words, collective commitment is the existence of "common ground, common interest, empathy and trust" to increase the participation of organizational members (Junni et al., 2015). In order to initiate and maintain business model innovation, and to renew value creation activities in this context, management must create collective commitment among the entire workforce (Doz and Kosonen, 2010). The relationship between management and employees as a result of the collective commitment enables the response to environmental opportunities and threats without internal resistance (Clauss et al., 2019; Doz and Kosonen, 2010; Junni et al., 2015). In other words, there is an important and significant relationship between value creation activities and the existence of collective commitment among all employees. Collective commitment positively affects the renewal of value creation activities. In other words, environmental threats such as technological turbulences positively affect the risk-taking and solidarity behavior of the enterprise (Saebi et al., 2017), leading to the formation of collective commitment between the top management and employees within the enterprise, and the resulting collective commitment is then able to renew the value creation activities of the enterprise by removing it from the status quo (Doz and Kosonen, 2010). In this study, the effects of technological turbulences in terms of the opportunities or threats on the relationship between collective commitment within the enterprise and the renewal of the enterprise's value creation activities they create, as well as how these effects are reflected in the enterprise's performance will be examined.

While we were thinking about these relationships based on the findings in the relevant literature, we were faced with the following question, which is not mentioned much in the related literature, but which we nevertheless think may be of significance: In an environment of technological fluctuation, does the impact of collective commitment on the renewal of value creation activities arise independently of employee profiles within the enterprise? In other words, does this effect differ according to technology-intensive and labor-intensive lines of work, which have different employee profiles? In technology-intensive business lines, it is white-collar workers with higher levels of education and qualifications who are primarily employed. On the other hand, it is blue-collar workers, often with limited levels of education, who are primarily employed in labor-intensive business lines. Although in the academic literature, there were studies showing the moderating effects of environmental factors between the capabilities, activities, and innovation outputs of enterprises (e.g., Tsai and Yang, 2014; Zulu-chisanga and Boso, 2016), we did not come across any comparative studies, quantitative or qualitative, examining the moderating effects of threats and opportunities brought by technological turbulence in the relationship between collective commitment and renewal of value-creation activities in technology-intensive and labor-intensive business lines. Therefore, we think that such a study would be a valuable contribution to the relevant academic literature. The particular effects in question are indicated in Figure 1 as a research model.

Figure 1: The Research Model



The fact that enterprises operate in technology-intensive or labor-intensive business lines does not diminish the importance of the role of employees in the implementation of strategic decisions taken by the top management within the enterprise. Since the realization of such strategic decisions is through the employees, collective commitment becomes important regardless of business line. Therefore, hypotheses $H1_a$ and $H1_b$ are proposed.

$H1_a$: In technology-intensive business lines, collective commitment positively affects the renewal of value creation activities.

$H1_b$: In labor-intensive business lines, collective commitment positively affects the renewal of value creation activities.

Enterprises with high innovation capability have higher performance by developing competitive advantage (Hurley and Hult, 1998). The renewal of value creation activities enables better use of internal and external resources of the enterprise (Chesbrough, 2007). In addition, it enables businesses to renew their value creation activities and offer new values that will meet the needs of their customers and stakeholders (Clauss et al., 2019). In this process, the enterprise gains a sustainable competitive advantage because the value needed by the customers is offered (Chesbrough, 2006). Since the renewal of value creation activities also brings cost optimization to enterprises, the financial performance of the enterprise also increases (Bashir and Verma, 2019). The significant relationship between more competitive value creation activities and business performance has been emphasized by many studies in the relevant literature (e.g., Bashir and Verma, 2019; Chesbrough, 2007; Chesbrough and Rosenbloom, 2002; Clauss et al., 2019; Giesen, Berman, Bell and Blitz, 2007; Huang, Lai, Kao and Chen, 2012; Pohle and Chapman, 2006). Hypotheses $H2_a$ and $H2_b$ have been proposed because enterprises optimize their resources and offer high and competitive value, and the performance increase brought by this competitive value offering.

$H2_a$: The renewal of value creation activities in technology-intensive business lines positively affects business performance.

$H2_b$: The renewal of value creation activities in labor-intensive business lines positively affects business performance

Technological fluctuations create opportunities or threats that will affect the business logic, market competition, profitability and sustainability of the enterprises. In order to seize opportunities and protect themselves from threats, enterprises need to shape their organizational capabilities by renewing their value creation activities (Giudice and Maggioni, 2014; Teece, 2007).At the center of organizational shaping are the employees of the enterprise. Therefore, the differences in employee profiles affect both the threat and opportunity perceptions of the enterprise and the renewal of the shaping process.

Employees in enterprises operating in technology-intensive business lines, due to their education and capability, can closely follow the technological developments and their effects in the business line and perceive the threats and opportunities that technological turbulences bring to the business (Cohen and Levinthal, 1990). Opportunities or threats brought by technological turbulences require employees and top management to work together for the continuation of business activities. Depending on the level of this commitment, enterprises can constantly update their products and services in accordance with the developing and changing technology. Therefore, it is expected that technological turbulences in technology-intensive business lines will have a moderating effect on the relationship between collective commitment and renewal of value creation activities. Due to this expectation, $H3_a$ has been proposed.

$H3_a$: Technological turbulences in technology-intensive business lines have a moderating effect on the relationship between collective commitment and renewal of value creation activities.

In enterprises operating in labor-intensive business lines, adaptation to new technologies is not easy and takes time due to both the cost of the technological infrastructures they use and the qualifications of the employees. When technological turbulence is perceived as an opportunity by the employees of businesses operating in these lines, the developing technology is seen as a means to provide them with a comfort zone. However, when the technological turbulence is perceived as a threat, the employees consider these changes as a factor negatively affecting the sustainability of the business, and compromising their job security. In other words, the threats and opportunities brought by technological turbulences affect both employees and senior management. Therefore, in such cases, both the collective commitment increases and the motivation of all employees to renew their value creation activities in order to seize opportunities or protect themselves from threats between top management and employees. In other words, technological turbulences also have a moderating effect on the existing relationship in labor-intensive business lines. In light of this, $H3_b$ is proposed.

$H3_b$: In labor-intensive business lines, technological turbulences have a moderating effect on the relationship between collective commitment and the renewal of value-creating activities.

As a result, in this study, the moderating effect of technological turbulences on the relationship between collective commitment and renewal of value activities and the effect of renewal in value creation activities on business performance in enterprises operating in technology and labor-intensive business lines are examined.

3. DATA COLLECTION AND RESEARCH METHODOLOGY

3.1. The Development of the Scales and Data Collection Forms

During the development of the scales employed, the scientific expectations were taken into account. (Hair, Howard and Nitzl, 2020; MacKenzie, Podsakoff and Podsakoff, 2011). The constructs in the model were developed in accordance with the findings acquired from a comprehensive literature search, and were later examined by an expert academic, a business development expert and a founder of a company in order to provide content validity. Following the piloting and pre-implementation processes, which were conducted to confirm the validity and the reliability of the scales, a questionnaire was formed.

In the final form of the questionnaire, technological turbulence (TT) section was based on the work of Jaworski and Kohli (1993) and was developed with the inclusion of the contributions of Li and Calantone (1998) and García-Villaverde et. al. (2013). This section of the scale includes three items. The renewal of the value creation activities (RVC) section of the scale was developed with the inclusion of the points made by Teece (2010), Osterwalder and Pigneur (2010), and Johnson (2010), and it comprises of 4 items. The collective commitment (CC) section, which refers to the employee commitment through an active management that provides a strong organizational culture through the inclusion of the employees in the decision making process, was formed to comprise of nine items that were developed based on the contributions of Doz and Kosonen (2008), Achtenhagen, Melin and Naldi (2013), and Hock, Clauss, and Schulz (2016). Business performance (BP) variable, which refers to how the value presented by the businesses is perceived by the customers and how a business compares to its competitors (Day and Wensley, 1998; Morgan, 2012), was developed to include five items based on the contributions of Morgan (2012) and Steigenberger (2014). All constructs were developed to be one dimensional and the definitions used during the development of these constructs were adapted from the aforementioned studies in a way that takes the aim and the coverage of this study (Table 1).

Table 1: Statements about the Constructs in the Model

Constructs /Indicators	Question	Indicators
Renewal of the value creation activities	We've further strengthened our collaborations with our present partners (customer, suppliers etc.)	RVC1
	We've formed new collaborations with parties other than our present partners.	RVC2
	We've optimized our resources and process of customer value creation.	RVC3
	We've acquired new skills and technologies on customer value creation.	RVC4
Collective commitment	All of our employees are informed on the objectives, priorities and strategies of our business.	CC1
	Our employees think the upper management cares about them and understands their issues.	CC2
	Our employees are the most valuable resource of our business.	CC3
	The communication channels between the management and the employees are open in our company.	CC4
	The valuable input produced by the employers are taken into account in the decision making of the upper management. .	CC5
	Our employees do not hesitate to freely express their opinions.	CC6
	All the partners freely express themselves during the decision making meetings of the upper management.	CC7
	The upper management clearly communicates with the employees.	CC8
	All employees of our company feel they are a part of the whole.	CC9

Technological turbulence	Technological advancements happen very fast in our line of business.	TT1
	Technological advancements in our line of business creates big opportunities.	TT2
	The technological inventions in our line of business lead to the emergence of new product ideas.	TT3
Business performance	General performance of our company has shown an increase.	BP1
	Compared to our biggest competitor, the general performance of our company has shown a better increase.	BP2
	Our company has produced business results that satisfy the customers.	BP3
	Generally speaking, our profitability has increased.	BP4
	Generally speaking, our sales volume has increased.	BP5

Participants were asked to rate individual items for these constructs and models on a 5-point Likert scale, fixed as "1: strongly disagree", "5: strongly agree" and the midpoint "3: neither agree nor disagree". In the created form, there are also questions to determine the demographic characteristics of the respondents (age, etc.) and the institutions they work for (sector, duration of the activity, number of employees, etc.).

3.2. Sample and Data Collection

Since the main subject of the research is value creation activities, we thought it would be meaningful to collect data from organizations involved in research and development activities. For this reason, we decided to collect data from businesses operating in Turkey and apply to benefit from government incentives (from public innovation incentives and technological venture investments). We contacted The Republic of Turkey Ministry of Science, Industry, and Technology, and The Scientific and Technological Research Council of Turkey (TUBITAK) and obtained the information of the companies that applied to benefit from the incentives specified. During the data collection, we determined that 7509 enterprises applied for these incentives in the last ten years. We tried to deliver the questionnaire electronically to the managers of each of these businesses, along with an information note explaining the purpose and importance of the research.

The data collection phase lasted three months. During this period, 481 of the 891 questionnaires received by us were excluded from the sample due reasons such as missing or insufficient data and being filled in duplicate (we were very meticulous regarding this in order to minimize possible complications during the analysis stage). As a result, 410 completely answered forms were accepted as the research sample of this study. According to the "10 times rule" (Hair, Ringle and Sarstedt, 2011) and "Minimum R^2 rule" (Hair, Sarstedt, Hopkins and Kuppelwieser, 2014) approaches, the available sample size is deemed sufficient.

General information about the enterprises included in the sample is shown in Table 2. Technology-intensive business lines encompass informatics, electronics, defense, aviation, health and biotechnology sectors; Labor-intensive business lines include manufacturing, construction, transportation, mining, agriculture and livestock sectors. Accordingly, 186 technology-intensive and 224 labor-intensive enterprises were included in the sample.

Table 2: General Characteristics of the Businesses Included in the Sample

Characteristics	Technology-intensive business	Labor-intensive business	Total
The number of the businesses	186	224	410
Average operation time	13,5	24,7	19,6
Average number of employees.	334	598	478

4. FINDINGS AND DISCUSSION

4.1. Data Analysis

In order to test the proposed research model, structural equation modeling (SEM) analyses were performed. Confirmatory Composite Analysis (CCA) was used to analyze the reliability and validity of the scales related to the model (Hair et al., 2020). After evaluating the measurement and structural models, path and moderation analysis tests were carried out. In order to

determine the significance of factor loads and path coefficients, a non-parametric preload test consisting of 5000 repetitions was performed (Preacher and Hayes, 2008). SmartPLS v3.3 software was used for structural equation model, path, and moderation analyses based on the least squares method.

In the model analysis, it is essential that the VIF value, which indicates the multicollinearity between the independent variables in the structural model, is below 3.0, the path coefficients of the dependent variables are significant at least at the level of 0.05, and the R^2 values of the dependent variables are as large as possible and meaningful (Hair et al., 2020). Q^2, f^2, and R^2 values are used to determine the within-sample predictive validity of the measured structural model (Sarstedt, Ringle, Smith, Reams and Hair, 2014). The f^2 value, which expresses the degree of influence of the independent variables according to the within-sample estimation, should be greater than 0.02 and be significant (Cohen, 1988). Q^2 values indicating the within-sample estimation level of dependent variables are considered low significant when they are less than 0.25, moderately significant between 0.25 and 0.50, and highly significant when greater than 0.50 (Sarstedt et. al., 2014).

In Table 3, the VIF value was calculated as 1 since the independent variable in the relationship indicates the effect of collective commitment on the renewal of value creation activities (collective commitment is the independent variable, and renewal of value creation activities is the dependent variable). Therefore, the independent variable does not show multicollinearity in the correlation mentioned above. According to the calculated Q^2 value, the within-sample estimation level of this relationship was observed to be significant but low. According to the f^2 value, collective commitment has a high effect on renewal of value creation activities (VIF=1, p<0,001, path coefficient=0,526, R^2=0,275, Q^2=0,177, f^2=0,382).

VIF value, which signals the effect of the value creation activities on the business performance, was calculated as 1.0 since it is the only independent variable in the relationship where the value creation activities are the independent variable and the businesses performance is the dependent variable, and the independent variable does not show multicollinearity in the said relationship. According to the calculated Q^2 value, the in-sample estimation level of this relationship was observed to be significant. According to the f^2 value, the variable of renewal of value creation activities has a high effect on the business performance variable (VIF=1, p<0,001, path coefficient =0,609, R^2=0,37 and Q^2=0,22, f^2=0,591).

Table 3: The Analyses of the Constructed Model: VIF, f^2, Q^2, R^2 Values

Dependent variable	Independent variable	VIF	Path Coefficient	t-value	f^2	R^2	Q^2
The renewal of the value creation activities	Collective commitment	1,0	0,526***	11,036	0,382	0,275	0,177
Business performance	The renewal of the value creation activities	1,0	0,609***	14,59	0,591	0,37	0,22

† < .1, * p < 0.05, ** p < 0.01, *** p < 0.001

Table 4 contains test results regarding the reliability of the constructs in the model and the average extracted variance (AVE) values. Since the factor loads values of all expressions in the constructs are observed between 0.705 and 0.881, they are considered significant (Franke and Sarstedt, 2019; Hair et al., 2011). All constructs also have composite reliability since CR test values are above 0.845 (Hair et al., 2020).

Table 4: Statistics of the Constructs in the Model

Constructs	Indicators	Factor Loadings	Composite Reliability (CR)	Average extracted variance (AVE)
The renewal of the value creation activities	RVC1	0,745	0,885	0,659
	RVC2	0,750		
	RVC3	0,884		
	RVC4	0,889		
Collective commitment	CC1	0,711	0,936	0,620
	CC2	0,746		
	CC3	0,811		
	CC4	0,798		
	CC5	0,836		
	CC6	0,835		
	CC7	0,787		
	CC8	0,766		
	CC9	0,790		

Technological turbulence	TT1	0,824	0,893	0,736
	TT2	0,894		
	TT3	0,854		
Business performance	BP1	0,881	0,895	0,630
	BP2	0,807		
	BP3	0,765		
	BP4	0,708		
	BP5	0,800		

4.2. Hypothesis Testing

Findings related to the analysis of the three main hypotheses carried out in line with the purpose of the research are included in this section. Table 5 presents the results of tests for $H1_{a,b}$ (the effect of collective commitment on value creation activities renewal for technology and labor-intensive lines of business) and $H2_{a,b}$ (effect of renewal of value creation activities on business performance). Since the relevant hypotheses were proposed for both business lines, hypothesis tests were carried out separately for both technology-intensive and labor-intensive business lines. Path coefficient values expressing the effect of collective commitment on the renewal of value creation activities consist of positive values close to each other at the 99% significance level in both technology and labor-intensive business lines. $H1_a$ and $H1_b$ were supported because there was a significant and positive relationship between collective commitment and renewal of value creation activities in both business lines (β=0,604 and 0,490, p<0,001). Similarly, for both business lines, it was observed that the value of the path coefficient, which expresses the effect of the renewal of value creation activities on business performance, is significant and positive at the 99% significance level. The value of the path coefficient for labor-intensive business lines is higher than that of technology-oriented business lines. This finding shows that the effect of renewing value creation activities in labor-intensive business lines on business performance is higher than in technology-intensive lines of business. However, $H2_a$ and $H2_b$ hypotheses were also supported since there was a positive and significant relationship between the renewal of value creation activities and business performance for both business lines (β=0.604 and 0.490, p<0.001).

Table 5: The Hypotheses Tests of $H1_{a,b}$ and $H2_{a,b}$

Line of business	**Technology-intensive**			**Labor-intensive**		
Independent variable → Dependent variable	**Hypothesis**	**Path Coefficients (β)**	**t Statistics**	**Hypothesis**	**Path Coefficients (β)**	**t Statistics**
Collective commitment → The renewal of the value creation activities	$H1_a$	0,604***	6,166	$H1_b$	0,591***	11,83
The renewal of the value creation activities→ Business performance	$H2_a$	0,490***	9,584	$H2_b$	0,614***	10,665

† < ,1, * p < 0,05, ** p < 0,01, *** p < 0,001

In $H3_{a,b}$, whether technological turbulence moderates the relationship between collective commitment and renewal of value creation activities is examined. In testing the moderator effects, a three-stage hierarchical multiple regression analysis was performed in line with the approach proposed by Aiken and West (1991) (Model-1, Model-2 and Model-3). In order to understand the effects of control variables that were not thought to affect the dependent and independent variables during the observation in Model 1 (control effect), a calculation including the effects of only control variables (age of the organization and initial research and development support incentive) on the dependent variable was made. In Model-2 (main effect), in addition to control variables, independent variables (collective commitment and technological turbulence) that are subject to hypothesis tests are also included in the calculation. In Model-3 (interaction effect), in addition to the variables in Model-2, the variable showing the interaction effect (CCxTT) was also included in the calculation in order to test the moderator effect. Table 6 shows the calculated values for the test of moderator effects.

Table 6: The Hypotheses Tests of the $H3_a$ and $H3_b$ (moderating effects)

Line of business/hypotheses	**Technology-intensive ($H3_a$) (unsupported)**			**Labor-intensive ($H3_b$) (supported)**		
	The renewal of the value creation activities			The renewal of the value creation activities		
Control variables	**Model 1 (Control)**	**Model 2 (Main impact)**	**Model 3 (Interaction)**	**Model 1 (Control)**	**Model 2 (Main impact)**	**Model 3 (Interaction)**
Age	0.073 (0,267)	0.062 (0,208)	0.053 (0,284)	-0.103 (0,412)	0.007 (0,891)	0.008 (0,876)
Research and Development Start-up support	0.082 (0,404)	0.069 (0,297)	0.054 (0,365)	0.108 (0,353)	0.069 (0,356)	0.057 (0,296)
Independent variables						
Collective commitment (CC)		0.375*** (0,000)	0.333*** (0,000)		0.500*** (0,000)	0.478*** (0,000)
Technological turbulence (TT)		0.248** (0,001)	0.240** (0,002)		0.226*** (0,000)	0.215*** (0,000)
CCxTT			-0.046 (0,311)			-0.087* (0,024)
R^2	0.014 (0,402)	0.294*** (0,000)	0.300*** (0,000)	0.008 (0,246)	0.381*** (0,000)	0.393*** (0,000)
Adjusted R^2	0.003 (0,857)	0.278** (0,001)	0.280** (0,001)	0.003 (0,494)	0.370*** (0,000)	0.379*** (0,000)
Q^2	0.003	0.264	0.257	-0.006	0.354	0.359

† < ,1, * p < 0,05, ** p < 0,01, *** p < 0,001

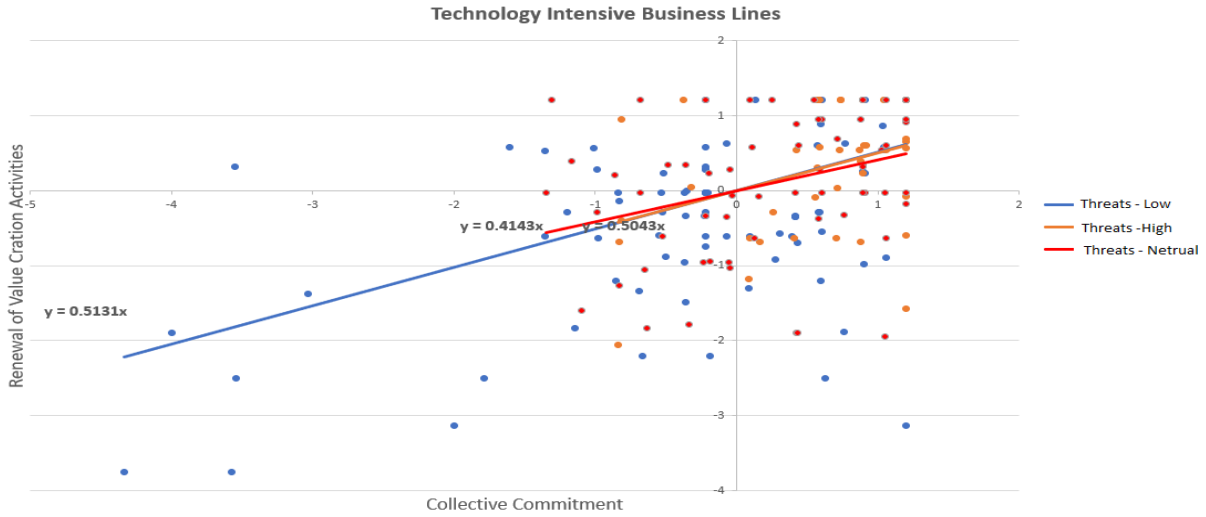
The path coefficients of the variables belonging to the control variables (age and initial R&D support incentive) in Model-1, Model-2, and Model-3, which do not affect the independent variable during observation, are statistically insignificant for both technology-intensive and labor-intensive business lines. That is, as expected, these variables have no effect on the regression equation in question (p=0.003). This confirms that these two variables were determined as control variables together with the dependent variables. For technology and labor-intensive business lines, the path coefficient values in the relationship between the collective commitment and technological turbulences in Model-2 and the renewal of value creation activities were significant in the 99% confidence interval. This situation shows that technological turbulence and collective commitment positively and significantly affect the renewal of value creation activities. When Model-3, which shows the interaction effect in both business lines, is examined, it is seen that the interaction effect is not significant for the technology-intensive business lines ($\beta int=-0.046$, $p>0.1$) but is significant for the labor-intensive business lines ($\beta int=-0.087$, $p<0.05$). As a result, the moderator effect hypothesis, which is thought to be caused by technological turbulences, was not supported for technology-intensive business lines ($H3_a$) but was supported for labor-intensive business lines ($H3_b$).

In addition to significant increases in the R^2 value, it is also recommended to determine the effects of the variable, which is thought to have a moderation effect, in cases where it is different (low, medium, and high) with regression curves in order to observe the interaction effects more clearly (Aiken and West, 1991). Thus, in order to observe the moderating effects of technological fluctuations more clearly, the observations of both business lines were divided into three subgroups according to the high, medium, and low scores given by the participants to the statements. The group with high scores represents those who perceive the opportunities brought by technological turbulence the group with medium scores represents those not affected by technological turbulence, and the group with low scores represent those who perceive the risks brought by technological turbulence. The regression equations and coefficients that emerged from the regression analyses between the collective commitment and the renewal of value creation activities related to the subgroups mentioned above in both

business lines were compared. Figure-2 shows the results of the regression equations calculated for the technology-intensive business line and Figure-3 shows the results of the labor-intensive business line.

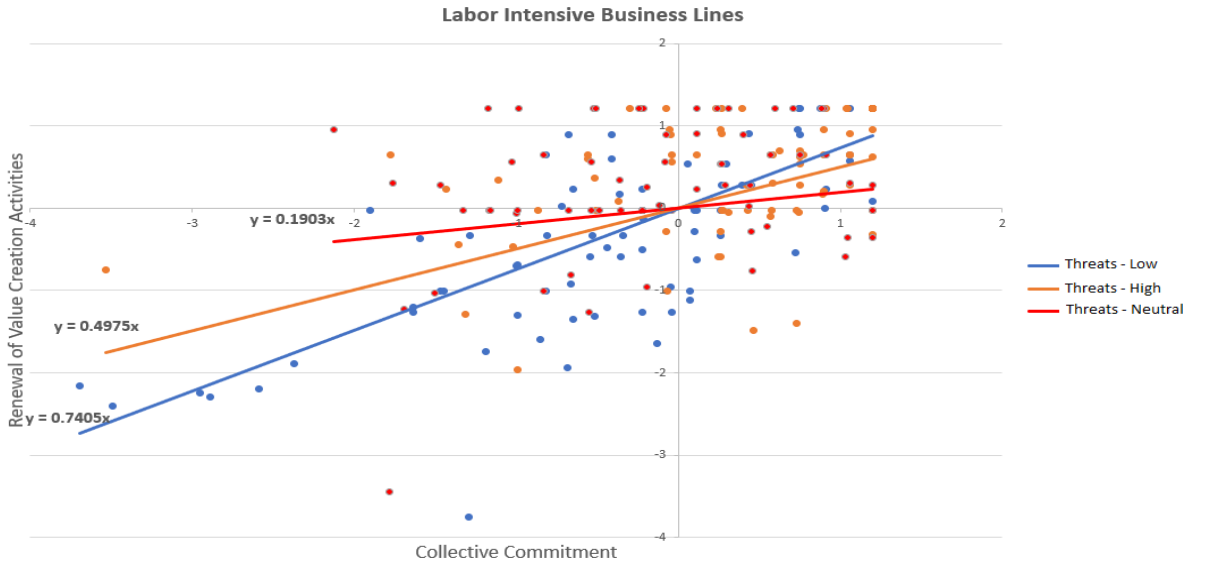
The $H3_a$ hypothesis, which tested the moderation effect of technological turbulences between collective commitment and renewal of value creation activities in technology-intensive lines of business, was not supported. In this study, the regression coefficients between collective commitment and renewal of value creation activities were calculated as β_{threat}=0.513, $\beta_{opportunity}$=0.504, and β_{notr}=0.414 for the subgroups representing technology-intensive business lines in Figure-2. The fact that the slopes and coefficients of the regression lines for the subgroups mentioned above are close to each other supports that technological turbulence does not have a moderation effect in each subgroup in technology-intensive business lines.

Figure 2: The Effects of the Technological Turbulence for Technology-Intensive Lines of Business



In labor-intensive business lines, the moderation effect of technological turbulences in the relationship between collective commitment and renewal of value creation activities was supported ($H3_b$). The fact that the slopes of the regression lines between collective commitment and the renewal of value creation activities for the sub-groups expressing the labor-intensive business lines in Figure-3 are different also shows that the technological fluctuation has a moderation effect based on sub-groups (regression coefficients β_{threat} =0.740, $\beta_{oppotunity}$=0.490 and $\beta_{neutral}$ =0.190).

Figure 3: The Effects of the Technological Turbulence for Labor-Intensive Lines of Business



4.3. Discussion

The main purpose of this study is to empirically examine the relationship between the collective commitment between the employees and their top management, the renewal of the value creation activities of the enterprises and the business performance, with a conceptual model created by taking into account the business lines of the enterprises. According to our analysis, regardless of the business lines of the enterprises, collective commitment positively affects renewal of value creation activities and renewal of value creation activities also positively affect business performance ($H1_{1a,b}$ and $H2_{a,b}$ were supported). In addition, the effect of technological turbulence, which is an external environment variable, on the specified relationships was examined. According to our data, it is understood that technological fluctuations strengthen the relationship between collective commitment and renewal of value creation activities in labor-intensive business lines ($H3_b$ hypothesis was supported), but this effect was not observed in technology-intensive business lines ($H3_a$ hypothesis was not supported).

Although we have conducted our study while taking into account the conceptual findings in the related literature, the reason for the existence of the moderation effect of technological turbulence in technology-intensive business lines has not been determined. In order to understand this issue, our findings were shared with 6 people (founder, business development, research expert) who work as experts on the subject in large, medium and small-sized companies operating in both technology and labor-intensive business lines, and interviews were conducted in order to try to determine possible reasons. In the interviews, the effects of technological turbulences on the employees in the enterprises were discussed. The importance of the characteristics of profile of the human resources employed in their business lines emerged as a particularly important issue. As mentioned previously, those working in technology-intensive business lines are predominantly white-collar employees with a high level of education, while those working in labor-intensive business lines are predominantly blue-collar employees with a lower level of education.

What has been emphasized in previous studies (e.g., Cohen and Levinthal, 1990) also came up in the interviews; namely, that it is easier for white-collar employees to follow and adapt to technological changes due to their higher levels of education than it is for blue-collar employees. Thus, people working in enterprises operating in technology-intensive business lines see technological turbulences as part and parcel of the business line they are in. This situation leads to the fact that these enterprises are constantly updating their technologies and the value they offer in the face of technological turbulences. Due to these constant and rapid updates, which have become routine, the effects of technological changes and turbulences in this business line do not affect the current situation of the enterprises much. Therefore, technological turbulences have not been found to have a moderation effect in technology-intensive businesses.

On the other hand, it is difficult and takes a long time for enterprises operating in labor-intensive business lines to adapt to new technologies due to the cost of technological infrastructures they use and the characteristics of their employees. As a result, changes that have become routine do not occur in labor-intensive business lines, as in technology-intensive business lines, and radical changes occur in situations of absolute necessity. However, although it is costly and difficult, the effects of these changes have a positive impact on the competitive position of the enterprise in the market and the company's sustainability under changing competitive conditions. Thus, the top managers of enterprises operating in labor-intensive business lines are motivated to develop new value logic in line with the needs of their customers and as much as their current situation allows, in the face of threats or opportunities brought by technological turbulences. Employees of these enterprises, on the other hand, perceive the possibility that technological turbulences may harm the sustainability of their enterprises as a threat in terms of their own job security. Therefore, due to technological turbulences, the motivation of the employees in the renewal of value creation activities also increases, and the moderation effect of technological turbulences in labor-intensive lines of work is observed.

By grouping the effects of technological turbulences on enterprises in labor-intensive business lines, the existence of regulatory effects was revealed in the analyses that we considered in three different groups: threat, opportunity, and neutral (Figure-3). In the neutral group of technological turbulences, the strength of the relationship between collective commitment and renewal of value creation activities weakens. However, the strength of this relationship is high in groups where technological fluctuations are perceived as an opportunity or a threat. In particular, it is seen that the effect in the group with threats is relatively higher than in the group with opportunities. These interviews revealed that the perception of threat or opportunity from technology turbulences in enterprises significantly impacts the organizational change activities.

It is understood that the renewal of the value creation activities of the enterprises is related to whether the effects occurring in the environment are perceived as a threat or an opportunity. Environmental threat or opportunity perceptions have a moderating effect on the relationship between the collective commitment of the enterprise and the renewal of value creation activities. This effect has been observed very clearly in labor-intensive lines of business. Since the adaptation of technology

has become a part of the routine operation in technology-intensive business lines, the perception of threat or opportunity in the face of technological turbulence is not high, so there is no moderation effect.

5. CONCLUSION

It has been shown in other studies, albeit few, that technological turbulences, which are an external environmental variable, have a moderation effect on the relationship between collective commitment and renewal of value creation activities. For example, Tuominen, Rajala, and Möller (2004) conducted a similar study in Finland, a developed country. According to the results of that study, in environments with technological turbulence, the upper management of the businesses look up new technologies by ensuring the participation of employees in activities such as strategic marketing and product management as well as the decision-making processes, as such updating their value creation activities by associating these new technologies with customer needs. This situation somehow brings together the upper management and employees within the enterprise, ensuring the formation of collective commitment. In other words, the findings of our study empirically support the results of the survey conducted by Tuominen et al., (2004) in a developed country context. However, in that study, the distinction between business lines was not mentioned, and collective evaluations were made regarding a sample that included businesses from labor and technology-intensive businesses. In fact, in another study of us (Dayıoğlu and Küskü, 2021), also based on the data set used in this study, we observed that technological turbulences have a moderation effect on the relationship between the collective leadership approach, in which the upper management includes in the employees in the decision-making processes, and innovative value creation activities. However, in that study, we did not take into account the distinction between business lines. However, this study showed that a variable's moderation effect on a relationship does not guarantee that this effect exists for all business lines in that sample. In other words, since the threat and opportunity perceptions of the enterprise's upper management and employees may differ according to the business lines they are in, the moderation effects of external variables may also be different. Thus, it will be essential to continue research that tries to understand and explain the effects of technological turbulences in both developed and developing country environments by associating them with business performance in order to be able to achieve more generalizable results.

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