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Research Article

Organisational structure revisited

Örgüt yapısının tekrar incelenmesi

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Abstract

This study's primary goal is to investigate all variables that are reported to affect the organisational structure in the same research model. For this purpose, effects of Top Management Team profile variables, including Strategic Decision-Making Style and Strategic Decision-Making Group Size, Environmental Dynamism, Environmental Hostility, Organization Size (both annual turnover and number of employees are taken separately as the indicators of organisation size), Organization's Age, and Technology (three technological levels: low, medium and high technologies) on the Organizational Structure analysed. Organisation's Degrees of Centralization and Formalization were taken as organisational structure variables. The research adopted a convenient sampling method and was conducted with 455 managers working in Turkey's different organisations. The Partial Least Square-Structural Equation Model (PLS-SEM) approach is used to assess the effects of Top Management Team profile variables, environmental factors, and organisational factors on both the degree of centralisation and formalisation. The results show that TMT Age, Environmental Hostility, Organizational Size (Annual Turnover only), and Technology have a positive and significant effect only on formalisation, while Strategic Decision-Making Group Size, Strategic Decision-Making Style, and Environmental Dynamism on both The Degree of Centralisation and Formalisation. This study also showed that the effects of most of the variables mentioned in the literature as antecedents of the organisational structure could not be determined while all the variables mentioned above are included in the same research model.

Keywords: Organisational structure, Environmental Dynamism, Environmental Hostility, Top Management Team, Organization Size, Technology

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Öz

Bu çalışmanın temel amacı, organizasyon yapısını etkilediği bildirilen tüm değişkenlerin aynı araştırma modelinde incelenmesidir. Bu amaçla, Stratejik Karar Alma Stili ve Stratejik Karar Alma Grup Büyüklüğü, Çevresel Dinamizm, Çevresel Olumsuzluk, Örgüt Büyüklüğü (hem yıllık ciro hem de çalışan sayısı örgüt büyüklüğünün göstergeleri olarak ayrı ayrı analize dâhil edilmiştir) Tepe Yönetim Ekibi profil değişkenleri, Örgüt Yaşı ve kullandığı Teknolojinin (düşük, orta ve yüksek olmak üzere üç farklı teknoloji seviyesi) örgüt yapısı değişkenleri olarak alınan Merkezileştirme Derecesi ve Biçimselleşme Derecesi üzerine etkileri incelenmiştir. Araştırma, kolayda örneklem yöntemiyle ulaşılan, Türkiye'de farklı kuruluşlarda yönetici pozisyonunda çalışan 455 kişinin katılımıyla gerçekleştirilmiştir. Kısmi En Küçük Kareler-Yapısal Eşitlik Modeli (PLS-SEM) yöntemiyle Üst Yönetim Ekibi profili, çevresel ve örgütsel değişkenlerin hem merkezileştirme hem de biçimselleşme derecesi üzerindeki etkileri incelenmiştir. Sonuçlar, Tepe Yönetimin Yaşı, Çevresel Olumsuzluk, Örgüt Büyüklüğü (yalnızca Ciro) ve kullanılan Teknolojinin Biçimselleşme üzerinde olumlu ve anlamlı bir etkiye sahip olduğunu, Stratejik Karar Alma Grup Büyüklüğü, Stratejik Karar Alma Tarzı ve Çevresel Dinamizmin hem Merkezileştirme hem de Biçimselleşme Derecesi üzerinde etkisi olduğunu ortaya koymuştur. Bu çalışma ayrıca, literatürde örgütsel yapının belirleyicileri olarak bahsedilen değişkenlerin çoğunun, tüm değişkenler bir arada olduğunda etkilerinin belirlenemediğini ortaya koymuştur.

Anahtar Kelimeler: Örgüt Yapısı, Çevresel Dinamizm, Çevresel Olumsuzluk, Tepe Yönetim Ekibi, Örgüt Büyüklüğü, Teknoloji

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Introduction

> *"Every organised human activity-from the making of pots to the placing of a man on the moon gives rise to two fundamental and opposing requirements: the division of labour into various tasks to be performed and the coordination of these tasks to accomplish the activity. The structure of an organisation can be defined simply as the sum total of the ways in which it divides its labour into distinct tasks and then achieves coordination among them"* (Mintzberg, 1979/2015:2).

Many researchers have been working on structure-performance, structure-strategic decision-making, and structure-innovation relationships by comparing high and low-income companies' structures to find the best organisational structure that will maximise organisational efficiency and effectiveness (Akdemir, 2018). Therefore, determining the factors influencing the organisational structure has been rigorously studied by researchers. In the literature, five contextual factors influence the design of the organisational structure. These are (i) goal and strategy, (ii) environment, (iii) technology, (iv) size (Child, 1972; Akdemir, 2018), and (v) firm age (Mintzberg, 1979/2015). These five factors define an organisation's structure, consisting of three components (Akdemir, 2018: Koçel, 2011). These components are (i) degree of complexity, (ii) formalisation, and (iii) centralisation.

According to Chandler (1962), environment and resources cause the strategy to be shaped and form the structure. According to this point of view, all organisations, whether they are previously established or in the establishment process, continuously scan and evaluate both the internal and external environments to identify opportunities and threats in advance. Furthermore, according to Child (1972), "the organisation decision-makers may be in a position to institute modifications to the context (through, for instance, a revised environmental strategy) in order to retain preferred structure without serious detriment to performance." The organisation's decision-makers define the goals and strategies of the organisation. Hence, the first factor, i.e., the goal and strategy term, will be much more apparent if we write *strategic decision-makers*, i.e., *Top Management Team (TMT)* instead.

There is a tremendous amount of research in the literature investigating each variable's effect on the organisational structure. Nevertheless, without including all variables in the same research model, no one will be able to say for sure about the investigated variable's natural effect since the effect could cause other non-present variables. However, a few studies included most of the variables in the same research model, but most of them are decades old, and therefore this issue is required to be rechecked since everything had changed radically, including technology.

Therefore, this study's importance lies in investigating the effects of all factors mentioned above on the organisational structure in one research model. In the literature review, the reported effects of each one of the five factors mentioned above will be examined.

Theoretical framework and hypotheses

Organisational structure

The organisational structure outlines how certain organisational activities are directed to achieve organisational objectives. These organisational activities include formal or informal rules, roles, and responsibilities that are shaped by three organisational components: degree of (i) complexity, (ii) formalisation, and (iii) centralisation. In this research, the degree of formalisation and centralisation will be taken as organisational structure indicators.

The ***degree of centralisation***, one of the most researched and emphasised issues in studies on Strategic Decision-Making Process (SDMP) (Papadakis and Barwise, 2002), expresses the degree of authority gathered in specific individuals and their power in decision-making processes. Both ***formalisations*** extend predefined policies such as the job descriptions, standardised procedures, managerial plans, and the extent to which they are used (Papadakis, Lioukas and Chambers, 1998) degree of centralisation increase the rationality and formality of SDMP.

Top management team (strategic choice - goals and strategies)

An organisation evolves and develops in line with the strategic decisions taken by the top management. Although the constraints imposed by the environment shape these decisions, they ultimately reflect the top management's goals or needs (Child, 1972). The strategic decisions are not made only by one person but made by a Top Management Team under the CEO's leadership. In this context, the TMT term covers all management levels that participate in the SDMP.

Many demographic, professional, and psychometric features of TMT and people at the TMT are effective in the SDMP (Hambrick and Mason, 1984). Some of these characteristics are TMT size, their ethnic origins (Slater, Paliwoda, and Slater, 2007), risk-taking, beliefs, number of past positions, ages, education levels (Shepherd and Rudd, 2014), and genders (Lechner and Gudmundsson, 2014). Strategic decisions mentioned below should be understood as the decisions that shape the organisational structure. In this study, the following will be taken as TMT profile: TMT members age, gender, tenure, sectoral experience, education level, education field, strategic decision-making (SDM), group size, and style.

Researches report a negative relationship between risk-taking tendency and ***age***. Although calculated risk-taking is one of the competencies that a manager must have (Smart, 1998; Aslan, 2016), individuals under a certain age tend to take risk blatantly while over a certain age become more conservative (Hambrick and Mason, 1984; Anbar and Eker, 2009; Saraç and Kahyaoğlu, 2011). ***Gender*** also affects the SDMP, while women take less risk than men (Terjesen and Szerb, 2008), use organisational resources more controlled and tend to activate the organisation's non-financial resources more than men (Frink et al., 2003).

The ***tenure*** and the ***sectoral experience*** also have effects on SDMP. Tenure causes TMT to maintain the current status quo, use fewer information sources, analyse more but filter information more (Hambrick and Fukutomi, 1991). Increment in the sector experience of TMT, especially in different companies, causes an increment in the tendency to work as a team, which should cause less formalisation and centralisation in the organisation.

The ***education field*** and ***education level*** also have effects on SDMP. The difference in the level of education causes people to have different job competencies such as performance, decision making, problem-solving, thinking, communication, conflict management, and changing the way they perceive the business (Yüksekbilgili, 2016). As far as concerning the education field, according to Hambrick and Mason (1984:197):

"Executives often are chosen precisely because they have the 'right' background or temperament to carry out actions hoped for by the board of directors or other controlling parties. Prime examples are the finance executive who is selected as CEO to conglomerate a firm, or an operations executive who is selected as CEO to retrench and rationalise a firm."

The ***SDM styles***, which range from a consultative to a joint decision-making style (Korsgaard, Schweiger and Sapienza, 1995), should impact both the formalisation and centralisation of the organisation. If the decision-making style is consultative, or decisions made by only one person, then the degree of centralisation should increase in order for the decision-maker to control all information and outcomes, but formalisation should decrease since the decision-maker is the only one to decide. If the decisions are made by a group and voting, i.e., participative, then the degree of centralisation should decrease. On the other hand, the formalisation should increase in order to control the SDMP.

Likewise, the ***SDM Group Size*** is positively correlated with team heterogeneity (Bantel and Jackson, 1989) and cognitive conflict (Bailey and Peck, 2013), and it is common to find or seek coalitions within the decision-making group to exert influence. The increase in decision-making group size should impose some rules to prevent political behaviour and coalitions. As per the TMT as mentioned above, profile variables, our first hypothesis group is developed as follow:

H_1: *TMT member profile variables have a statically significant effect on the organisational structure while all other antecedents of organisational structure are present.*

$H_{1a,b}$: *TMT member age significantly increases both (a) the formalisation and (b) the centralisation degree of the organisation.*

$H_{1c,d}$: *TMT gender significantly affects the formalisation and centralisation degree of the organisation. Organisations managed by men are (c) more formalised and (d) centralised compared to organisations managed by women.*

$H_{1e,f}$: *TMT member tenure significantly increases both (e) the formalisation and (f) the centralisation degree of the organisation.*

$H_{1g,h}$: *TMT member sector experience significantly decreases both (g) the Formalisation and (h) the centralisation degree of the organisation.*

$H_{1i,j}$: *TMT member education level significantly increases both (i) the formalisation and (j) the centralisation degree of the organisation.*

$H_{1k,l}$: *Organisations managed by TMT member graduated from technical fields significantly increases (k) the formalisation and (l) the centralisation degree of the organisation.*

$H_{1m,n}$: *TMT participative decision-making style significantly increases (m) the formalisation and (n) decreases the centralisation degree of the organisation.*

H1o,p: The strategic decision-making group size significantly increases (o) formalisation and (p) decreases the centralisation degree of the organisation.

Organisation

Do the structures of older organisations differ from those of new ones? Mintzberg's (1979/2015: 228) response to this question is "*as organisations age, all other things being equal, they repeat their work, with the result that it becomes more predictable, and so more easily formalised*" and continues by giving Aston group experiment. When the Aston group repeated their work about five years later, they saw that more than 90% of firms (13 out of 14 firms) increased their formalisation levels (Inkson, Pugh and Hickson, 1970; Mintzberg, 1979/2015). Hence, ***the organisation age*** should increase both degrees of centralisation and formalisation. The same is true for ***organisation size***, which positively affects competition, technology use, and access to resources.

Organisational size affects the organisational structure, including formalisation, departmentalisation, and SDMP (Mintzberg, 1979/2015) to implement the hierarchical control mechanism effectively. The formalisation level increases with the size (Blau and Schoenherr, 1971; Pugh et al., 1969), but both Blau and Schoenherr and Aston Group, i.e., Pugh, found that the degree of centralisation is negatively correlated with the organisation size.

The methods, techniques, machinery, and knowledge employed by an organisation for converting inputs into outputs, i.e., ***the technology***, has been listed as another factor that shapes the organisational structure (Child, 1972; Akdemir, 2018). There are, however, studies that have not found a statistically significant effect of technology on the organisational structure (Mohr, 1971; Routamaa, 1985).

Nevertheless, the technology itself should impose some level of formalisation in order to be adopted and used as prescribed and should distribute the decision-making authority between the people who possess the knowledge about the technology, i.e., should decrease the centralisation but increase the formalisation in order to ensure the quality of workflow. In this study, only organisation age, organisation size, and technology were taken as organisational variables.

H_2: *Organisation-specific variables have statically significant effects on the organisational structure while all other antecedents of organisational structure are present.*

$H_{2a,b}$: *Organisation age significantly increases both (a) the formalisation and (b) the centralisation degree of the organisation.*

$H_{2c,d,e,f}$: *The number of employees of an organisation significantly increases (c) formalisation and (d) decreases the centralisation degree of the organisation. While the annual turnover of an organisation significantly increases (e) formalisation and (f) decreases the centralisation degree of the organisation.*

$H_{2g,h}$: *The technology used significantly increases (g) the formalisation, and (h) decreases the centralisation degree of the organisation.*

Environment

According to contingency theory, organisations try to adapt environment (Donaldson, 2006), and an effective organisation has to be designed to be adapted to cope with the contingencies that derive from the circumstances of environment, technology, scale, resources, and other factors (Child, 1973). Furthermore, strategic decisions are the organisations' reactions to the change in the environment and adaptation to those changes (Papadakis and Barwise, 2002; Shepherd and Rudd, 2014). Several environmental variables affect the organisational structure. This study, however, examines environmental hostility and dynamism on organisational structure.

Environmental hostility refers to undesirable environmental conditions like high competition, scarce resources and opportunities, low munificent, economic, political, and legal drawbacks, rapid and dramatic changes in customer preferences (Elbelbessi, 2018). Organisations adapt and change their structures and strategies according to the perceived environmental hostility (Khandwalla, 1972). It limits TMT's decision-making (Papadakis and Barwise, 2002) and affects the centralisation and formalisation of organisations, as well as in decision-making styles of TMT.

Environmental dynamism, on the other hand, is the frequency of changes in the organisation's environment in terms of but not limited to customer demands, technology, competitive structure,

economic, social, and political policies, and has effects on organisational structure (Lawrence and Lorsch, 1967) and SDMP (Miller, Burke and Glick, 1988) so that TMT tent to use intuition more in dynamic environmental conditions (Khatri and Ng, 2000). To prevent the use of intuition in SDMP, organisations should impose rules, and this should cause an increase in both formalisation and centralisation degree of organisation.

H_3: *Environment has a statically significant effect on the organisational structure while all other antecedents of organisational structure are present.*

$H_{3a,b}$: *Environmental hostility significantly increases (a) the formalisation and (b) the centralisation degree of the organisation.*

$H_{3c,d}$: *Environmental dynamism significantly increases (c) the formalisation and (d) the centralisation degree of the organisation.*

All these hypotheses are illustrated in Figure 1.

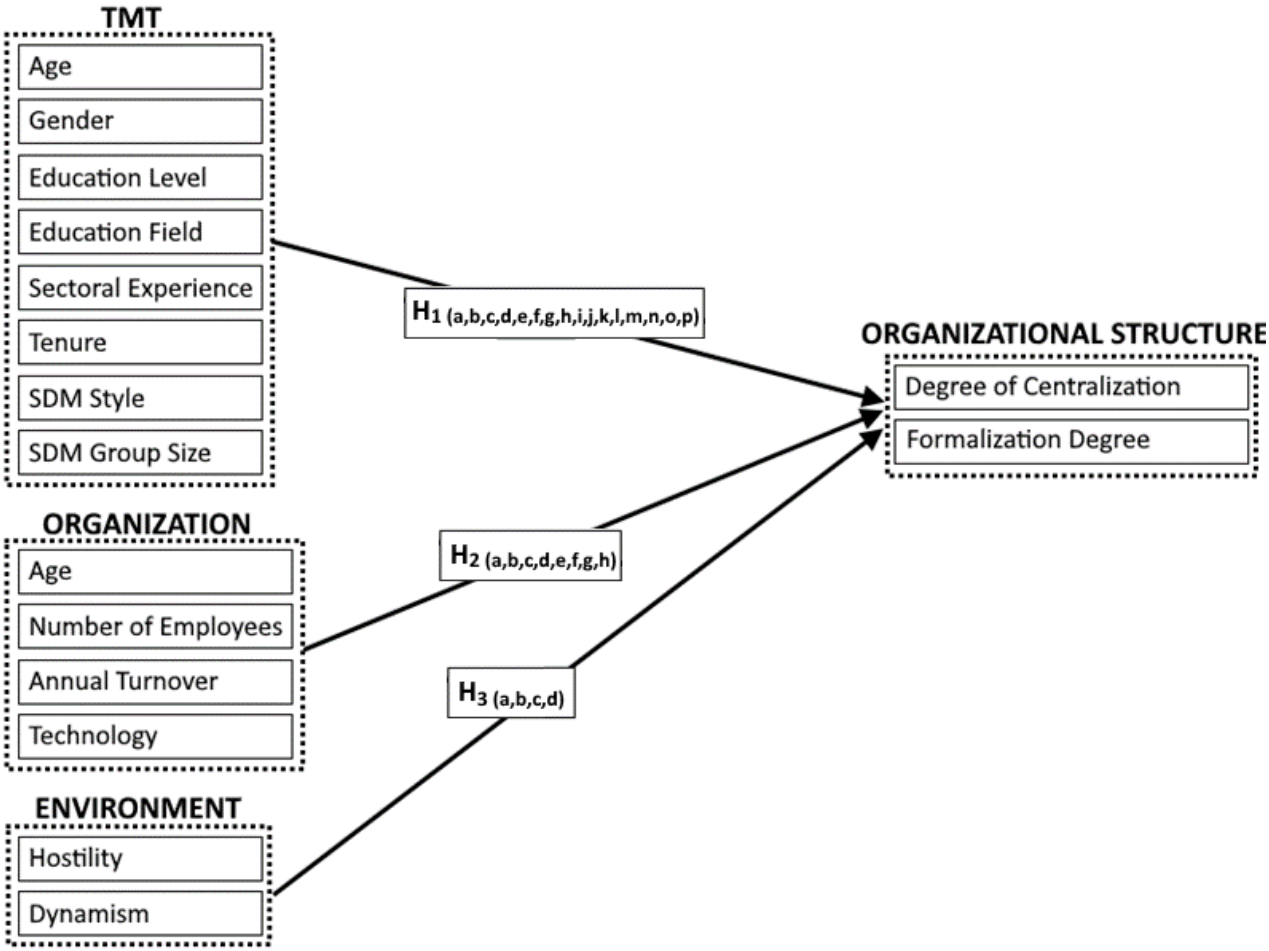

Figure 1. Proposed Research Model

Research design

Measures

Based on the literature review, our research's primary goal is to assess the effect of environment, TMT Profile, and organisation-specific variables on the organisational structure while all the variables are present. Four different scales were used to measure the variables in our research model. Questions were also asked to determine the TMT profile and Organization specific characteristics, the SDM style, SDM Group Size, and the participant's effect on the SDMP.

The technology is determined based on the sector. The sectors are divided into three technology levels. The first level is the lowest, and the third is the highest in the range. Organisations operating in the service industry, such as accounting offices, insurance brokers, consulting companies, hotels, are considered the *lowest (1)*. The organisations operating in the defence, food processing, electronics, automotive, pharmaceutical, IT industries are considered the *highest (3)*. In contrast, all other industries

that do not require complex or very advanced technologies to carry on manufacturing activities, such as machinery manufacturing, plastic goods, construction, are considered *medium (2)* level technologies.

In order to determine the size of the organisation, participants were asked to select the number of employees and annual turnover from the given list. For annual turnover, the criteria adopted as *(1) below 2 million USD, (2) between 2-25 million USD*, and *(3) over 25 million USD*, which aims to define micro, SME, and big scale organisations, respectively.

Wally and Baum (1994) initially developed the centralisation degree scale, adapted into Turkish and used by Ürü et al. (2011). The measure has five items and uses a 5-point Likert scale ranging from *(1) Strongly Disagree* to *(5) Strongly Agree*.

The formalisation degree scale initially developed by Papadakis, Lioukas, and Chambers (1998), adapted into Turkish and used by Ürü et al. (2011). The measure has seven items and uses a 7-point Likert scale ranging from *(1) Absolutely wrong* to *(7) Absolutely true*.

The environmental dynamism scale was developed by Ürü et al. (2011). The measure has five items and uses a 5-point Likert scale ranging from *(1) Never* to *(5) Always*. The environmental hostility scale was developed by Ürü Sanı et al. (2016). The measure has three items and uses a 7-point Likert scale ranging from *(1) Absolutely wrong* to *(7) Absolutely true*.

Sampling

In this research, the convenient sampling method was adopted. No industry or location restrictions were applied to the selection of participants. The only criteria were to be in a management position and have a significant effect on SDMP. The participants were mostly reached via LinkedIn, one of the biggest professional social networking websites, and the researchers' professional network executives. The questionnaires were sent to 3,230 executives in electronic form. Only about 10% of the questionnaires were filled in by face-to-face interview with the participants.

Total 455 of 603 returned questionaries were used in the analysis because of either duplicate (38 questionaries) or low effect on SDMP (110 participants). The participants' profile is given in Table 1. All the data used in this study is collected between 14 Oct 2019-12 Dec 2019.

Table 1: Profile of Respondents

Variable	Coding & Category	f	%	Variable	Coding & Categories	f	%
Gender	1) Male	362	79,6	Tenure	1) <5 Years	190	41,8
	2) Female	93	20,4		2) ≥5 and <10	126	27,7
Age	1) <35 Years Old	72	15,8		3) ≥10 and <20	55	12,1
	2) ≥35 and <45	146	32,1		4) ≥20 Years	84	18,5
	3) ≥45 and <55	173	38,0	Sector Experience	1) <5 Years	76	16,7
	4) ≥55 Years Old	64	14,1		2) ≥5 and <10	86	18,9
Education Level	1) High School & Below	21	4,6		3) ≥10 and <20	200	44,0
	2) Undergraduate	239	52,5		4) ≥20 Years	93	20,4
	3) Graduate School	195	42,9	Effect on SDMP	1) Same as other TMT Members	135	29,7
Education Field	1) Social Sciences (Business, Finance etc.)	190	41,8		2) Slightly more than other TMT Members	87	19,1
	2) Technical fields	131	28,8		3) Very High	172	37,8
	3) Both Social Sciences and Technical fields	46	10,1		4) I make strategic decisions	61	13,4
	4) Other	88	19,3	Title	1) Department Manager	74	16,3
Relationship to Owner	1) Owner	114	25,1		2) Director, C-Level Manager	151	33,2
	2) Close Relative	42	9,2		3) GM or CEO	78	17,1
	3) Professional	299	65,7		4) Chairman or Member of The Board.	152	33,4

Figures related to SDM group size and style are given in Table 2.

Table 2: Strategic Decision-Making Group Size and Style

Variable	Categories	f	%
SDM Group Size	1 Person	25	5,5
	2 People	58	12,7
	3 People	137	30,1
	4 People	64	14,1
	5 People	86	18,9
	6 People	11	2,4
	7 And More People	74	16,3
SDM Style	By one person who has the power to make SD	28	6,2
	By one person after consulting with SDM Group	217	47,7
	By SDM Group with the majority of votes	159	34,9
	By SDM Group anonymously	51	11,2

Figures related to organisations that participants are working at are given in Table 3.

Table 3: Organisation Specific Variables

Variable	Coding &	f	%
Number of Employees	1) ≤49 Employees	171	37,6
	2) ≥50; ≤249	125	27,5
	3) ≥250; ≤499	37	8,1
	3) ≥500	122	26,8
Annual Turnover (in Million $)	1) ≤2	208	45,7
	2) >2; ≤25	79	17,4
	3) >25	168	36,9

Variable	Coding &	f	%
Organisation Age	1) ≤1 Year	32	7,0
	2) >1; ≤3	22	4,8
	3) >3; ≤10	83	18,2
	4) >10; ≤20	93	20,4
	5) >20; ≤50	165	36,3
	6) >50 Years	60	13,2
Technology	1) Low	205	45,1
	2) Medium	101	22,2
	3) High	149	32,7

Findings

Confirmatory Factor Analysis (CFA) is performed with SmartPLS 3.2.9 software. The proposed model is tested by conducting partial least squares (PLS) analysis, a structural equation model (SEM) technique.

Measure validity and reliability

Within the scope of validity and reliability analyses, internal consistency and reliability, convergent validity, and discriminant validity were evaluated. Internal consistency and reliability verified via Cronbach's Alpha and Composite Reliability (CR) coefficients. Convergence reliability verified by assessing Average Variance Extracted (AVE) and factor loadings.

The factor loadings are expected to be greater or equal to 0.708, and Cronbach Alpha is expected to be greater or equal to 0.60 (Lyberg et al., 1997), and CR coefficients are greater or equal to 0.70 (Hair, Risher, Sarstedt and Ringle, 2019). The AVE value is expected to be greater or equal to 0.50 (Fornell and Larcker, 1981; Hair et al., 2019).

Hair et al. (2014) suggest the removal of items with a factor loading below 0.40. Furthermore, items with factor loadings between 0.40 and 0.70 should be removed if the AVE or CR values of those constructs are below the threshold.

Two items of the Degree of Centralisation scale and one item from Environmental Hostility were removed to satisfy convergence validity and results obtained from the final run reported in Table 4.

Table 4: Factor Loadings, CR and AVE Values of Scales

Variable	Item	Factor Loading	Cronbach's	CR	AVE
Degree of Centralization	CENT1	0.679	0.696	0.826	0.614
	CENT2	0.825			
	CENT3	0.838			
Environmental Dynamism	DYN1	0.653	0.760	0.836	0.509
	DYN2	0.764			
	DYN3	0.797			
	DYN4	0.764			
	DYN5	0.560			
Environmental Hostility	HOST1	0.963	0.771	0.885	0.795
	HOST2	0.815			
Formalization Degree	FORM1	0.832	0.914	0.932	0.665
	FORM2	0.851			
	FORM3	0.882			
	FORM4	0.845			
	FORM5	0.815			
	FORM6	0.657			
	FORM7	0.808			

The discriminant validity assessment is verified with the heterotrait-monotrait (HTMT) ratio of the correlations (Voorhees, Brady, Calantone and Ramirez, 2016; Henseler, Ringle and Sarstedt, 2015). The HTMT value is expected to be less than 0.90 for constructs that are similar to each other and less than 0.85 for those that are distinct (Henseler et al., 2015).

The discriminant validity is established since the highest HTMT value observed was 0.481<0.850. The structural model was assessed by evaluating the R^2 and Q^2 (Hair et al., 2019) that are presented in Table 5.

Table 5: R2 and Q2 Values of The Research Model

Variable	Q2	R^2
Centralization	0.032	0.083
Formalization	**0.104**	**0.166**

According to the results given above and all VIF values are being lower than 3, and the value of the R^2 statistics (0.166 for Formalization Degree) is higher than the recommended value of 0.10 (Falk and Miller, 1992; Hair et al., 2019), it is concluded that the measures have adequate reliability and discriminant validity, and the research model is acceptable.

Hypothesis Testing

Partial least squares path analysis (PLS-SEM) and bootstrapping resampling method were used to reveal both the main and the interaction effects in the research model. For this purpose, SmartPLS 3.2.9 statistics software was used.

PLS algorithm was run to calculate the path coefficients and R2 for the research model. In order to evaluate the significance of PLS path coefficients, t-values were calculated by taking 5000 sub-samples from the sample with bootstrapping. The results related to the research model are given in Table 6

Table 6. The Statistical Significance and Path Coefficients

Path	Hypothesis	β
TMT Age -> Formalization	H_{1a}	0.132**
TMT Age -> Centralization	H_{1b}	-0.018
Gender -> Formalization	H_{1c}	-0.006
Gender -> Centralization	H_{1d}	0.051
Tenure -> Formalization	H_{1e}	-0.057
Tenure -> Centralization	H_{1f}	-0.129
Sectoral Experience -> Formalization	H_{1g}	0.109
Sectoral Experience -> Centralization	H_{1h}	0.038
Education Level -> Formalization	H_{1i}	-0.003
Education Level -> Centralization	H_{1j}	0.023
Education Field -> Formalization	H_{1k}	-0.005
Education Field -> Centralization	H_{1l}	-0.073
SD Making Style -> Formalization	H_{1m}	0.103*
SD Making Style -> Centralization	H_{1n}	0.152**
SD Making Group Size -> Formalization	H_{1o}	0.154**
SD Making Group Size -> Centralization	H_{1p}	0.106*
Organization Age -> Formalization	H_{2s}	0.086
Organization Age -> Centralization	H_{2b}	-0.030
Number of Employees -> Formalisation	H_{2c}	-0.091
Number of Employees -> Centralisation	H_{2d}	-0.063
Annual Turnover -> Formalization	H_{2e}	0.113*
Annual Turnover -> Centralization	H_{2f}	0.012
Technology -> Formalization	H_{2g}	0.095*
Technology -> Centralization	H_{2h}	-0.005
Environmental Hostility -> Formalization	H_{3a}	0.172**
Environmental Hostility -> Centralization	H_{3b}	-0.048
Environmental Dynamism -> Formalization	H_{3c}	0.111*
Environmental Dynamism -> Centralization	H_{3d}	0.140*

β: Standardized Coefficient; ***p<0.05: ****p<0.01**

Regarding the first hypothesis, the TMT age has a statistically significant and positive effect only on the organisations' formalisation degree, and therefore H_{1a} is supported while H_{1b} is not. No statistically significant effects of gender (H_{1c} and H_{1d}), tenure (H_{1e} and H_{1f}), sector experience (H_{1g} and H_{1h}), the education level (H_{1i} and H_{1j}), and education field (H_{1k} and H_{1l}) on either the formalisation or the centralisation degree of the organisation could be determined. Therefore, those hypotheses are not supported.

The results show that the participative decision-making style significantly increases the Formalisation (H_{1m}) but does not decrease the organisation's centralisation degree as proposed in H_{1n} but increases. Therefore, H_{1m} is supported while H_{1n} is not. The results also showed that SDM group size significantly increases Formalisation (H_{1o}), and like in the SDM style, it increases the organisation's centralisation degree, despite our hypothesis. Therefore, H_{1o} is supported while H_{1p} is not.

Organisation Size, when *Annual Turnover* is considered the indicator of the size, has a positive and statistically significant effect on the organisation's formalisation degree and technology. All other organisational variables have no statistically significant effect on either the organisation's formalisation or centralisation degree. Therefore, the hypotheses related to organisation age (H_{2a} and H_{2b}) and the number of employees (H_{2c} and H_{2d}) on both the formalisation and centralisation are not supported. Furthermore, annual turnover (H_{2f}) and technology (H_{2h}) on the organisation's centralisation degree are not supported.

Environmental dynamism has statistically significant and positive effects on both the formalisation and centralisation degree of the organisation. Hence, hypotheses related to environmental dynamism (H_{3c}

and H_{3d}) are supported. Environmental hostility has a statistically significant and positive effect only on formalisation. Therefore, H_{3a} is supported while H_{3b} is not.

Discussion and conclusion

Theoretical contributions

This study showed that the effects of most of the variables mentioned in the literature as antecedents of the organisational structure could not be determined. As mentioned in the introduction, without including all variables in the same research model, no one will be able to say for sure about the investigated variable's natural effect since the effect could be the cause of another non-present one.

The results verified the literature about the significant positive effect of TMT age on formalisation. In the literature, it is mentioned that younger managers are more willing to undertake change, while seasoned managers prefer formal rules, established routines (Wiersema and Bantel, 1992; Aslan, 2020; Child, 1974) and try to gather as much information as possible to make decisions (Taylor, 1975).

The positive effects of the SDM group size on both degrees of centralisation and formalisation are crucial for organisations since it also implies having and using predefined SDM procedures to make and evaluate SDs. The same is valid with the SDM style due to its significant effects on SDM group size, degree of centralisation, and formalisation.

This study verified the effect of technology on the organisational structure. Centralisation is not preferred by the service industry where either small teams or individuals fulfil the tasks, and the problems have to be solved immediately right at the spot. In medium and high technology industries, especially organisations involved in mass production, formalisation, and centralisation, they increase to avoid mistakes and failures.

Although annual turnover, as the indicator of organisational size, revealed the relationship between size and formalisation, unfortunately, a free entry field for participants to enter the number of employees in their organisation was not provided. The options provided to choose from four different ranges (e.g., 1-49, 50-249, 250-499, and 500 and over, respectively).

Environmental dynamism and hostility force organisations to adopt and implement written procedures and rules to avoid any mistakes, and this is demonstrated in our results where both environmental variables increase formalisation and centralisation degrees of the organisation. These results contradict the findings of Ford and Slocum (1977) and Child (1975). They stated that environmental dynamism and uncertainties cause lower centralisation and formalisation. However, as mentioned above regarding technology, lower centralisation and formalisation are valid only for service and high technology industries to handle, adapt with the environmental dynamism, and solve the problems immediately right at the spot. Even in those industries, the staff's solutions are being written down and become part of formal rules, policies to comply with some quality standards offered by the organisation.

Practical implications

This study showed the importance of the TMT members' age, SD making style, and SD making group size. The organisations that use low-level or high-level technologies should focus on the TMT age, SD group size, and style since they positively affect the formalisation. Both high and low-technology companies, especially service firms, are not formalised as much as mid-technology firms. The formalisation causes resources to be used more efficiently. That is why formalisation is essential for firms (Neilson, Martin and Powers, 2008). However, particular attention should be given to both SD-making and SD-making groups since they increase formalisation and centralisation, which negatively affects creativity (Kalay and Lynn, 2016).

Limitations and further studies

Some methodological limitations may also apply to this study, such as the same participants answered both dependent and independent variables, which is open for standard method variance. Harman's one-factor test (Podsakoff and Organ, 1986) is used to rule out this possibility. The result of the one-factor test was 19,932%, which is less than 50%. Therefore, it is concluded that a single (global) factor does not account for most of the variance.

The effect size and the relationship of the SD-making group size and style on organisational structure variables suggest that further studies should focus on determining the optimal SD-making group size and the effect of SD-making style on SD-making group size. At this point, the TMT's effects on both SD-making group size and style are crucial and need to be investigated.

Another suggestion is about the Management Information Systems (MIS) usage level of TMT. This variable should be included in the research model as either independent or a mediator between TMT, and organisational structure variables should lead to a better assessment of the degree of effects of TMT on the organisational structure since MIS is one of the ways that communication is established between stakeholders and the only way used to assess the performance of the organisation. It should, therefore, have a significant effect on both the degree of centralisation and formalisation.

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