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STUDY OF TOE FRAMEWORK WITH CONTENT ANALYSIS IN THE USE OF MARKETING MANAGEMENT

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Abstract

The purpose of the study is to investigate how the Technology-Organization-Environment (TOE) framework is used in social sciences and to discuss how it can be used especially in the field of marketing management. Within the scope of the research, literature review is conducted and relevant studies are selected. Content analysis is applied to selected studies. The literature review is conducted without any time limitation and only articles in social sciences are selected as restrictions. According to limited available resources, 33 studies deemed appropriate within the scope. The studies are evaluated and grouped according to; subjects, the sub-variables of the main context of the TOE model, sample, data collection, analysis method and research method. Results showed that, TOE framework is mostly used in social media and e-business adoption. When sub-contexts of the model are analyzed, the most used variables are; relative advantage and compatibility in the technological context, firm size and top management support in organizational context, competitive pressure in environmental context.

Keywords: TOE Framework, Technology Adoption, Content Analysis, Marketing Management, Social Sciences.

Jel Classification: M13, M30, M31

PAZARLAMA YÖNETİMİNDE KULLANIMI AÇISINDAN TOÇ MODELİNİN İÇERİK ANALİZİYLE İNCELENMESİ

Öz

Çalışmanın amacı, sosyal bilimlerde Teknoloji-Organizasyon-Çevre (TOÇ) modelinin nasıl kullanıldığını incelemek ve özellikle pazarlama yönetimi alanında nasıl kullanılabileceğini tartışmaktır. Araştırma kapsamında literatür taraması yapılmış ve amaca yönelik olarak bazı çalışmalar tespit edilmiştir. Ulaşılan çalışmalar içerik analizi ile incelenmiştir. Araştırma kapsamında yıl sınırlaması olmadan veri tabanları üzerinden literatür taraması yapılmış, kısıt olarak sadece sosyal bilimler alanında yer alan makaleler seçilmiştir. Ulaşılabilen kaynaklar incelendiğinde içerik analizi kapsamında uygun bulunan 33 çalışmaya yer verilmiştir. Elde edilen çalışmalar; konular, TOÇ modeli ana bağlamlarının alt değişkenleri, örneklem, örneklem toplama yöntemleri, analiz yöntemi ve araştırma yöntemi açısından değerlendirilip gruplandırılmıştır. Analiz sonuçları, TOÇ modelinin en çok sosyal medyanın ve e-ticaretin benimsenmesinde kullanıldığını göstermiştir. Model alt bağlamları açısından incelendiğinde, araştırmacılar tarafından en çok kullanılan değişkenler; teknolojik bağlamda göreceli üstünlük ve uyumluluk; organizasyonel bağlamda firma büyüklüğü ve üst yönetim desteği, çevresel bağlamda rekabet baskısı olmuştur.

Anahar Kelimeler: TOÇ Modeli, Teknoloji Benimseme, İçerik Analizi, Pazarlama Yönetimi, Sosyal Bilimler.

Jel Sınıflaması: M13, M30, M31

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1. Introduction

Rapid development of information technologies have important effects on businesses in many ways. This dynamic issue in addressed by researchers in wide range of studies. Technology adoption and related outcomes generally have important effects on business processes and business models. According to the literature, researchers analyze the organizational behaviors towards technology and try to analyze the impact of adopting innovation on achieving desired goals. There are some important studies aim to measure technology adoption of enterprises; The Technology Acceptance Model (TAM), the Theory of Planned Behavior (TPB), The Diffusion of Innovation Theory (IDT), the Diffusion of Innovation (DOI), the Theory Reasoned Action (TRA) and the Technological, Organizational and Environmental Framework (TOE) (Maduku et al., 2016; Parveen, 2012; Rehayu and Day, 2015). This study specially focuses on TOE framework by content analysis of literature.

Tornatzky and Fleischer (1990) developed the TOE Framework to evaluate technology adoption. The authors defined the adoption of technological innovations in three-stages; initiation, adoption and implementation. The first stage involves the initialization phase of collecting and evaluating information about technological innovation, a decision is made on which technology to use in the adoption phase, the implementation phase involves the introduction of innovation (Scupola, 2003: 52).

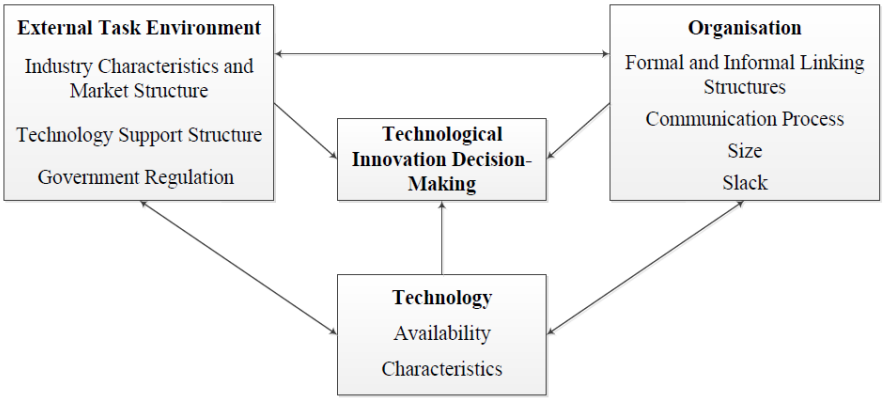

Figure I: Tornatzky and Fleischer (1990) TOE Framework

Source: Rahman and Aydın, 2019: 130

The TOE framework explains how adoption of technological innovation takes place at the firm level. The theory states that there are broad contexts that affect the adoption, implementation and using of innovation (Figure I): organizational context, technological context and environmental context. The technological context explains both internal and external technologies associated with the organization and possible technologies that can be adopted. The organizational context is typically defined by the firm's various descriptive measures, features and resources. The environmental context refers to the outer arena in which the organization performs its business, its capability to access sources provided by others, and to interact with the governance and other firms (Zhang and Xiao, 2017: 7-8).

The TOE framework not only focuses on the technological contexts, but also provides a broader perspective, taking into account organizational and environmental contexts.

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The model supposes that changes in a firm are designated not only by employees in the firm, but also by the features of the firm in which they actuate, and this view provides an interactive approach. The interaction between the interactive approach and the context explains the technology adoption of businesses comprehensively (Rahayu and Day, 2015: 144).

As with many models, although the TOE framework has open aspects to development, it is remarkable that the model has a wide and versatile context structure, and the sub-dimensions of the basic contexts can be varied according to the research subject. Another important issue is noteworthy in the literature review is that the theoretical infrastructure provided by the model can be a process input that enables different outputs. Based on the TOE framework, researchers may find solutions to different business questions with different approaches.

2. Methodology

In the current study, content analysis was used to evaluate the data obtained. Stone et al. (1966: 213) defined content analysis as a research technique used to draw systematic and unbiased results from certain characters explained in the text. Krippendorff (1980: 25), stated that it is a research technique used to draw repeatable and valid results from the data. Content analysis is a measurement technique that is widely used in social sciences (Marangoz et al., 2012: 68). In the literature, there are some grouping types made by the researchers within the TOE framework; Robertson (2005) grouped studies according to the sub-dimensions of the TOE framework; Salwani et al. (2009) grouped studies by purpose and sub-dimensions; Arpaci et al (2012) grouped them according to their subjects; Yadegaridehkordi et al. (2019) grouped them by sub-dimensions; Alharji et al. (2017) grouped the studies according to their subjects, methods and dimensions.

In order to collect data, only studies that use the TOE framework in the social sciences field were chosen, without time restrictions from available databases. Selected 33 studies were analyzed in 6 basic categories; subjects, the sub-variables of the main context of the TOE model, sample, data collection, analysis method and research method. In order to ensure validity and reliability, consensus of the article researchers of category selection is sought after. Frequency analysis of the collected data was done in SPSS program and findings were shown in the tables in the form of frequency and percentage results and comments were added.

3. Findings

For data analysis, frequency analysis was applied to categories in SPSS program for content analysis. The tables below include the analysis made for each category. In order to achieve objective results, the statements in the tables were taken as stated in the source, loyal to original formats.

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Table 1: Technology Focus of Researches (Subjects)

		Frequency	Percent
Subjects	Electronic data interchange (EDI) adoption	1	3
	E-business value	1	3
	E-business adoption	7	21,2
	E-commerce usage	3	9,1
	E-procurement adoption	1	3
	E-market adoption	1	3
	Social media adoption	8	24,2
	IT adoption	2	6,1
	E-commerce adoption	3	9,1
	Enterprise applications adoption	1	3
	Mobile marketing adoption	1	3
	Mobile service adoption	1	3
	Social media usage	1	3
	ICT adoption	1	3
	Big Data Adoption	1	3
	Total	33	100

Table 1, shows the technological focus of the studies within the TOE framework. Within the scope of the analysis, the most repeated statements were social media adoption (24.2%), followed by e-business adoption (21.2%). Based on this table, we can state that the TOE framework can be appropriate model for examining the social media adoption for businesses.

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Table 2: TOE Framework Technological Context

		Responses		Percent of Cases
		N	Percent	
Technological Context Sub-dimensions	Perceived direct benefits	3	3,40%	9,70%
	Technology Integration	3	3,40%	9,70%
	Technology competence	3	3,40%	9,70%
	Discontinuity of services	1	1,10%	3,20%
	Compatibility integration	1	1,10%	3,20%
	Benefits of new technology	1	1,10%	3,20%
	EDI	1	1,10%	3,20%
	Asset specificity	1	1,10%	3,20%
	Technology readiness	2	2,30%	6,50%
	Perceived indirect benefits	2	2,30%	6,50%
	Perceived costs	1	1,10%	3,20%
	Relative advantage	11	12,50%	35,50%
	Barriers and benefits	1	1,10%	3,20%
	Related technologies	1	1,10%	3,20%
	Type of ICT adopted	1	1,10%	3,20%
	Type of ICT application	1	1,10%	3,20%
	Perceived benefits	3	3,40%	9,70%
	Compatibility	11	12,50%	35,50%
	Cost	5	5,70%	16,10%
	Complexity	10	11,40%	32,30%
	Network Reliability	2	2,30%	6,50%
	Data Security	2	2,30%	6,50%
	Scalability	2	2,30%	6,50%
	Trialability	3	3,40%	9,70%
	Observability	4	4,50%	12,90%
	Perceived compatibility	1	1,10%	3,20%

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	IT infrastructure	2	2,30%	6,50%
	Internet skills	1	1,10%	3,20%
	Perceived security risks	1	1,10%	3,20%
	Uncertainty	1	1,10%	3,20%
	Expected benefits	1	1,10%	3,20%
	Perceived risks	1	1,10%	3,20%
	Structural assurance	1	1,10%	3,20%
	Interactivity	1	1,10%	3,20%
	Information intensity	1	1,10%	3,20%
	Cost of adoption	1	1,10%	3,20%
Total		88	100,00%	283,90%

Table 2, shows the 36 determined sub-dimensions of technology, which is one of the main context of the TOE framework. In the technological context, the sub-variables most frequently referred to were the relative advantage and compatibility with 12.5% each. Third most used variable is the complexity with 11.4%.

Table 3: TOE Framework Organizational Context

		Responses		Percent of Cases
		N	Percent	
Organizational Context Sub-dimensions	Perceived financial cost	1	1,20%	3,10%
	Perceived technical competence	1	1,20%	3,10%
	Firm size	15	17,60%	46,90%
	Firm scope	3	3,50%	9,40%
	Financial resources	2	2,40%	6,30%
	International scope	1	1,20%	3,10%
	Financial commitment	1	1,20%	3,10%
	Readiness	1	1,20%	3,10%
	Decision makers IT knowledge	1	1,20%	3,10%
	Managerial structure	1	1,20%	3,10%
	Global scope	1	1,20%	3,10%

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	Managerial obstacles	1	1,20%	3,10%
	Web-technology investment	1	1,20%	3,10%
	Managerial beliefs	1	1,20%	3,10%
	Top management support	15	17,60%	46,90%
	Information sharing culture	1	1,20%	3,10%
	CEO's characteristics and top management support	1	1,20%	3,10%
	Employee's IS knowledge and attıtude	1	1,20%	3,10%
	Resource constraints	1	1,20%	3,10%
	Perceived benefits	1	1,20%	3,10%
	Motivations for ICT investments	1	1,20%	3,10%
	Barriers impeding ICT investments	1	1,20%	3,10%
	Reasons for using ICT	1	1,20%	3,10%
	Management commitment and support	1	1,20%	3,10%
	Organizational IT competence	1	1,20%	3,10%
	Organization readiness	2	2,40%	6,30%
	Entrepreneurial orientation	2	2,40%	6,30%
	Trust	2	2,40%	6,30%
	Pressure from Trading Partners	1	1,20%	3,10%
	Pressure from Competitors	1	1,20%	3,10%
	ICT experience	1	1,20%	3,10%
	Knowledge	1	1,20%	3,10%
	Organizational attitude	1	1,20%	3,10%
	Technology readiness	1	1,20%	3,10%
	CEO’s knowledge	1	1,20%	3,10%
	Adoption cost	1	1,20%	3,10%
	Degree of formalization	1	1,20%	3,10%
	Employee capability	1	1,20%	3,10%

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	Technological competence	1	1,20%	3,10%
	Organizational structure	1	1,20%	3,10%
	Innovativeness	1	1,20%	3,10%
	Age of manager	2	2,40%	6,30%
	Manager's level of education	1	1,20%	3,10%
	Time constraints	1	1,20%	3,10%
	Organizational pressure	1	1,20%	3,10%
	Firm resources	1	1,20%	3,10%
	Owner's innovativeness for IT implementation	1	1,20%	3,10%
	Owner's attitude for IT implementation	1	1,20%	3,10%
	Owner's knowledge of IT	1	1,20%	3,10%
	Organizational resource	1	1,20%	3,10%
Total		85	100,00%	265,60%
a. Group				

Table 3, shows the sub-dimensions of the TOE framework organizational context, the most used variable 50 sub-dimensions were the firm size and top management support with 17.6% each.

Table 4: TOE Framework Environmental Context

		Responses		Percent of Cases
		N	Percent	
Environmental Context Sub-dimensions	Perceived industry pressure	1	1,30%	3,20%
	Perceived government	2	2,60%	6,50%
	Competition intensity	2	2,60%	6,50%
	Regulatory environment	2	2,60%	6,50%
	Competitive pressure	13	16,70%	41,90%
	Regulatory support	2	2,60%	6,50%

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	Competitive environment	1	1,30%	3,20%
	Relationship with business partners	1	1,30%	3,20%
	Industry dynamics	1	1,30%	3,20%
	External resources	1	1,30%	3,20%
	Industry support	1	1,30%	3,20%
	Institutional factors	1	1,30%	3,20%
	Pressure intensity	1	1,30%	3,20%
	Business partner influence	1	1,30%	3,20%
	Role of government	1	1,30%	3,20%
	Technology support infrastructure	1	1,30%	3,20%
	Trading partner collaboration	1	1,30%	3,20%
	Challenges of implementations	1	1,30%	3,20%
	Trusted sources of IT advice	1	1,30%	3,20%
	External pressure	3	3,80%	9,70%
	IS vendor support and pressure	1	1,30%	3,20%
	Financial resources availability	1	1,30%	3,20%
	Institutional pressure	1	1,30%	3,20%
	Environmental Dynamism	1	1,30%	3,20%
	Environmental Complexity	1	1,30%	3,20%
	Environmental Hostility	1	1,30%	3,20%

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	Pressure from trading partners	1	1,30%	3,20%
	Pressure from competitors	1	1,30%	3,20%
	Industry	1	1,30%	3,20%
	Market scope	1	1,30%	3,20%
	External ICT support	1	1,30%	3,20%
	External change agents	1	1,30%	3,20%
	Pressure from partners	1	1,30%	3,20%
	Customers/suppliers pressure	1	1,30%	3,20%
	External support	2	2,60%	6,50%
	Willingness and capabilities of supply chain partners	2	2,60%	6,50%
	Government support	1	1,30%	3,20%
	Consumer readiness	1	1,30%	3,20%
	Community demand	1	1,30%	3,20%
	Faddishness	1	1,30%	3,20%
	Vendor support	1	1,30%	3,20%
	Customer pressure	2	2,60%	6,50%
	Critical mass	1	1,30%	3,20%
	Network externality	1	1,30%	3,20%
	Citizen readiness	1	1,30%	3,20%
	Competitive intensity	1	1,30%	3,20%
	Bandwagon pressure	2	2,60%	6,50%
	Perceived benefits	1	1,30%	3,20%
	Perceived ease of use	1	1,30%	3,20%
	Internal readiness	1	1,30%	3,20%
	Strategic goals	1	1,30%	3,20%

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	Competitive industry	1	1,30%	3,20%
	Institutional pressure	1	1,30%	3,20%
	Supplier pressure	1	1,30%	3,20%
	Government pressure	1	1,30%	3,20%
	Security and privacy concerns	1	1,30%	3,20%
Total		78	100,00%	251,60%
a. Group				

Table 4 shows the sub-dimensions of the TOE framework of the environmental context, out of 56 sub-dimensions, the most used was the competitive pressure with 16.7%.

Table 5: TOE Framework Sample Sizes

				Frequency	Percent
N	Valid	29	Sample Sizes	30,00	1	3,0
	Missing	4		60,00	1	3,0
Median		214,0000		102,00	1	3,0
Minimum		30,00		140,00	1	3,0
Maximum		2459,00		141,00	1	3,0
				144,00	2	6,1
				150,00	2	6,1
				161,00	1	3,0
				165,00	1	3,0
				173,00	1	3,0
				174,00	1	3,0
				212,00	1	3,0
				214,00	1	3,0
				223,00	1	3,0
				229,00	1	3,0
				237,00	1	3,0

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		250,00	1	3,0
		275,00	1	3,0
		285,00	1	3,0
		292,00	1	3,0
		307,00	1	3,0
		418,00	1	3,0
		575,00	1	3,0
		612,00	1	3,0
		624,00	1	3,0
		1857,00	1	3,0
		2459,00	1	3,0
		Total	29	87,9
	Missing	System	4	12,1
	Total		33	100,0

Table 5 shows the sample size in the studies. In the studies, only Zhang and Xiao (2017) conducted their studies on the government employees, the other studies' sample size showed the number of organizations. While the samples were mostly obtained from a single country in the studies, a few study samples consisted of several countries. In Table 5, it is shown that the smallest sample number is 33 and the largest sample number is 2459. In four studies the sample sizes were not given.

Table 6: TOE Framework Research Methods

		Frequency	Percent
Research Methods	Quantitative	27	81,8
	Qualitative	3	9,1
	Qualitative and quantitative	3	9,1
	Total	33	100

Table 6 shows the research methods. According to the data, the researchers mostly used quantitative methods (81.8%). Parveen (2012), Chatzoglou and Chatzoudes (2016) and Nair et al. (2019) preferred the mixed method.

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Table 7: TOE Framework Data Collection

		Frequency	Percent
Data Collection	Survey	28	84,8
	Interview	1	3
	Website analysis, ın depth interviews and survey	1	3
	In-depth interview and survey	1	3
	Total	31	93,9
Missing	System	2	6,1
Total		33	100

Table 7 shows the methods used by researchers for collecting data. 84.4% of researchers collected data with the survey method.

Table 8: TOE Framework Analyzing Methods

		Responses	
		N	Percent
Analyzing Methods	Logistic regression analysis	5	14,30%
	Structural equation modeling	11	31,40%
	Partial least squares	3	8,60%
	Literature review	1	2,90%
	Multiple Regression analysis	5	14,30%
	Analysis of Variance-One Way Anova	2	5,70%
	Regression analysis	1	2,90%
	Partial least squares structural equation modeling	4	11,40%
	Case study	1	2,90%
	Adaptive neuro-fuzzy inference systems	1	2,90%
	Cluster Analysis	1	2,90%
Total		35	100,00%

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Table 8 shows the methods used by the researchers to analyze the collected data. It is seen that structural equation model (31.4%) was the most used analysis method.

According to the literature, the sub-dimensions of the TOE framework and the effects of these dimensions were examined. Kuan and Chau (2001) stated that direct benefits, financial costs and higher technical capability had significant effect on EDI adoption. Zhu et al. (2003) stated that technology integration was the strongest factor for e business value. Zue and Kraemer (2005) stated that technology competence, financial commitment, firm size, competitive pressure, and regulatory support were important premises of e-business use. Zhu et al. (2006) stated that technology readiness and integration and regularity environment had significant effect on e-business adoption process. Salwani et al. (2008) stated that technology competency, firm scope, firm size, pressure intensity, web-technology investment, and back-end usage had remarkable impact on e-commerce usage. Teo et al. (2009) stated that firm size, perceived indirect benefits, top management support and business partner influence had considerably effect on acception of e-procurement. Scupola (2009) stated that there were similarities and differences between countries on e-commerce adoption. Oliveira and Martins (2010) stated that competitive pressure, technology readiness, and trading partner collaboration were considerable factors for e-business adoption. Dalipi et al. (2011) stated that almost all organizations were using the internet for collecting information lacking the vision of internet and e-commerce opportunities. Ilfinedo (2011) stated that perceived benefits, management support and external pressure were noteworthy effects on IEBT adoption. Duan et al. (2012) stated that the top management support emerged the most significant factor on e-market acception. Sıla (2013) stated that scalability was the most significant factor on e-commerce adoption. Ramdani et al (2013) stated that his study found trialability, observability, industry and market scope were significant factors on ICT adoption. Ahmad et al. (2014) stated that e-commerce adoption was impressed by perceived relative advantage, management characteristics, managers/owner's knowledge and expertise, perceived compatibility and external change agents. Rahayu and Day (2015) stated that perceived benefits, technology readiness were the determinant factors on e-commerce adoption. Chatzoglou and Chatzoudes (2016) stated that firm size was the most outstanding factor on e-business adoption. Sharif et al. (2016) stated that perceived security risks, compatibility, perceived benefits and degree of formalization were substantial estimaters of social media impact. Maduku et al. (2016) stated that top management support was the strongest driver of adoption intention. Wang et al. (2016) stated that compatibility, firm size, technology competence and critical mass had significant effect on mobile service adoption. Araujo and Zilber (2016) stated that relative advantage and observability were important factors on social media adoption. Zhang and Xiao (2017) stated that the most influential factor in social media adoption in the public institution was the top management support. Alharji et al. (2018) stated that technology construct had no outstanding effect on SMEs' adoption of social media. Matikiti et al. (2018) stated that the main factors affecting the attitude towards the use of social media marketing were top management support, perceived benefits, pressure from competitors, managers' level of education and perceived ease of use. Cao et al. (2018) stated that organizational pressures, expected benefits, internal readiness, strategic goals and perceived risks were the key factors in organizational social media usage. Tajudeen et al. (2018) stated that relative advantage, structural assurance, entrepreneurial orientation and institutional pressures had effect on social media usage. Ahmad et al (2019) stated that complexity, management support, bandwagon pressure and competitive pressure had a significant effect on social media adoption.

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Ullah and Qureshi (2019) stated that managers had significant effect between TOE factors and ICT adoption. Nair et al. (2019) stated that pressure from customers, owner's attitude towards IT, owner's age and owner's knowledge of IT had more impact on IT adoption and Yadegaridehkordi et al. (2019) stated that relative advantage, management support and external pressure were the most considerable determinants on big data adoption.

4. Conclusion

The aim of this study is to analyze the previous researches in social sciences utilizing the content analysis using TOE framework to be used for marketing management. For this purpose, the study aims to guide future research through identification of critical factors such as technology focal points, sub-dimensions, and analysis methods. It is found that the model is used extensively in social sciences and can especially be used in marketing research. In the model developed by Tornatzky and Fleischer (1990), there are three main technological, organizational and environmental contexts and also sub-dimensions related to these. The literature shows that, main contexts are to a very high extend aligned however the sub-dimensions are diversified due to the research purposes. This fact strongly how multidimensional and flexible the models in measuring the organizational behaviors in technology adoption. TOE framework enables very comprehensive.

The statements in the tables are taken in their original forms in selected studies and have not been changed. Some statements may appear similar. This is because each statement is relevant for its study purpose. Summing up the majority of the studies are done in the fields of social media adoption and e-business adoption; the most used technological sub-dimensions are relative advantage, compatibility and complexity; the most used organizational sub-dimensions are firm size and top management support; the most used environmental dimension is competitive pressure. It is found that the quantitative method is preferred more and the data is generally collected through the survey method, and mostly structural equation model is preferred as the analysis method.

The main contribution of the current study to the literature is that it presents the areas and variables that can be used in the TOE framework as a whole. The study is expected to guide researchers for their future studies in marketing management.

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