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THE IMPACT OF ORGANIZATIONAL STRUCTURE ON MANAGEMENT INNOVATION: AN EMPIRICAL RESEARCH IN TURKEY

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ABSTRACT

The purpose of this paper is to investigate the effect of the two core components of organizational structure, centralization and formalization, on management innovation. In order to do this, the data received from 198 managers working in a public organization in Turkey has been analyzed. The results of this analysis have demonstrated that centralization has a significant negative impact on management innovation. However, the impact of formalization on management innovation has not been determined.

Keywords : Management innovation, innovation, organizational structure, centralization, formalization.
JEL Classification : D21, M21, O30

1. INTRODUCTION

The formation of organizational structures, which make cross-functional knowledge and resource sharing possible, is a critical element for companies; ensuring strategic decision-making, the resolution of disagreements, and the active and effective coordination of the process of innovation (Olson et al., 1995). Researchers of innovation and organizational theorists have consistently asserted that the structure of an organization is an essential factor in the function of innovation, serving to benefit or impede it accordingly (Aiken and Hage 1971; Kim, 1980; Damanpour, 1991; Subramanian and Nilakanta 1996). Innovation is considered a key factor in the establishment of new business and industry, economic development, firm performance and competitive edge, and in the efficient management of public departments and businesses (Drucker, 1985; Gopalakrishnan and Damanpour, 1997). Therefore, maintaining an environment in which innovation can occur is an essential component of a business, and thus a worthy area of academic study (Damanpour and Wischnevsky, 2006).

Miller (1987) defines organizational structure as the permanent distribution of work roles and administrative mechanisms to enable an organization to perform, coordinate and control its business activities and resource flow. Organizational structure can be thought of in terms of two core factors: centralization and formalization (Damanpour, 1991; Russell and Russell 1992; Caruana et al., 1998; Raub, 2007; Bolin and Harenstam, 2008; Mumford et al., 2008; Hirst et al., 2011). Centralized decision making and formal rules and procedures are ways of regulating and controlling employee behavior and are also linked to the degree of discretion found in employees. Both factors of organizational structure are expected to have an impact on innovative outputs (Ettlie et al., 1984; Damanpour, 1991).

Though there are a small amount of studies that have shown a beneficial effect of a highly centralized and formalized structure upon innovation (Zmud, 1982; Ruekert et al., 1985; Rogers, 1995; Gosselin, 1997; Schultz

et al., 2013), most studies conclude that decentralized and non-formalized organizational structures are more conducive to innovative performance (Hage and Aiken, 1967; West, 2000; Cardinal, 2001; Jansen et al., 2006; Kalay and Lynn, 2015). Thus, it is commonly held that centralization and formalization impede innovation; whereas non-formal, 'horizontal' arrangements are thought beneficial to the cultivation of innovative ventures (Russell and Russell 1992; Mumford et al., 2008). Yet, this statement must not be accepted without question, as the case may be that a structure initially thought of as negative in the production of innovation may assist a different form of innovation; as was shown by Damanpour (1991) when he completed a meta-analysis exploring the effects of organization on innovation.

In the majority of studies, the links between technological, product, and process innovation types and organizational arrangements have been focused upon (e.g., Subramanian and Nilakanta, 1996; Cardinal, 2001; Daugherty et al., 2011; Hirst et al., 2011; Prajogo and McDermott, 2014). Less of a focus has been given to the link between management innovation and organizational arrangements. Scholars of both innovation and management have proposed that the foundations and workings of management innovation may differ largely from other kinds of innovation, for example, from those of process, product and technological innovation (Daft, 1978; Kimberly and Evanisko, 1981; Damanpour, 2014). As a result, conclusions formed about various other types of innovation may not be immediately applicable to innovation in management (Swanson, 1994; Damanpour, 2014).

In business organizations, innovation in management is as prevalent as other types of innovation. Additionally, Damanpour and Evan (1984) conclude that managerial and non-managerial innovation complement each other in high-performance organizations. Given that this is the case, it is interesting that there remains limited research on the subject of management innovation, and there is a great need to rectify this omission. This study aims to begin bridging that gap in research. In this context, the purpose of this study is to explore the effect of the two core components of organizational structure, centralization and formalization, on management innovation. It is important to determine this relationship for scholarly purposes, ascertaining the processes and conditions of business organization that best facilitate management innovation; and for management in practicality, as it is the task of management to form organizations that are innovative and to manage the process of innovation within them.

2. LITERATURE REVIEW and HYPOTHESES

2.1. Organizational Structure

Organizational decision makers have the power to influence innovation within their company through their direct control of the structure of an organization. The dispersion of control and responsibility within an organization are determined by its organizational structure, as are the grouping, coordination, and division of tasks amongst departments and employees in an organization (Daft, 1978). Scholarly knowledge on the subject of organizational structure proposes that it has several sub-dimensions. A conclusive list of these sub-dimensions is given by Damanpour (1991) and includes such variables in organizational structure as formalization, centralization, professionalism, specialization, functional differentiation, vertical differentiation, and more, including resource-related variables, process, and culture. Further suggestions for these sub-dimensions are presented by Aiken and Hage (1971) and include decentralization, formalization, professionalism, complexity and scheduled and unscheduled communication. In an investigation into the role played by organizational structure in innovation in logistics, Germain (1996) too includes specialization and decentralization; and makes the addition of 'integration' to the list of subcategories. An investigation on the topic of organizational structure and its link to product customization by Vickery et al. (1999) utilized the sub-dimensions of operations decentralization, focus on formal control, spans of control and layers. Another study by Nahm et al. (2003) focused on the manner in which plant performance and time-based manufacturing were affected by organizational structure, and the following dimensions were included: the manner in which formalization occurred, the number of hierarchical levels in the organization, the point where the power to make decisions lay, the degree of horizontal integration and the communication levels within the organization.

Two contrasting ideas of organizational structure are given by some scholars, namely 'organic' organizational structure and 'mechanic' organizational structure (Cosh et al., 2012). In mechanic organizational structure,

authority and control are often centralized, and task standardization and specialization occur frequently. In contrast, in an organic organizational structure, a 'flatter' structure occurs. That is, the hierarchy consists of fewer levels, decision making is more frequently decentralized, and employees who are multifunctional, who work in systems where greater degrees of horizontal integration occur, are more widely found (Aiken and Hage 1971; Cosh et al., 2012).

Evidently, academic articles discussing the sub-dimensions of organizational structure are, thus far, diverse in both topic and in conclusions formed on the subject. A comprehensive list of the sub-dimensions of organizational structure that is universally agreed upon is yet to be found, and there are instances in which theorists have referred to dimensions that correspond conceptually by different names. This study does not attempt to formalize these sub-dimensions; however, in its use of centralization and formalization, it considers two of the sub-dimensions that are included throughout a number of studies.

2.2. Innovation Types and Management Innovation

Innovation can be thought of as new structures and management processes, new policies, new plans and programs, new processes of production and new products and services produced in an enterprise (Vaccaro et al., 2012). In the OECD Oslo Manuel (2005), innovation has been categorized into four dimensions: product, process, marketing, and management (or organizational) innovation. In most studies, however, innovations are considered in the broader terms of technological and management innovations (Kimberly and Evanisko 1981; Damanpour, 2014). Another method of classifying innovation is based on the factor of innovation radicalness, which makes the distinction between radical innovation and incremental innovation (Germain, 1996; Cardinal, 2001). In more recent times, these distinctions have sometimes been named as exploitative innovation and exploratory innovation (Jansen et al., 2006; Bierly et al., 2009).

The term management innovation, as it is used here, corresponds to the terms administrative innovation, organizational innovation, and managerial innovation from previous research (Birkinshaw et al., 2008; Damanpour, 2014). Damanpour and Aravind (2012) reviewed these terms and found that they overlap significantly in both definition and use. Regardless of the term used to describe this type of innovation, management innovation is most frequently explored in comparison with technical innovation or technological innovation. Technological innovation is explicitly linked with the central function of an organization, and the results produced mainly occur in the operating systems; whereas innovation in management is inexplicitly linked with the central work of the organization, and occur more frequently within the social systems of an organization (Damanpour et al., 2009). The distinction between technological and management innovation is an important one, as research suggests: "facilitation factors vary among them and further, that adoption sequence and timing may also vary systematically" (Swanson, 1994: 1071).

The OECD (2005) Oslo Manual and the Community Innovation Survey has provided a comprehensive description of management innovation, which has been grouped into three categories: (1) new practices in business, such as: the management of knowledge, the management of quality, supply-chain management, the re-engineering of business, and lean production; (2) new modes to organize decision-making and work responsibilities, such as: decentralization, teamwork, a new structure of employee responsibilities used first, department de-integration or integration, and training and education programs; and finally, (3) new modes to organize relations with external organizations, such as the first use of partnerships and alliances, and subcontracting or outsourcing. In other words, management innovation denotes the forming of and utilization of new practices in management, structures, processes and techniques with the intention of advancing the goals of an organization (Vaccaro et al., 2012; Birkinshaw et al., 2008).

The tasks that managers perform as part of their everyday role are referred to as 'management practices'. Such tasks include the setting of goals and the procedures associated with doing so; the arrangement of functions and tasks; the development of talented employees, and achieving the various demands of stakeholders (Birkinshaw et al., 2008). The routines facilitating the work of managers are referred to as 'management processes', which denotes the conversion of abstract ideas into workable implements. Common examples of these include performance assessment, strategic planning, and project management (Birkinshaw et al., 2008).

The manner in which organizations systemize their communication and unify and utilize effort in their members is referred to as 'structure' (Birkinshaw et al., 2008).

2.3. Structural Theories of Innovation

Owing to the great disparity in results of much of the research on the subject of connections between innovation and structure, the research covering this has been questioned (Miller and Friesen, 1982). Researchers have proposed several ideas to account for this disparity. All such ideas propose the notion that the structure of an organization will affect the various innovation types differently, as ultimately all resultant innovations are themselves dissimilar.

There are two groups of theories about the structure of innovation that have been put forward (Damanpour and Gopalakrishnan, 1998). In the group of theories most commonly cited as uni-dimensional theories, links found between innovation and a structural variable are explicated. These uni-dimensional theories revealed that the associations between formalization, centralization and innovation are negative (Damanpour and Gopalakrishnan, 1998). Due to discrepancies found in the results of the research of uni-dimensional theories, they were disparaged by researchers.

In a bid to account for such discrepancies, the second group of theories regarding structure and innovation were developed by researchers. These were termed the middle range theories of organizational innovation (Damanpour and Gopalakrishnan, 1998). The focus in this grouping tends to be the variance of innovation types. The middle range theories are the dual-core theory of innovation (Daft, 1978; Kimberly and Evanisko, 1981; Zmud, 1982), innovation radicalness (the theory of innovation radicalness) (Nord and Tucker, 1987), and the stages in the process of innovation (the ambidextrous theory of innovation) (Duncan, 1976; Zmud, 1982). A brief description of each theory follows.

The dual-core theory of innovation: This theory categorizes innovation into two dimensions: technical innovation and management innovation (Daft, 1978). The division of innovation in this way is significant, as it is linked to the distinction at large between an organization's technical and social systems (Swanson, 1994; Damanpour and Evan, 1984). According to this theory, an organization possesses both an administrative and technical core. The primary concern of the technical core is the conversion of resources into the services and products that the organization provides. The concern of the administrative core is the structure of the organization, the mechanisms of coordination, and the systems of control (Daft, 1978). It is possible for innovation to happen in either core, however, the innovations of the variant cores develop in different ways. It is typical for innovations of the technical kind to occur within the technical core in a 'bottom-up' form. Conversely, innovations of the administrative kind tend to occur within the administrative core in a 'top-down' motion (Daft, 1978). Therefore, in decision-making, greater behavior formalization and centralization cultivate top-down administrative innovation, whereas low levels of centralization and formalization allow for bottom-up technical innovation.

The theory of innovation radicalness: This notion once again considers innovation in the form of dual components, as is the case in the dual-core theory. The two terms used by the theory are often named as 'incremental' and 'radical' innovation when examined in empirical research (Damanpour and Gopalakrishnan, 1998). Radical innovations bring about extreme modifications in an organization's activity and demonstrate an obvious move from what was done before, whereas incremental innovation brings about a more moderate level of change from initial practices. Radical type innovation has a greater chance of occurrence when an organization has an informal, centralized structure; while those of the incremental kind are likely to happen in organizations that have structures which are decentralized and complex (Kalay and Lynn, 2015).

The ambidextrous theory of innovation: In the ambidextrous theory, it is the manner in which innovation is implemented that is the focus. Here, implementation refers to both the work involved in deciding to take up the new innovation, and that of bringing about and maintaining the innovation. Accordingly, the theory holds that there are two phases involved in innovation, and it refers to these respectively as the 'initiation' and the 'implementation' (Duncan, 1976). The first of these, initiation, includes all tasks involved in the research of the innovation, the generation of and evaluation of attitudes towards the innovation, and the identification of possible problems and the development of resources prior to taking up the innovation. The second phase,

implementation, includes all activity undertaken to adapt both organization and the innovation itself, and the innovation's inceptive period of use and its ongoing use until the innovation becomes a standard component of the organization. This theory indicates that the initiation phase is stimulated by a combination of lower levels of centralization and formalization and greater levels of complexity, while conversely, the implementation phase is facilitated by low levels of complexity and higher levels of centralization and formalization (Duncan, 1976).

2.4. The Impact of Centralization on Management Innovation

The manner in which an organization arranges its authority and carries out the process of making decisions is what is referred to in the term 'centralization' (Gosselin, 1997; Caruana et al., 1998; Jansen et al., 2006). In other words, centralization relates to how power is distributed in an organizational hierarchy, and whether employees are encouraged to participate in the process of decision making or not (Hage and Aiken, 1967; Rogers, 1995: 379). This includes the partaking in decisions regarding policy, strategy and resource allocation (Hage and Aiken, 1967; Hendricks et al., 1993). Structures in which authority has been centralized are formed 'vertically', with a select group at the top of the hierarchy in charge of directing the organization.

Previous investigations have differed on the subject of centralization's impact upon innovation. A few studies have come to find that centralization has a positive impact on innovative output (Kimberly and Evanisko, 1981; Zmud, 1982; Rogers, 1995; Gosselin, 1997), but others appear to have discovered a negative impact (Damanpour, 1991). In other studies, no notable link of any kind between the two factors has been found (Lai and Guynes, 1997). The results from existing studies regarding centralization's effect on various innovation types are summarized in Table 1. The results reflect the significant direction of regression coefficients. The significance and direction of correlation coefficients have been given in the case where the results of previous studies were not provided. For instance, in a study by Cardinal (2001), the regression coefficients are significant and positive in the case of centralization as it was compared with both radical (in the form of new drug inno¬vations) and incremental (in the form of drug enhancements) innovation. Hence in Table 1, these relationships are indicated as "Radical: Positive" and "Incremental: Positive".

When a positive effect occurs through centralization, upper-level managers have increased control, and those making decisions have more freedom when doing so. The discretion to manage and the scope of management in these roles is thus increased (Miller, 1987). When an organization is centralized, upper-level management are better able to integrate and organize knowledge and resources more effectively in order to lower the costs of this internally, and to foster competence and innovation (Olson et al., 1995; Sheremata, 2000; Cardinal, 2001). Additionally, this greater level of authority and responsibility in management can make them more receptive to opportunities of the technological, market, and organizational variety (Mom et al., 2009). Moreover, a centralized structure can facilitate better commitment and cooperation in job roles, aid in the resolution of conflict, aid in effective distribution of knowledge within the company, and result in a greater innovative output (Olson et al., 1995; Sheremata, 2000; Zhou & Li, 2012).

Conversely, the adverse effects of centralization include: narrower channels of communication, increased layers in the transfer of information and the further filtering of information (Hage and Aiken, 1967; Cardinal, 2001; Jansen et al., 2006). So, in a centralized structure, sources of knowledge formation and information the progress of information from lower levels to upper management are impeded; and thus, the quality and frequency of ideas, employee initiative and problem-solving are reduced (Jansen et al., 2006). Such a reduction will result in decreased levels of innovative performance, the consequences of which are the substandard development of products, processes, and management (Pierce and Delbecq, 1977). Additionally, through centralization, the perception employees hold of their autonomy and participation may well decrease, subsequently reducing their levels of ego-involvement and their commitment (Pierce and Delbecq, 1977). Employees working within an organization that employs centralization make less frequent attempts to pursue the finding of new and innovative solutions to problems proactively (Jansen et al., 2006). Centralization, through its limitation of employee discretion, can be expected to impede the propensity to seek out opportunities on an inter-member basis, and thus on an intra-organizational basis at large (Sheremata, 2000; Bunderson and Boumgarden, 2010). It is due to this restricted flow of information within an organization, and to the reduced level of motivation in employees, that many studies have formed the conclusion that

centralization has a negative effect on innovation (Damanpour, 1991). Owing to this, the hypothesis below is proposed:

Hypothesis 1: The impact of centralization on management innovation is negative and significant.

2.5. The Impact of Formalization on Management Innovation

Formalization refers to an organization's degree of role specificity, job codification and the presence of clearly defined rules for employees to adhere to (Hage and Dewar, 1973). In other words, it refers to the extent that instructions, communications, procedures, and rules are officially clarified (Hage and Aiken, 1967; Gosselin, 1997). In organizations with a high degree of formality, comprehensive rules exist outlining the purpose and responsibilities of each member of management. It is expected that these rules will be strictly adhered to, and it is difficult for such individuals to break away from routine practices and current organizational behaviors. In contrast to formalized organizations, in organizations that are not formalized managers have greater levels of autonomy and are able to diversify their purpose and responsibilities as necessary.

Table 1, also shows the results of existing studies concerned with the impact of formalization on various innovation types. According to some scholars, an organizational structure based on formal control may increase innovative performance by enabling coordination among different functional units, increasing the level of cost effectiveness, decreasing uncertainty and minimizing mistakes (Schultz et al., 2013). On the other hand, various authors (Hage and Aiken, 1967; West, 2000; Kalay and Lynn, 2015) have shown that a negative relationship exists between formalization and innovation. Increasing formalization reduces the extent of freedom of employees by prescribing procedures and potentially sanctioning some courses of action, providing specific directions as to appropriate actions, directing and enforcing these actions, and constraining employees' ability to engage in discretionary behaviors (Raub, 2007). Lewis et al. (2002) found that formalization discourages the generation of ideas due to the inflexibility of this mode, which constrains creativity. Formalization prevents divergence from standard knowledge and from the tendency to seek variation. Shepard (1967) posits that flexibility within a system is facilitated by a low level of formalization, and this flexibility is key for the generation of ideas. The dominant opinion regarding the impact of formalization on performance in innovation endorses a low degree of formalization (West, 2000; Kalay and Lynn, 2015; Raub, 2007). Thus, the following hypothesis is formulated:

Hypothesis 2: The impact of formalization on management innovation is negative and significant.

Table 1: Summary of Studies on the Relationship between Centralization, Formalization and Innovation.

Study	Sample Size[b]	Innovation Type	Results[a]	
			Formalization	Centralization
Cardinal (2001)	57	Technological (radical and incremental)	Radical: Positive*, Incremental: Negative	Radical: Positive*, Incremental: Positive*
Ekvall (1996)	49	Mixed	Negative**	n.a.
Grover et al. (2007)	154	Technological (radical and incremental)	Incremental: Negative***	Incremental: Negative***
Hashem and Tann (2007)	255	Administrative	Positive**	Positive**
Herrmann and Gordillo (2001)	55	Technological	Negative*	NS
Jansen et al. (2006)	283	Products/Services (radical and incremental)	Exploratory: NS, Exploitative: Positive**	Exploratory: Negative**, Exploitative: NS
Liao (2007)	203	Technological (product)	Positive*	NS
Nohria and Gulati (1996)	256	Mixed	NS	NS
Souitaris (2001)	105	Technological (Process, product-radical and product-incremental)	Process: Negative*, Product radical: NS, Product incremental: NS	Process: NS, Product radical: NS, Product incremental: NS
Delaney et al. (1996)	45	Mixed	n.a.	NS

Germain (1996)	183	Technological (process radical and process incremental)	n.a.	Incremental: Negative*
Hirst et al. (2011)	95	Mixed	NS	NS
Prajogo and McDermott (2014)	196	Service innovation (exploratory and exploitative)	Exploratory: NS, Exploitative: Positive**	Exploratory: Negative**, Exploitative: NS
Subramanian and Nilakanta (1996)	143	Administrative and technical innovation	Administrative: positive**, Technical: NS	Administrative: NS, Technical: Negative**
Daugherty et al. (2011)		Mixed	Positive	n.a.

[a]The statistical significance is the significance level of regression coefficients or the significance levels of the correlation coefficients from the original studies.
[b]The analytical method of all studies is cross-sectional.
n.a.: Not available.
NS: Not significant.
*p < .05; **p < .01; ***p < .001.

3. RESEARCH METHODOLOGY

3.1. Data Description

The individuals composing the sample of this study are managers working in a public organization in Turkey. The organization that the data was collected from is regarded as the biggest organization in Turkey. The organization has a centralized and formalized organizational structure in summation. Data was collected through a prepared questionnaire. The data was gathered through a series of one-on-one interviews with participants using a convenience sampling method. At the end of the data collection process, the data received from 198 managers was analyzed.

Table 2 outlines some of the socio-demographic characteristics of the respondent managers, illustrating their diversity in terms of organizational job tenure, education level, age, and managerial position. 'Organizational job tenure' has been divided into five categories such as 1-5 years, 6-10 years, 11-15 years, 16-20 years, and 21 years or more. 'Age' has been divided into four categories such as 20-29 years, 30-39 years, 40-49 years, and 50 years or more. As shown in Table 2, 41.4% of participants have senior high school degree, 17.2% of participants have high school degree, 34.3% of participants have university degree, 6.6% participants have master degree and 0.5% of participants have doctorate degree. The majority of respondents' ages are ranged between 30-40 years. Their organizational job tenure is ranged between 11-15 years mostly. 63.6% of participants are lower level managers, 31.8 of participants are middle level managers and 4.5 of participants are senior managers.

Table 2: Sample Profile

Organizational job tenure		Education		Age		Position	
Category	**%**	**Category**	**%**	**Category**	**%**	**Category**	**%**
1-5 years	3.0	Senior high school	41.4	20-29 years	5.1	Lower level managers	63.6
6-10 years	10.6	High school	17.2	30-39 years	64.1	Middle level managers	31.8
11-15 years	47.0	University	34.3	40-49 years	28.8	Senior managers	4.5
16-20 years	26.3	Master	6.6	50 or more	2.0		
21 or more	13.1	Doctorate	0.5				

3.2. Measures

In this study, multiple items were used to measure the constructs of interest. The questionnaire items are in the Appendix 1. Respondents communicated their agreement or disagreement with each item with a five-point Likert scale, wherein the most extreme descriptions of such comprised of: ''strongly disagree'' (1) and ''strongly agree'' (5). The items measuring the constructs of centralization and formalization were developed from existing spectrums in prior research (Caruana et al., 1998). The centralization construct was measured with six

items, and the formalization construct was measured with four items. Centralization was measured by whether the participants had immediate control of operating decisions and strategic decisions. Formalization was measured by determining the extent of the presence of structured control and communication reinforced by official written direction in the organization. The items of management construct was adapted from Vaccaro et al. (2012) and Nieves and Segarra-Cipres (2015) and was measured with six items. The bivariate correlations and descriptive statistics of the constructs are shown in Table 3.

3.3. Psychometric Properties

Confirmatory factor analysis (CFA) was used to assess the psychometric properties of the measures. A model was developed which included all three first-order constructs (centralization, formalization, and management innovation) and this was trialed with the whole sample from the study (N = 198). The model was shown to suit the data by the item loadings and the fit statistics ($\chi 2 = 160.61$, df = 96, $\chi 2/df = 1.67$, IFI = 0.96, NFI = 0.90, CFI = 0.96, RMSEA = 0.06) (Bollen, 1989). For all constructs, the standardized item loadings on their respective constructs ranged from 0.36 to 0.90, and were highly significant ($P < 0.01$). Item reliabilities were calculated as the square of the path (i.e., factor) loadings (Bagozzi, 1981). The reliability score for each item was near to or larger than the 0.40 limit, demonstrating a sound level of reliability (Froehle and Roth 2004). (see Appendix 1).

The internal consistency's reliability was examined by means of composite scale reliability (CR). For all constructs, the CR ranged from 0.85 to 0.92, and this exceeded the suggested cutoff value of 0.70 or above (Fornell and Larcker, 1981). Convergent validity was assessed through the inspection of average variance extracted (AVE). Each construct's AVE ranged from 0.50 to 0.85, and this was above the suggested 0.50 cutoff value and consistent with the recommendation of Fornell and Larcker (1981) (see Appendix 1). Therefore, both CR and AVE show sound reliability and validity levels for all constructs in the measurement model (Fornell and Larcker 1981).

Following this, the unidimensionality of the scale was tested. According to O'Leary-Kelly and Vokurka (1998), to confirm unidimensionality two conditions exist. Firstly, there should be a significant association between the item and the underlying latent variable, and secondly, the item should be linked with just one single variable. By using CFA, the assessment of both at the same time is possible through the assessment of item loadings and general model fit. Notable item loadings confirm an item and latent variable share an association, and indices showing a good overall fit indicate that the model and data correspond, as well as indicating that an item does not share an association with a different latent variable (O'Leary-Kelly and Vokurka, 1998; Menor and Roth, 2007). The unidimensionality of the scales used in this study is thus demonstrated by the correspondence of the items and latent variables (with significant positive loadings) combined with a satisfactory overall model fit (Hair et al. 1998).

Lastly, by examining Fornell and Larcker's criteria (Fornell & Larcker, 1981), the discriminant validity of the measures was assessed. In order to confirm acceptable discriminant validity, it is necessary for the square root of the AVE to be above the values of both horizontal and vertical correlations between constructs. As Fornell and Larcker (1981) advised, the square root of the AVE was bigger than the latent factor correlations between pairs of constructs for each. The highest correlation was between formalization and centralization (r = 0.57), as shown in Table 3, which is less than the square root of the AVE for centralization (0.75) and formalization (0.87). According to these findings, all constructs show satisfactory discriminant validity.

Table 3: Descriptive Statistics and Correlation Matrix (N = 198)

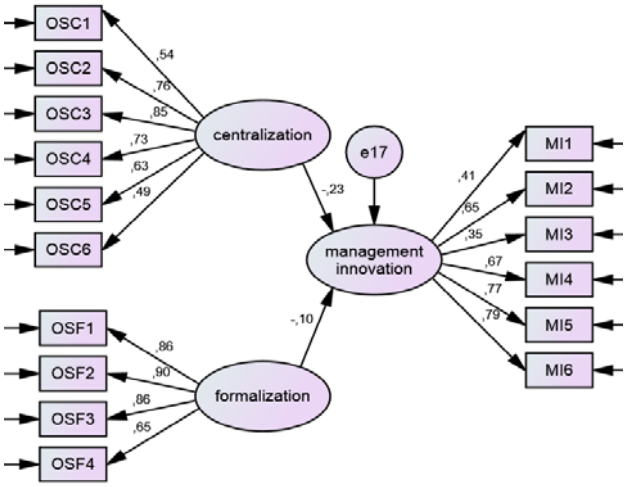
Constructs	Mean	Standard deviation	Management innovation	Centralization	Formalization
Management innovation	2.33	0.70	**0.71**		
Centralization	3.92	0.71	-0.21**	**0.75**	
Formalization	4.32	0.66	-0.13	0.57	**0.87**

** $p < .01$; the square root of AVE was shown as bold numbers on the diagonals.

3.4. Hypotheses Testing

The hypotheses of the study were assessed through structural equation modeling (SEM). The SEM results can be seen in Figure 1. The good fit of data and model is demonstrated by the fit indices for this model ($\chi 2$ = 246.58, df = 97, $\chi 2/df$ = 2.54, IFI = 0.90, NFI = 0.85, CFI = 0.90, RMSEA = 0.08). Hypothesis 1, which proposed that a negative relationship between centralization and management innovation exists, is supported by the model's results. The relationship between centralization and management innovation has a path coefficient of -0.23, and this has statistical significance ($P < 0.05$). However, the results of the model do not support Hypothesis 2, meaning that the relationship between formalization and management innovation, which has a path coefficient of -0.10, is statistically insignificant ($P > 0.05$).

Figure 1: The SEM Results



Notes: $\chi 2$ = 246.58, df (degree of freedom) = 97, $\chi 2/df$ = 2.54, IFI (the incremental fit index) = 0.90, NFI (the normed fit index) = 0.85, CFI (the comparative fit index) = 0.90, RMSEA (the root mean square error of approximation) = 0.08

4. CONCLUSION

This study has been conducted to reveal the impact of two core components of organizational structure, centralization and formalization, on management innovation. In accordance with this purpose, the data derived from 198 managers working in a public organization in Turkey was analyzed. The results of analysis have revealed that centralization affects management innovation significantly and negatively. This finding provides evidence that a centralized organizational structure impedes management innovation. It has also been found that formalization does not have a significant impact on management innovation.

This study's results are consistent with those of the meta-analysis study conducted by Damanpour (1991). A meta-analytical procedure was used in Damanpour's (1991) study, including seven moderators of the antecedent–innovation relationship and 13 antecedents of innovation, were integrated. His analysis resulted in: (1) a negative link between centralization and innovation, and (2) a non-significant link between formalization and innovation.

However, the findings of this study do not coincide with the argument of the dual-core theory of innovation. According to the dual-core theory of innovation, because management innovation requires top-down processes, it is likely that centralization and formalization can effect management innovation positively.

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Appendix 1: CFA Results for the Measurement Model (N = 198)

Fit statistics: $\chi 2 = 160.61$, df = 96, $\chi 2/df = 1.67$, IFI = 0.96, NFI = 0.90, CFI = 0.96, RMSEA = 0.06

Measurement item	Standardized path loadings	Standard error*	Item reliability
Centralization (AVE = 0.57; CR = 0.89)			
OSC1) Any major decision that I make has to have this company's approval	0.57	0.17	0.32
OSC2) Employees have to report small things to their supervisors	0.79	0.19	0.62
OSC3) Even within one's responsibility, an employee has to acquire permission before taking action.	0.83	0.23	0.69
OSC4) I can take very little action on my own until this company or its reps approve it	0.72	0.20	0.52
OSC5) I have to ask company reps before I do almost anything in my business	0.59	0.18	0.35
OSC6) When encountering a special circumstance, an employee cannot determine on his/her own how to handle the event.	0.50	-	0.25
Formalization (AVE = 0.75; CR = 0.92)			
OSF1) The firm has standard procedures for most routine practices, and these standards are written.	0.86	0.11	0.74
OSF2) There is a complete and refined set of rules and systems.	0.90	0.13	0.81
OSF3) It is required that everyone in the firm complies with the rules and codes.	0.86	0.12	0.74
OSF4) Contact with my company and its representatives are on a formal preplanned basis	0.65	-	0.42
Management innovation (AVE = 0.50; CR = 0.85)			
MI1) Our organization regularly renews rules and procedures.	0.42	-	0.18
MI2) New management systems are regularly implemented in our organization.	0.66	0.24	0.44
MI3) Our organization has changed the policy with regard to compensation in the last three years.	0.36	0.22	0.13
MI4) Our organization regularly restructures the intra- and inter-departmental communication structure within organization.	0.68	0.27	0.46
MI5) Certain elements of the organizational structure are continuously altered by we.	0.77	0.28	0.59
MI6) New methods for managing external relationships with other firms or public institutions (e.g., new forms of cooperation, new alliances, etc.) are frequently introduced by we.	0.80	0.31	0.64

* All of the path loadings are significant at the 0.01 level.