ENABLING DOMESTIC DIGITAL TRANSFORMATION:

A METHODOLOGY FOR DETERMINING THE COUNTRY OF ORIGIN OF IT PRODUCTS

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ENABLING DOMESTIC DIGITAL TRANSFORMATION: A METHODOLOGY FOR DETERMINING THE COUNTRY OF ORIGIN OF IT PRODUCTS

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DECLARATION OF ORIGINALITY

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ABSTRACT

Enabling Domestic Digital Transformation:

A Methodology for Determining the Country of Origin of IT Products

Digital transformation enhancement in IT sector is getting crucial for efficient solutions in organizations. Institutions in public sector try to enrich its process solutions with additional products and services. On the other hand, in order to reduce financial expenses, especially developing countries give high emphasis on obtaining products with domestic resources. In addition to that, it becomes crucial for public and military institutions to develop IT products and technology infrastructure with domestic resources in order to preserve data security and privacy. The recent actions from Google company to ban Android products for Huawei smartphone producer for security reasons and United States withdraw for F-35 fighter jets sales to Turkey for strategic data privacy reasons give clue about the importance of domestic production. Thus, there is a need to develop a reliable scale to measure domesticity of products. This study attempts to construct a methodology for determining country of origin of IT products. Suggested methodology was verified by interviews with experts in subject area.

ÖZET

Yerli Dijital Dönüşümün Sağlanması:
BT Ürünlerinin Menşei Ülkesini Belirleme Metodolojisi

Bilişim sektöründe yapılan dijital dönüşüm geliştirmeleri, organizasyonlar için daha verimli çözüm bulabilmeleri açısından her geçen gün daha önemli hale gelmektedir. Kamu sektörü kuruluşları, süreçleri ek ürün ve servislerle zenginleştirip çözüme kavuşturmaya çalışmaktadır. Bunun yanında, özellikle gelişmekte olan ülkeler masraflarını azaltmak için ürün satın alımında yerli kaynaklara yönelmeye büyük önem vermektedir. Özellikle kamu sektörü ve askeri kuruluşlarda bilgi teknolojileri ürünlerinin ve teknoloji altyapısının yerli kaynaklarla geliştirilmesi veri güvenliği ve gizliliği açısından büyük önem arz etmektedir. Son zamanlarda yaşanan gelişmeler, Google'ın güvenliği sebep göstererek Android ürünlerinin Huawei telefonlarında kullanılmasını yasaklaması ve Amerika Birleşik Devletleri'nin veri gizliğinin korunmasını gerekçe göstererek F-35 jetlerinin Türkiye'ye satışını geri çekmesi, yerli üretimin önemi konusunda bir ipucu vermektedir. Bu yüzden yerli üretimin artırılabilmesi için ürünlerin yerliliğini ölçen güvenilir bir ölçek geliştirilmesi gerekmektedir. Bu çalışma özellikle bilgi teknoloji ürünleri için menşei ülkesini belirlemek adına bir metodoloji geliştirmeye odaklanmıştır. Önerilen metodoloji aynı zamanda uzman kişilerle yapılan görüşmeler sonucu tasdik edilmiştir.

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TABLE OF CONTENTS

LIST OF TABLES

LIST OF APPENDIX TABLES

LIST OF FIGURES

LIST OF ABBREVIATIONS

BAA	Business Associate Agreement
CBP	Customs and Border Protection
CFR	Code of Federal Regulations
COB	Country of Brand
COD	Country of Design
COM	Country of Manufacture
COO	Country of Origin
DFT	Digital Transformation Framework
EU	European Union
FAR	Federal Acquisition Regulation
FTC	Federal Trade Commission
GAO	Government Accountability Office
ICT	Information and Communication Technologies
IS	Information Systems
IT	Information Technology
R&D	Research and Development
TAA	Trade Adjustment Assistance
US	United States
USC	United States Code

CHAPTER 1

INTRODUCTION

In today's world there is a high tendency for companies and organizations to reach maximum number of customers and dominate global markets. In almost all countries, there are some companies that do not fully belong to the country they operate in. Although some countries set rules and regulations in order to identify companies and products as which country they come from, there is not a unanimous criterion for identification of company or product origin. However, especially in public sector, it gets crucial to provide domestic products for safety and privacy reasons. The recent actions from British government to Kaspersky products and US government to Huawei products point out the rising importance of domestic technology production and domesticity identification.

1.1 Background

The public sector and municipalities face demographic and financial challenges daily in an increasing rate of population. Thus, there is an urgent need for an efficient solution to satisfy increasing rate of demand. For this reason, the public sector must adapt to the changing world and has to look for new opportunities to improve productivity and process efficiency, increase collaboration in inside and outside parties and focus on innovation (Dilmegani, Korkmaz and Lundqvist, 2014).

Digital transformation can be integrated with digital technology products into all areas of business even in public sector. Furthermore, it is a fundamental change that affects institutions how they operate and deliver value to their customer and

other third parties. It is also a cultural change for organizations that require them to challenge status quo, experiment and appreciate the failure.

There are different definitions for digital transformation. The European Commission sets a broad definition which has highly comprehensive explanation stating it as “a fusion of advanced technologies and the integration of physical and digital systems, the predominance of innovative business models and new processes, and the creation of smart products and services”. (Probst L. et al, 2018)

The globalization is a popular term that enables companies, especially, giant holdings and conglomerates to escalate offshore manufacturing and exploit economies of scale and costs. This results in the production, assembly and raw material supply of products in different parts of the world. In increasing globalization, it is common that companies supply and manufacture their products from numerous locations (Samiee, 2011; Martin and Cerviño, 2011). The multicountry affiliation of products which is known as a hybrid product, increase the complexity of evaluation of product’s origin. Therefore, Country of Origin (COO) can be viewed as a hybrid of different factors in a multidimensional construct which makes the distinction between the Country of Manufacture (COM) or assembly and the country of the company’ s home. Thus, in the literature there is new concepts besides ‘made in’ or ‘assembled in’ such as ‘designed in’, ‘engineered in’ and ‘parts supplied by’ (Han and Terpstra, 1988; D’ Astous and Ahmed, 1992; Chao, 1993; Ettenson, 1993; Ahmed and D’ Astous, 1996).

The term COO, first explained as “the country which a consumer associates a certain product or brand as being its source, regardless of where the product is actually produced” (Jaffe and Nebenzahl 2006, p. 29). The concept then, slightly changed into different dimensions as manufacturing origin, brand origin and

assembly origin (Demirbag et al., 2010; Phau and Chao, 2008; Verlegh and Steenkamp, 1999).

The growth of borderless world and international trade emerged the new concept as hybrid products or binational products which increased the researchers' attention into COO research (Han and Terpstra, 1988; Chao, 1993). The multicountry affiliation of products questioned the need and relevance of the construct of COO (Johansson, 1989; Phau and Prendergast, 1998)

The growth of international trade resulting in the emergence of hybrid products or binational products has furnished fresh impetus to COO research (Han and Terpstra, 1988; Chao, 1993). Products with a multicountry affiliation question the role and relevance of the construct of COO (Johansson, 1989; Phau and Prendergast, 1998). More importantly, as the borders between countries become blurred, a new product evaluation tool is needed.

1.2 Problem Discussion

There exist current differences and even contradictions about the domestic COO construct. The FTC (Federal Trade Commission) defines the domesticity of a product as the country where the product was last substantially transformed. On the other hand, EU differs products according to tariff duties as the goods wholly obtained or produced in a single country and goods whose production involved materials from more than one country. The EU views first type of goods as a domestic product and charge zero or close to zero rates of duty. However, for the second type of products, EU considers the product originates from the country where it is assembled. Therefore, the duty requirement will depend on the arrangements between the country in which the product was assembled and the country into which it will be

imported (HM Revenue& Customs, 2012). In Turkey, the Ministry of Industry and Technology (2014) defines domestic product as 3 different criteria. It has to be produced from the company which has industrial registry certificate, substantial amount of production must be done inside of country and it has to have at least 51% of domestic content rate.

In Turkey and other developing countries, there is a national policy of improving IT and technology related production with domestic resources. In addition, establishing information systems (IS) infrastructure and software, administration and periodic updates with domestic resources are important motivational boosting power for municipalities. Besides, there is scarce COO studies with new development, digital transformation and technology products which need thorough investigation.

1.3 Purpose

The purpose of this thesis is to extend the understanding about the concept of domestic COO and construct a reliable and valid scale to measure domestic COO as in this case digitalization products in municipalities.

1.4 Research Questions

1) To what extent do hardware attributes influence digitalization products' COO evaluation?

2) To what extent do software production attributes influence digitalization products' COO evaluation?

3) To what extent do digitalization platforms attributes influence digitalization products' COO evaluation?

4) To what extent do IT outsource attributes influence digitalization products' COO evaluation?

5) To what extent do producer attributes influence digitalization products' COO evaluation?

6) Is there any difference between municipality departments when evaluating digitalization products' COO?

1.5 Thesis Structure

Chapter 1 – Introduction

Introduces the topic by highlighting the COO and digital transformation concept together with additional constructs continues with problem discussion, purpose and research questions.

Chapter 2 - Literature Review

This chapter provides a literature review of research and science that function as a framework for understanding and analyzing the COO and digital transformation construct.

Chapter 3 - Conceptual Framework

Aim of this chapter is to provide conceptual distinctions from the literature that would function as the foundation for the hypothesis testing.

Chapter 4 - Methodology

In the methodology chapter the different methods are presented together with motivations for the selected choices in order to be as transparent as possible.

Chapter 5 - Analysis and Results

In this chapter the analysis and results are presented comprising demographic variables, correlations, regression-analysis and hypotheses testing.

Chapter 6 - Discussion

The discussion chapter aims to explain the relationship between the theoretical framework and past research combined with the empirical data and findings.

Chapter 7 - Conclusions

This chapter presents the conclusion based on the previous chapters.

CHAPTER 2

LITERATURE REVIEW

This chapter is comprised of two sections. The first section gives information about COO concept, its requirement and the literature definition of COO in industrial and technology products. Second section describes digital transformation, its tools, products as hardware and software, its enablers and literature information about digital transformation in public sector.

2.1 Country of Origin

There are different definitions and views in the study and concept of COO. Peterson and Jolibert (1995) defined the concept as an extrinsic product cue which is an intangible product attribute that is distinct from a physical product characteristic or intrinsic attribute. The researchers also stated that COO concept is typically operationalized as “Made in _____”. Whereas, Phau and Cheong (2009) defines the concept as the country where the corporate headquarter of a company or brand is situated. The brand origin is attached to a brand name, even if the product is not designed, manufactured or assembled in that country. By just being produced in another country cannot eliminate the `nationalities’ of the products. The notion of `convergence of culture’ suggested by Levitt (1983), Ohmae (1992) and Sheth (1998) may in fact inflate the nationalities of the products. However, Aiello et al. (2009) define the concept from a different perspective stating that the origin must be the country that consumers typically associate with a product, regardless of where it was manufactured.

In literature, the concept of COO has been derived with new perspectives. The COM is the term used for product that has a 'made-in' label on it. The concept was identified as a synonym for COO and it was represented as the country where the final assembly of a product was completed. The country-of-design (COD), on the other hand, is used when the product was designed and developed in a particular country. Lastly, global companies use country-of-brand (COB) in order to point out specific origin for brand names (Aiello et al., 2009).

Another significant view about the concept in literature is the COO effect and its indicators. Roth and Romero (1992) state that in order to thoroughly investigate COO effect, it is vital to focus on country's local production and country image. In addition, national stereotyping has substantial effect on COO (Reierson, 1966). In his study, Ballington (2001) found that for specific product categories information cues operates differently for different countries. A more investigated study from Chao (2001) states that in order to predict a product's COO information a consumer may rely on other informational cues such as where the product actually was made.

A more detailed chronological table in figure 1 represents the phases in COO investigations in literature.

First definitions and explanations for COO requirements determination considered limited number of criteria. Johansson, Douglas and Nonaka (1985) determined it as the country where the corporate headquarter of the company the product or brand is located. It can be inferred that product may not be necessarily manufactured in that country because of multinational elements and sources, it can be assumed the product or brand is identified with that country. On the other hand, Lee and Lee (2009) state that COO can be determined with considering the place in which the product is conceived, manufactured and assembled.

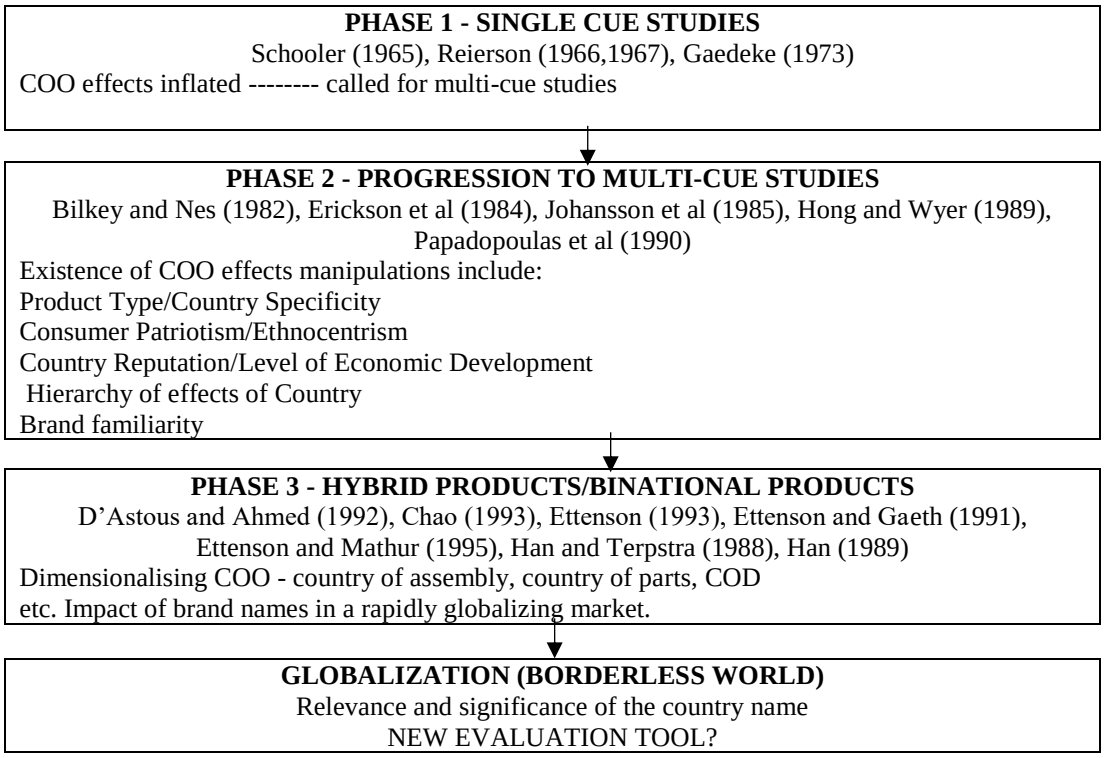

Figure 1. Phases in Country of Origin. Adapted from Conceptualizing the country of origin of brand, by Ian Phau & Gerard Prendergast, 2000, *Journal of Marketing Communications, 6*(3), p. 159-170.

In the U.S. there are strict rules and regulations to indicate a product as a domestic country product. The Code of Federal Regulations (CFR) states that "To qualify as a domestic end product a non-manufactured product must be mined or produced in the US" (48 C.F.R. § 25.003). In addition, "A manufactured product qualifies as a domestic end product if: it is manufactured in the US; and the cost of its components mined, produced or manufactured in the US exceeds 50% of the cost of all of its components" (48 C.F.R. § 25.101). The regulation also views from cost perspective as "Manufactured product requires that the cost of domestic components exceeds 50% of the total component cost. However, the practical application of a test can be both complex and administratively burdensome" (48 C.F.R. § 25.003).

In the US, the FTC regulates the use and rights of 'Made in America' claims and proper marketing efforts. Even if it may be viewed as a domestic end product under regulation of Business Associate Agreement (BAA), it may not be properly

labeled as “Made in America”. There is guidance published by FTC which states an item must be all or virtually all domestic to be properly labeled as “Made in America” (Koehl et al., 2014).

United States Code (USC) explains the requirements for COO as “Contractors must supply items which are either: Wholly grown, produced or manufactured in the US or a Designated Country or substantially transformed into new and different articles of commerce in the US or a Designated Country (19 U.S.C. § 2518). The detailed explanation about the COO test is stated by US Customs and Border Protection (CBP) as “The substantial transformation test, applied on a totality of the circumstances basis, most often assesses whether a “final stage” manufacturing or assembly process involving components originating from multiple countries transforms these components into a new and different product that differs from the underlying components in: Name, character, use” (Koehl and Masini, 2017). For the services CFR states that “Test for COO under services contracts is where the contractor is established. The term “established” is not defined in the Federal Acquisition Regulation (FAR) but has been recognized by the Government Accountability Office (GAO) to mean the country where the contractor is either: Incorporated or headquartered (48 C.F.R. § 25.402).

CBP issued rulings that “COO for software was established by the country where the “diskette” containing the software was produced” (HRL 732087 (February 7, 1990)). Koehl et al. (2014) state that CBP found the software build is the vital part for software characteristics and use and what gives the software a new name which makes software build location an important determination criterion. In 2011, GAO issued in Trade Adjustment Assistance (TAA) stating for cloud computing services

the origin country is determined by where the bidder was established, regardless of data center location (Koehl and Masini, 2017).

FTC suggested a cost-based COO system as companies which have at least 75% of their manufacturing costs in the US can claim their products as "Made in the U.S.A." (Ingersoll 1997). The Commission also allows companies to make US-made claim if the product component parts are assembled in the US, even if some parts in assembly process were imported (Chao, 2001).

2.2 Digital Transformation

There are different types of digital transformation definition in literature. Stolterman and Fors (2004) define it as a strategical business model driven by “the changes associated with the application of digital technology in all aspects of human society” (p. 689). While Kane, Palmer, Phillips, Kiron and Buckly (2015) state digital transformation has a scope that goes beyond the digitalization of current process and resources that is transformation of key structural and organizational aspects with the use of advanced information technologies or creating value with key products and services which eventually leads to completely new business models. In Westerman’s (2017) view digital transformation is a dynamic process for organizations that requires interconnectedness and dependencies between businesses and units, thus it is needed to be prepared to implement action plans and possible technology instruments. Therefore, digital transformation requires technology beyond the need of automation and optimization, to increase organizations’ innovation and sustainable competitive differentiation through additional value creation (Melian-Gonzalez and Bulchand-Gidumal, 2016). Furthermore, digital transformation technologies can transform an organization’s processes, products, services,

operations and business models and even its competitive environment (Fichman, Dos Santos and Zheng, 2014; Hess, Matt, Benlian and Wiesböck, 2016; Lucas, Agarwal, Clemons, El Sawy and Weber, 2013; Yoo, Boland, Lyytinen and Majchrzac, 2012). Digitalization is a change in the business model with the use of digital technologies, which generates new revenue and added-value opportunities; it is eventually a transmission to digital business. (Gartner Group, 2016).

In order to implement digital transformation in organizations, there are different types of transformation strategies. According to Bharadwaj, El Sawy, Pavlou and Venkatraman (2013), digital strategy is defined as "an organizational strategy formulated and executed by leveraging digital resources to create differential value" (p. 472). Transformation is usually implemented through digitization, i.e. the "ability to turn existing products or services into digital variants, and thus offer advantages over tangible product" (Gassmann, Frankenberger and Csik, 2014). Digital transformation strategies have certain elements that every organization share. These elements can be described in four different dimensions: "use of technologies, changes in value creation, structural changes and financial aspects" (Matt, Hess and Benlian, 2015). These elements also construct digital transformation framework (DFT).

Although some researchers focused on digital transformation in terms of business models and strategy, others investigated more of a paradigm or process parts (Berman, 2012; Berman and Marshall, 2014). In, literature, researchers investigated different parts of the digital transformation process. Westerman, Bonnet and McAfee (2014) state that there are three key areas for digital transformation which take place in organizations: "customer experience, operational processes and

business models" which is a meaningful contribution to understand how digital transformation affects organizations.

In order to successfully implement digital transformation in organization there is a need to understand the requirements besides technology such as alignment of technology with people, its culture, mindset, talent development and leadership (Goran, LaBerge and Srinivasan, 2017). Furthermore, Westerman (2017) contributed to Goran and other's ideas and claimed the most important aspect in digital transformation is the transformation itself rather than the digital aspect. However, it is important to note that it requires organizational agility in systems, processes, structure, setup and people with the right mindset and culture. Previous studies have shown that collaborative culture and behavior, data-driven practices, innovative team members and executives and focus on customer priority are essential dimensions for organizations to achieve digital transformation effectively (Buhse, 2015; Kumar, Ribeiro, Carvalho and Hradilak, 2017). In order to get the best digital transformation results digital technologies must be in harmony with relevant skill set and culture-digital capabilities (Matt et.al. 2015, Schuchmann and Seufert 2015, Tamm, Seddon, Shanks, Reynolds and Frampton, 2015, Berman and Marshall 2014, Loebbeck and Picot 2015). Technology based systems are the main driver in order to get technology enabled organizational transformation (Besson and Rowe 2012, Cha and Lee 2013).

Lastly, in literature there is a sharp difference between digitization and digital transformation. Digitization is generally used for either conversion of information from the analog to the digital world or an automation of processes through Information and Communication Technologies (ICT). On the other hand, digital transformation focuses on company's business model, products, processes

organizational structure that can be improved by changes with digital technologies. These changes can be both in individual and organization-wide context. Digitization can be seen in rising demand for Internet-based media. Digital transformation can be seen in the music industry where the entire business model changed by new developments in digital technologies (Hess et al., 2016).

2.2.1 Digital Transformations Enablers

Digital transformation is a fundamental economic and technology change at both the organizational and industry-wide-level that is enabled by IS of pre-digital organizations (Besson and Rowe, 2012; Crowston and Myers, 2004; Venkatraman, 1994).

Innovation in organizations can be ensured by complex networks of relationships which has same goal in context level among different actors involved in innovative activities (Lundvall, 1992; Edquist, 2005). An interdependency can be found between all actors and components in innovations systems, regardless the size of the system which can be national, regional or sectoral.

One of the most important factors that enables digital transformation is spatial factor or location itself which is geographic proximity and localized knowledge accumulation. Various training sessions and learning programs, user-producer interactions, knowledge exchanges and even information leakages from high technology organizations are preferred across innovation actors. It requires them to keep close interaction and day-to-day contact in order to increase effectiveness. Researchers have found that in adoption of new technology there is inter-regional variation which shows that innovation is related with geographically related bounds (Saxenian, 1994; Baptista 2001; Asheim and Gertler, 2005). According to EU, there

are five different enablers for digital transformation shown in figure 2 which stands for tangible and intangible initiators of digital transformation.

Enablers:	Digital Infrastructures
	Supply and Demand of Digital Skills
	Entrepreneurial Culture
	Investment and Access to Finance
	E-leadership

Figure 2. Digital transformation enablers. Adapted from Digital Transformation Scoreboard 2018, EU businesses go digital: Opportunities, outcomes and uptake, Retrieved April 28, 2019, from https://ec.europa.eu/growth/tools-databases/dem/monitor/sites/default/files/Digital%20Transformation%20Scoreboard%202018_0.pdf

2.2.2 Digital Transformation in Public Sector

Public sector thrives to improve itself and adapt outside changes because of the need to save money and mitigate the risk of failure regarding new ICT solution implementations (Andrews et al., 2016). The key to be successful in digital transformation for a public sector is to look at the digital public sector as-a-whole concept which states for connecting public sectors to each other and outside parties. The concept has a front-end which state for provision of services and a back end that supports front end with integration, consolidation and innovation in order to provide maximum cost savings and improved service delivery. For these types of systems, technology is a strategic tool and the main enabler for innovation (UN, 2008).

There are different types of stakeholders and interest groups in municipalities such as “municipal executive board, municipal council, political parties, governmental agencies, users of the service delivered, ICT department, chief municipal executive, managers, employees, unions, lobbyist, media, and suppliers”. These diverse stakeholder categories can provide success or cause failure for the

process of digitalization in municipalities. Therefore, stakeholder interests should be in parallel to goals of a digital municipality (Al-Balushi, Bahari, Rahman and Hashim, 2016).

CHAPTER 3

THEORETICAL FRAMEWORK AND HYPOTHESIS

The theoretical framework and model were developed by conducting detailed literature reviews and semi-structured interviews. The parameters were analyzed and grouped under five categories: infrastructure influence, software production influence, digitalization platforms influence, IT outsource influence and producer influence.

Table 1 indicates the parameters that were constructed via literature review and semi-structured interviews. The parameter that was gathered from literature review was indicated as (L) and the constructed parameter with semi-structured interviews was indicated as (I).

Table 1. Parameters from Interviews and Literature

Added Value to product (I)	Expenditure of the company (I)
Abroad companies and distributions (I)	Export Availability (I)
Amount of patent (I)	GDP Contribution (I)
Assembly Location (L) (I)	Government or related public institutions approved projects (I)
Charity Organizations Contribution (I)	Headquarter Location (L)(I)
Chip with domestic OS (I)	Import and Export difference / Balance of Trade (I)
Community Support (I)	Industrial Production Contribution (I)
Company Age (I)	Investment in domestic country (I)
Competitiveness Index Contribution (I)	Marketability of product (I)
Compliance with international standards (I)	National Academy Education (I)
Configurated software availability (I)	Open Architecture (I)
Consumer Confidence Contribution (I)	Open Document Format (I)
Corporate Tax Contribution (I)	Open Source System (I)
Critical Parts Origin (I)	Open Stock Exchange of the Company (I)
Database Origin (I)	Production Location (L)(I)
Data Center Location (I)	Protocol Origin for chip and engines (I)
Domestic Capital in Partnership (L)(I)	Raw Materials and Spare Parts Origin (L)(I)
Domestic Communication Infrastructure (I)	R&D Budget (I)
Domestic cyber security (I)	R&D Budget Ratio (I)
Domestic electronic card design (I)	Ratio of national R&D personnel (I)
Domestic IOT Data Analytics (I)	Resources Purchased in Foreign Currency (I)
Domestic maintenance of products (I)	Revenue (I)
Domestic personnel in the company (I)	Software idea (I)
Domestic product energy supply (I)	Software Library Origin (I)
Domestically commercial products (I)	Software Producer Citizenship (I)
Distribution of imported products (I)	Web server origin (I)
Employment Contribution (I)	

Thorough semi-structured interviews have been done with the expert focus group and some of the parameters were selected for deeper analysis. These parameters structured the base of the study. In the selection process, some of the parameters were grouped under a category. Several items in the study were not selected for further analysis and were not included in the scope of the research study.

Table 2 lists the major parameters and the literatures that are indicated before. It reveals that some of the parameters in this research are already investigated by previous researchers.

Table 2. Major Parameters and Their Literature

Parameter	Analyzed Literature
Production Place	Aiello et al., 2009; Lee and Lee, 2009; 48 C.F.R. § 25.003; 19 U.S.C. § 2518; 48 C.F.R. § 25.101; HRL 732087 (February 7, 1990); Koehl et al., 2014
Assembly Place	Chao, 2001; Lee and Lee, 2009
Raw Material Origin	48 C.F.R. § 25.101 2011; Republic of Turkey Ministry of Industry and Technology, 2014; TOBB; 48 C.F.R. § 25.003
Headquarter Location	Lim and O'Cass, 2001; Mort and Duncan 2003; Samiee 1994; Thakor and Lavack, 2003; 48 C.F.R. § 25.402; Johansson et al., 1985
Domestic Capital	Thakor and Kohli, 1996; Lim and O'Cass, 2001; Thakor and Lavack, 2003; Samiee, Shimp and Sharma, 2005; Kinra, 2006

The conceptual framework was developed according to the formative model shown in figure 3. The 5 independent variables are determined according to 37 parameters in total. All parameters are grouped according to factor analysis results into 5 dimensions. The 5 hypotheses in the framework measure whether Digital Domestic COO can be determined by these 5 independent variables.

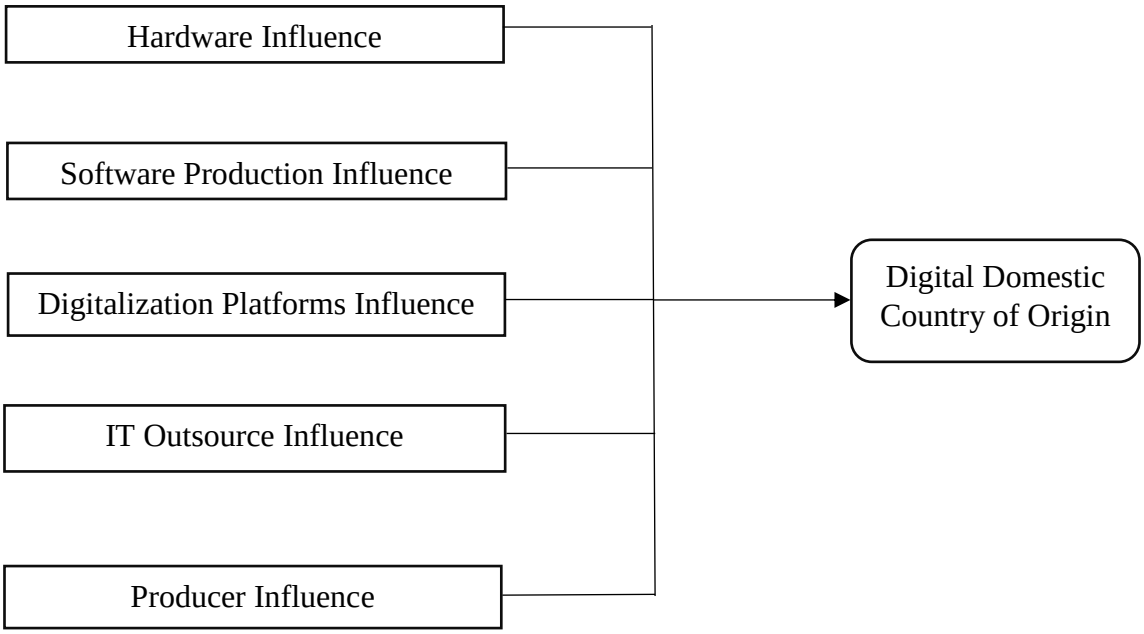

Figure 3. Digital domestic COO framework

H1: Hardware and infrastructure products influence is positively correlated with Digital COO Evaluation.

Five parameters that were extracted from literature review and face-to-face interviews combined into a dimension that contributes the evaluation on Digital COO. The parameters for hardware and infrastructure influence are determined as hardware production place, hardware assembly place, raw materials and spare parts origin, strategic and unique value of the product and energy source origin for product.

According to various authors that are mentioned in table 2; production place, assembly place and raw material origin were included in hardware and infrastructure products influence. These items are basic representors for product characteristics.

In addition to literature, the experts from municipalities and industry suggested new ideas in order to expand the parameter list in hardware influence. According to them, even though the product is produced, assembled and designed inside the country and by the national personnel if the product desperately needs

energy that should be imported from outside the country, e.g. oil, it should reduce the domestic level of COO. Furthermore, the product's strategic parts must be developed inside the country because it shows the capability of hardware development with critical parts such as chip and engine.

H2: Software production influence is positively correlated with Digital COO Evaluation.

In a comprehensive literature review and detailed face-to-face interview software production influence was determined in seven parameters as software production place, public institutions approved projects rate, software producer citizenship, capability of software development based on new technology, software capability of sales in international market, compliance with international standards for exportable produced software and software library origin.

CBP states "COO for software was established by the country where the "diskette" containing the software was produced" (HRL 732087 (February 7, 1990)). In addition, CBP found the software build location an important determination criterion (Koehl et al., 2014).

Although there is scarce knowledge and experience in literature about software and related products; experts in municipalities and industry suggested new parameters that can be used for evaluation criteria. One of them is due to its scarcity in global scale software producer should have same national citizenship. Besides, government or related public institutions approved project should increase the domesticity of software product because eventually the public sector wants to supply its products with domestic resources in order to keep expenses at the minimum level. In addition, experts noted that it is important to give value to the capability of

innovation with domestic personnel because if the product needs foreign support for software development it must reduce its domesticity. The next two items suggested by experts are related to each other. One of them is software capability of sales in international market and the other one is compliance with international standards for exportable software. The reasons for these suggestions are these items directly affects foreign image of the product and increases domesticity. Last suggestion is software library origin. The main reason for this suggestion is to preserve privacy. For example, it is still unknown what is inside in android libraries which affects the privacy and reduces domesticity of the product.

H3: Digital platforms development influence is positively correlated with Digital COO Evaluation.

When it comes to the digital platforms development, there is scarce study in literature. The experts from municipality and industry looked from a different perception to the study with their contribution.

For development platform origin, GAO issued in TAA stating for cloud computing services the origin country is determined by where the bidder was established, regardless of data center location (Koehl and Masini, 2017).

Experts suggested that data store location must be inside the country in order to preserve privacy and increase domesticity of product. In addition, the software must be open source against commercial software and programs. This increases the safety and privacy of the software. The openness rate, community support availability, open source database availability and open architecture are also important parameters for open source software development. Experts also gave valuable information and added new parameters to the list as software design patent,

communication infrastructure origin and document format origin. These parameters were added because they contribute to the domesticity by preserving data privacy and uniqueness.

Last suggestion is that the operating system of a software which includes web server origin, protocol origin and hardware related operating system origin must be developed by domestic resources. Experts supported that if software producer depends on a foreign operating system to create software it would reduce its domestic value and could also damage the privacy of the software.

H4: IT outsource influence is positively correlated with Digital COO Evaluation.

The experts suggested a valuable parameter of IT outsource which includes 5 parameters as supplier production place, supplier headquarter place, configurated software availability, source code analysis origin and security test maintenance citizenship.

First two items of supplier production place and supplier headquarter place measures domesticity by product's characteristics. Configurated software enables outsourced IT product to be customized according to the needs without any charge. Last two items of source code analysis origin and security test maintenance citizenship provides more secure software environment by putting private data under protection.

H5: Producer attributes and characteristics influence is positively correlated with Digital COO Evaluation.

In literature, some producer influence parameters of Digital COO Evaluation parameters which are headquarter location and domestic capital rate determined.

It is stated in literature that COO is the country where the corporate headquarters of a company marketing a product or brand is situated. (Lim and O'Cass 2001; Mort and Duncan 2003; Samiee 1994; Thakor and Lavack 2003). Johansson et al. (1985) determined it as the country where the corporate headquarter of the company the product or brand is located. CFR states that the COO of a product is the country where the contractor is either incorporated or headquartered (48 C.F.R. § 25.402).

Multi-national company existence in the global economy in which companies supply and manufacture their products from multiple and changing locations and extend their value-added chain beyond national boundaries makes capital structures of companies diversified across different countries. In this context, brand origin is potentially the only stable information about a product, leading some scholars to argue that it may be a more appropriate research stream than COO (Thakor and Kohli, 1996; Lim and O'Cass, 2001; Thakor and Lavack, 2003; Samiee et al., 2005; Kinra, 2006).

Furthermore, experts' new ideas about evaluation of digital domestic COO contributed to the literature with four parameters as tax payment to domestic country, investment rate in domestic country, employment contribution and R&D spending rate. Eventually, these four parameters support the idea that in order to count as a domestic product, the producer must contribute financially to the country it operates in.

H6: There is a significant difference in different municipality departments in terms of Digital COO evaluation.

Because of different needs and regulations of different municipalities and ambiguity and multiple ideas in literature about evaluation criteria of COO, it is considered there is a difference in evaluation of COO in terms of different municipality departments.

CHAPTER 4

RESEARCH METHODOLOGY

In this research study some interviews, surveys and literature research were conducted to deeply understand the topic and to develop hypothesis. In the literature some elements related to the topic of COO were analyzed and main variables and parameters were extracted.

4.1 Research Approach

Both qualitative and quantitative approach were applied in this thesis in order to statistically provide evidence for measurement of Digital COO Evaluation process for municipalities, but also in order to see if the impact differed depending on the digitalization integration. By adopting a quantitative approach in this research, it is possible to statistically explain the relationship between the different concepts since a quantitative approach aims to gather quantified numbers in order to get more accurate and generalizable results (Bryman and Bell, 2011). Despite the ambiguous result among researchers in the concept of COO in literature, it has been widely studied since its introduction in the 1960s (Pharr, 2005). Furthermore, COO field is criticized for its biased methodology determination in recent years and one of the main techniques to increase objectivity in research is to minimize researchers' own thoughts and beliefs (Patel and Davidson, 2003).

4.2 Research Strategy

A researcher should collect the most relevant and up-to-date data and answer the paper's research questions for a suitable research strategy (Bryman and Bell, 2011).

In this paper, in-dept face-to-face interview and survey were the most appropriate methods since they provide thoroughly investigated analysis and easily accessible quantitative results that can be generalized. Although there might be subjective biases, in-depth interviews provide careful elimination with parsimoniously selected indicators which is considerably important for solid construction of a multi-item scale. On the other hand, survey is the cheapest and fastest way to collect information according to scholars, it also provides generalizability effect if the survey is proven scientifically valid (Fink and Kosecoff, 1985). In addition, survey method prevents any impact to the respondent by the interviewer with any subjective bias (Bryman and Bell, 2011).

4.3 Data Collection Procedures

The main emphasis in this paper is to answer the research questions and also construct a study that is impartial and without contradictions of different views in the literature, since it is criticized that the context and method of COO is too biased (Samiee, 2011; Usunier, 2011).

This research was conducted via a questionnaire survey sent to the according responders in the metropolitan municipalities, municipalities and affiliated institutions. These respondents will represent a person that is preferably in a managing position of municipal digital transformation.

Furthermore, to combine the literature information, semi-structured interviews were conducted with experts who oversee the digital transformation process in municipalities and private sector. The results of the literature research and semi-structured interviews were consolidated in order to develop hypotheses.

During the initial stage of this research, the intention was to study the meaning structures consumers attach to 'Made in …' labels. Therefore, a first series of in-depth interviews were conducted. The aim was to gather the items respondents think of when they hear the word 'Domestic COO '.

A focus group study with experts in IS, IT and related departments was conducted. A parameter list was developed with them and their top preferences were counted. In order to test the hypotheses, a quantitative field survey study was conducted with 102 participants.

The managers were targeted for the interview group because they are the main agents in digital transformation process. However, although there are other agents in the process such as administrations, IT specialists; these groups were not included in the face-to-face interviews.

The focus group was carried out with 19 experts. Participants were experienced municipality presidents, software development engineers and digital transformation experts. Expert focus group interview was based on their experiences about digital transformation and views about the concept of COO (See in Appendix A).

A pilot study was conducted with 10 people with a survey of 37 questions. Participants completed the survey and shared their comments regarding the quality or wording of the questions that were prepared. Figure 4 reveals the steps in this research study.

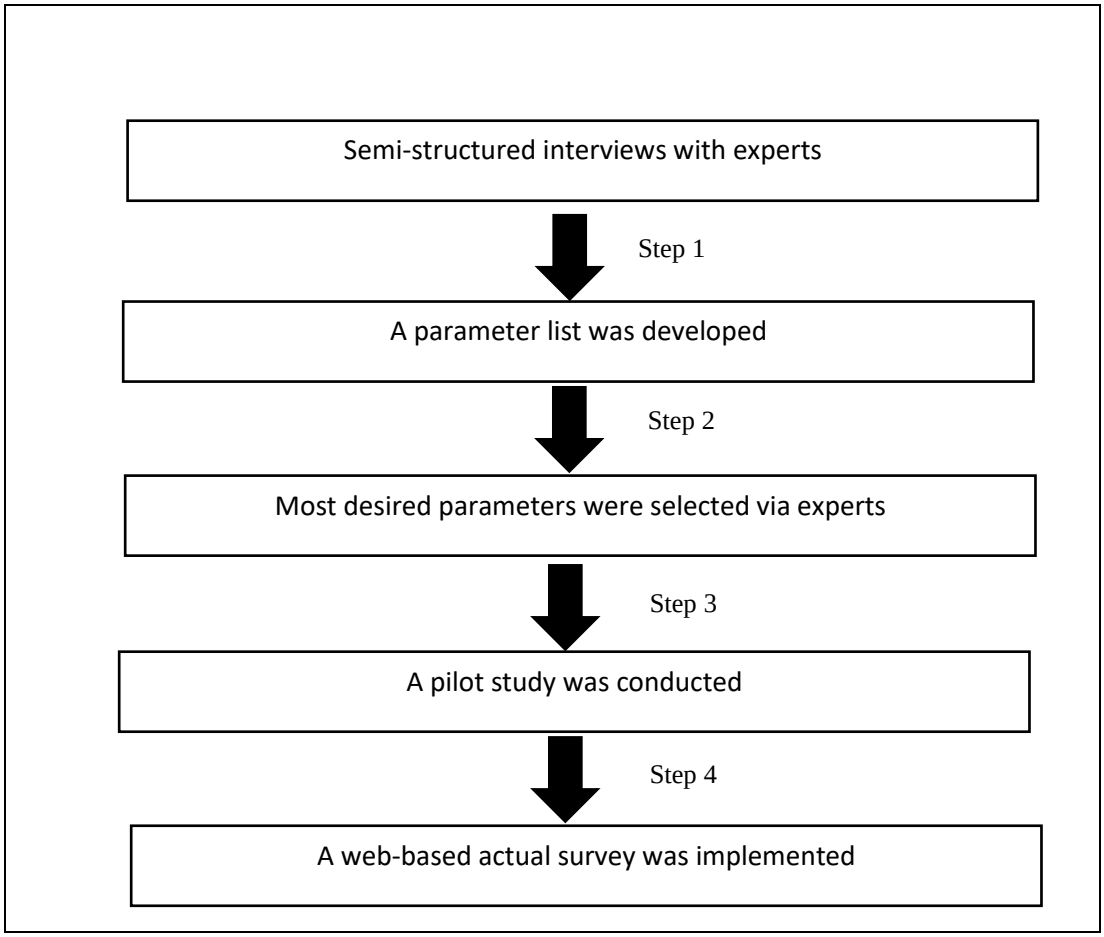

Figure 4. Research study steps

The survey was prepared in a web-based tool and shared via e-mail through different channels. Initially, municipalities in environment department were targeted. The survey was shared with other departments and municipalities in different cities. Participation steadily increased and a total of 102 people answered the survey. Mostly the participants were departmental or general head in municipalities in Marmara Region.

4.4 Questionnaire Design

There were six main concepts that were tested in the study; domestic COO, hardware influence, software production influence, digitalization platforms influence, IT

outsource influence and producer influence. The questionnaire was structured by using a single product category which is digital transformation product and the survey was designed in a way that each construct was tested independently towards domestic COO. The questions were measured using a Likert scale which a measurement tool is often applied in surveys and the instruments have been adapted from previous research of scale development. By using Likert scale, in the process the respondents could rank the statement 1-5, with 1 representing strongly disagree and 5 representing strongly agree. To receive comprehensive and representative answers, each parameter had questions and the total amount of questions were 37. To ensure the robustness of the study, the questionnaire also included control variables asking the respondent to write their work experience, municipality department and annual spending (see in Appendix B). The Turkish version that is distributed to the respondents can be seen in Appendix C.

4.5 Sampling

The sampling procedure for the survey was a non-probability sampling and the respondents were chosen through a simple random sampling. This type of method is the most efficient method for this research because it is well suited for the main research concern in the concept of COO. A simple random sample is a technique where the respondents have an equal probability of selection which best represents the research aim for the researcher.

4.6 Variables

By adopting references from literature and in-depth interviews this study defines domestic COO as characteristics of products in different informational cues, which is

the degree of domestic attributes when making a product evaluation. Digital Domestic COO acts as a dependent variable in order to see to what extent the COO is dependent on different product attributes in the decision-making process.

In this study hardware influence acts as an independent variable in order to see in what extent hardware influence impact domestic COO criteria. The concept consists of 5 hardware attributes which are hardware production place, hardware assembly place, raw materials and spare parts origin, strategic parts origin and used energy origin. As for the second independent variable, software production influence can be defined as an indicator which changes the level of origin. The main objective is the same but because of its unique circumstances, the attributes are slightly different such as software production place, software producer citizenship, government or related public institutions approved projects, capability of software development based on new technology, software capability of sales in international market, compliance with international standards for exportable produced software and software library origin. The third independent variable, digitalization platforms influence consists of 14 attributes which are development platform origin, data store location, open source code ratio, openness rate, community support availability, open source database availability, patented software design, communication infrastructure origin, document format origin, open architecture ratio, operating system origin, web server origin, protocol origin and hardware related operating system origin. The fourth independent variable which is IT outsource supplier influence has five attributes which are supplier production place, supplier headquarter place, configurated software/operating system, source code analysis origin and security test maintenance citizenship. As for the last independent variable, producer influence has different perspective as the product cannot be viewed as a separate actor from its

producer. The variable consists of six producer attributes as, headquarter location, tax payment to domestic country, the ratio of domestic capital, degree of producer investment in domestic country, employment contribution and R&D spending rate. A detailed summary is shown in table 3.

Table 3. Independent Variables Summary

Concept	Conceptual Definition	Operational Definition	Questions
Hardware Influence	Aiello et al., 2009; Lee and Lee, 2009; 48 C.F.R. § 25.003; 19 U.S.C. § 2518; 48 C.F.R. § 25.101; Chao, 2001; Republic of Turkey Ministry of Industry and Technology, 2014; Union of Chambers and Commodity Exchanges of Turkey	Indicates to what extent the domestic COO criteria is dependent on hardware influence.	Q1-5
Software Production Influence	HRL 732087, 1990; Koehl et al., 2014	Indicates to what extent the domestic COO criteria is dependent on software production influence.	Q6-12
Digitalization Platforms Influence	Koehl and Masini, 2017	Indicates to what extent the domestic COO criteria is dependent on digital influence.	Q13-26
IT Outsource Influence		Indicates to what extent the domestic COO criteria is dependent on outsourced IT materials influence.	Q27-31
Producer Influence	Lim and O'Cass 2001; Mort and Duncan 2003; Samiee 1994; Thakor and Lavack 2003 Johansson et al. 1985; 48 C.F.R. § 25.402; Thakor and Kohli, 1996; Samiee et al., 2005; Kinra, 2006	Indicates to what extent the domestic COO criteria is dependent on producer contribution	Q32-37

4.7 Data Analysis Method

Accurate data analysis tools selection is important in research because it is going to be used as a tool to answer the hypotheses. This thesis uses quantitative data analysis methods and in order to analyze statistical results SPSS program which is the widely

known and commonly used software for precision in data analysis in quantitative studies is used (Bryman and Bell, 2011).

In order to explore the relationship between variables a widely used data analysis method which is regression analysis is used. Since the aim in this paper is to investigate COO and its construct attributes factor analysis and linear regression analysis was chosen in this paper. In order to complete the factor analysis and linear regressions for this research, SPSS version 25.0 was statistical tool used.

4.8 Measurements

In research, understanding statistical variables, interpreting its meanings and selecting the most accurate analysis method for any specific area are vital processes for researchers. This paper mainly interprets two values as data; p-value and R^2-value. The R-square value is an important indicator which explains a percentage of change in the dependent variable in terms of variance in the dependent variable (Pallant, 2010). The p-value, on the other hand, shows the statistical significance of the research whether the research is strong enough to be accepted. Strong statistical significance of a research demonstrates that the research findings are reliable, and they are applicable for the selected population of study (Bryman and Bell, 2011). In academic world the maximum level of statistical significance that is accepted is $p<0.05$ and p-value is the probability which shows random results are obtained from the research and there is no sampling errors. Presenting p-values that is below $P<0.05$ signifies that the tested hypothesis is accepted (Nolan and Heinzen, 2011).

4.9 Quality Criteria

In order to increase the quality in the research and enable easily understood questions for the survey a pre-test was applied. In addition to pretest, the reliability and validity were involved in the quality procedure. The aim of using validity and reliability in the procedure is to assess the research quality and make sure the research strength and credibility are at the desired level (Bryman and Bell, 2011).

4.9.1 Reliability

The Cronbach Alpha test was used in this study in order to assess the reliability. It is a widely used reliability test by researchers that measures internal consistency. The Cronbach Alpha test generally explains the closeness of a set of items as a group and whether the survey questions that respondents answer altogether measure the same variable or aim. The Cronbach Alpha test has a coefficient value that ranges from 0 to 1 and scholars agreed on an acceptable coefficient of higher than 0.7 (Santos, 1999).

4.9.2 Validity

Another important item for quality criteria is validity, which assess whether a measurement tool confidently measures what it is supposed to do in the study (Bakker, 2012). In order to ensure validity, this study measured content validity, construct validity and external validity. Content validity is used to assess whether the theories are relevant according to what is tested (Bryman and Bell, 2011). This study measured the content validity by performing a pre-test to ensure understandable and clear questions and prevent any double-barreled questions for the survey. Furthermore, the content validity was strengthened by semi-structured face-to-face

interviews with municipality personnel and industry leaders in the relevant expertise area and it is checked if the questionnaire is relevant to its intended purpose. Ghauri and Grønhaug (2005) states that individuals with knowledge in the relevant subject or area can increase the validity of a study and in this research procedure 10 municipality members who are in head of related institutions and 9 managers in industry helped by revising and operationalizing. Construct validity demonstrates whether the study measures the intended aim or purpose and generally it can be performed by applying correlation test (Gibbert, Ruigrok and Wicki, 2008). In the research, the construct validity is attained by a Pearson Correlation test. The main purpose of conducting a Pearson Correlation test was to see the correlation level of two sets of data and constructs. The Pearson Correlation test range is +1 (perfect correlation) to -1 (perfect but negative correlation) besides a value of 0 indicates of an absence in the relationship (Adler and Parmryd, 2010). Additionally, in a scale from 0 to 1, values of 0.30 refers to a relative weak to moderate positive linear relationship while values of 0.40 refers to a moderate positive linear relationship (Cicchetti, 1994). An additional indicator for construct validity is measuring the correlation between the variables and accepting the variables which are below 0.8 (Bryman and Bell, 2011). The last validity item for this research is the external validity which also referred as generalizability of the study (Hair, Money, Samouel and Babin, 2003). There were 102 respondents in the study which can be sufficient for the external validity considering a total population of approximately 500 municipality personnel involved or related in digital transformation in Marmara Region.

4.10 Method Summary

Table 4 gives the summary of used research methodology techniques according to research approach, research design, research strategy, data collection method, sampling, operationalization, data analysis method and quality criteria

Table 4. Method Summary

Research Methodology	
Research Approach	Deductive Quantitative
Research Design	Descriptive
Research Strategy	Survey
Data Collection Method	In-depth Interviews Pre-test/Questionnaire
Sampling	Non-probability Sampling Convenience Sampling
Operationalization	Variables
Data Analysis Method	Descriptive Statistics Factor Analysis Regression Analysis
Quality Criteria	Reliability Validity

CHAPTER 5

ANALYSIS AND FINDINGS

5.1 Qualitative Study Findings

Semi structured face-to-face interviews were conducted with a total of 19 participants. The participants represent a person that is in a managing position of municipal administration and managing position in production related private sector. 95% of the participants were males. 68% of the participants had more than 15 years of work experience. A detailed demographics of respondents is shown in table 5.

Table 5. Interview Respondents' Demographics

Specialty	Age	Organization	Gender	Experience
R&D Director	40	Metropolitan Municipality	Female	10+
Head of Environmental Department	45	Environmental Protection	Male	15+
Head of Agricultural Services	55	Agricultural Services	Male	20+
Head of IT Department	35	Metropolitan Municipality	Male	10+
IT Manager	35	Water and Wastewater Treatment	Male	10+
Head of Environmental Protection Department	45	Water and Wastewater Treatment	Male	15+
Head of Geographical Information Systems	40	Water and Wastewater Treatment	Male	15+
Head of Water and Wastewater Treatment	45	Water and Wastewater Treatment	Male	20+
Treatment Plants Director	35	Treatment Plants	Male	10+
Transportation Director	40	Transportation	Male	15+
Industry Branch Manager	45	Chamber of Industry	Male	15+
Chef Executive Officer	60	Rail Systems	Male	30+
Software Manager	45	Wagon Production	Male	15+
SAP Manager	45	Aluminium Production	Male	15+
SAP Assistant Manager	35	Aluminium Production	Male	10+
SAP Assistant Manager	35	Aluminium Production	Male	10+
R&D Director	50	Tractor Production	Male	20+
Head of IOT Laboratory	50	IOT Laboratory	Male	25+
Head of Domestic Software Laboratory	55	Software Production	Male	25+

Participants were selected from Marmara Region according to their level of specialties in information technologies and experience in digital transformation. The

participants gave valuable information about the digital transformation in municipalities they achieved. Furthermore, participants shared substantial information about the evaluation of national product criteria.

During the interviews, participants mentioned different types of evaluation criteria that can be used as determination of a domestic product. Even though there are most used evaluation criteria such as production place and raw material origin, some of the participants suggested new ideas which can be used as domestic product determination. Those ideas were also considered for the determination of digital domestic COO evaluation and the whole list of suggested parameters and frequency of suggestion can be found in table 6.

Table 6. Suggested Parameters List

Concept	Fqy*	Concept	Fqy*
Added Value to product	6	Expenditure of the company	1
Abroad companies and distributions	4	Export Availability	6
Amount of patent	5	GDP Contribution	5
Assembly Location	9	Government or related public institutions approved projects	2
Charity Organizations Contribution	1	Headquarter Location	8
Chip with domestic OS	5	Import and Export difference / Balance of Trade	6
Community Support	5	Industrial Production Contribution	7
Company Age	2	Investment in domestic country	8
Competitiveness Index Contribution	1	Marketability of product	5
Compliance with international standards	4	National Academy Education	1
Configurated software availability	4	Open Architecture	8
Consumer Confidence Contribution	1	Open Document Format	8
Corporate Tax Contribution	7	Open Source System	8
Critical Parts Origin	8	Open Stock Exchange of the Company	3
Database Origin	6	Production Location	10
Data Center Location	6	Protocol Origin for chip and engines	9
Domestic Capital in Partnership	8	Raw Materials and Spare Parts Origin	8
Domestic Communication Infrastructure	5	R&D Budget	2
Domestic cyber security	6	R&D Budget Ratio	2
Domestic electronic card design	5	Ratio of national R&D personnel	2
Domestic IOT Data Analytics	4	Resources Purchased in Foreign Currency	1
Domestic maintenance of products	6	Revenue	3
Domestic personnel in the company	5	Software idea	4
Domestic product energy supply	5	Software Library Origin	5
Domestically commercial products	3	Software Producer Citizenship	6
Distribution of imported products	4	Web server origin	5
Employment Contribution	2		

* Fqy : Frequency

5. 2 Pilot Study Findings

10 participants were involved in the pilot study in order to ensure that the questionnaire was in good format and well-designed for the research. The departments were selected intentionally in order to get diversified opinions from different departments. Statistics for the pilot test can be seen in table 7.

Table 7. Pilot Study Demographics

Item	Range	Frequency	Percentage
Department			
	Engineering	8	80
	IT	2	20
Experience			
	Less than 1 year	3	30
	1-5 years	2	20
	6-10 years	2	20
	11-15 years	2	20
	More than 15 years	1	10
Annual Spending			
	Less than 100,000 TL	3	30
	100,001-250,000 TL	1	10
	250,001-500,000 TL	1	10
	500,001-1,000,000 TL	2	20
	More than 1,000,000 TL	3	30

5.3 Quantitative Survey Study Findings

The study aimed to explore the evaluation tool and indicators for domestic COO. An online data collection method was used to gather data via questionnaire from experts with related specialties in municipalities.

5.3.1 Profile of the Respondents

All the respondents were municipality personnel and majority of the respondents were in IT, engineering or related departments (48.1%). The whole population constitutes for only municipality personnel in Marmara Region, Turkey. The engineering and environmental department personnel ratio is the highest among all

departments because it is the department where municipalities implement digital transformation the most.

To provide a more rigorous test and see how opinions differ between different subgroups, the study included three demographic variables: department, work experience age and annual spending. For the sample included in the study, the majority (27.5%) of the 102 respondents were in engineering department. In addition, personnel who has average 1-5 years work experience has the highest percentage of personnel (29.4%) as this survey's respondents. Although there is close results in institution annual spending, a weighted average of 636,000 TL represents the importance of how much of the spending can be covered by domestic resources. The actual demographics is shown in table 8.

Table 8. Actual Survey Demographics

Item	Range	Frequency	Percentage
Department			
	IT	9	8.8
	R&D	12	11.8
	Environment	21	20.6
	Engineering	28	27.5
	Wastewater Treatment	15	14.7
	Other	17	16.7
Experience			
	Less than 1 year	18	17.6
	1-5 years	30	29.4
	6-10 years	21	20.6
	11-15 years	21	20.6
	More than 15 years	12	11.8
Annual Spending			
	Less than 100,000 TL	12	11.8
	100,001-250,000 TL	12	11.8
	250,001-500,000 TL	30	29.4
	500,001-1,000,000 TL	18	11.6
	More than 1,000,000 TL	30	29.4

5.3.2 Quality criteria

In order to ensure the internal consistency, the research implemented a Cronbach's alpha test to make the reliability coefficient. The reliability is high for overall and for the dimensions in the scale. As shown in table 9, The total-scale reliability is 0.902 and every single dimension in scale has a reliability value more than 0.7. Detailed information can be found in Appendix D. Since the reliability of the scale is above 0.7, there is no need for extraction of any item in the scale.

Table 9. Internal Consistencies of the Domestic COO Dimensions

Dimension	Label	Number of Items	Reliability Coefficients (Alphas)
Hardware	F1	5 (Q1-Q5)	0.714
Software Production	F2	7 (Q6-Q12)	0.71
Digitalization Platforms	F3	14 (Q13-Q26)	0.849
IT Outsource	F4	5 (Q27-Q31)	0.763
Producer	F5	6 (Q32-Q37)	0.705
Total Scale Reliability		37	0.902

In order to ensure high quality and validity in the research procedure a Pearson's r correlation test was conducted to see how two different sets of data is correlated. The table 10 indicates that correlation values range between 0.186 to 0.708.

Table 10. Correlation Results Between Variables

		1	2	3	4	5	6
1-Hardware Influence	Pearson Sig. (2-tailed)	1	0.4	0.488	0.434	0.387	0.186
2-Software Production Influence	Pearson Sig. (2-tailed)	0.4	1	0.602	0.547	0.476	0.222
3-Digitalization Platforms Influence	Pearson Sig. (2-tailed)	0.488	0.602	1	0.708	0.578	0.286
4-IT Outsource Influence	Pearson Sig. (2-tailed)	0.434	0.547	0.708	1	0.632	0.208
5-Producer Influence	Pearson Sig. (2-tailed)	0.387	0.476	0.578	0.632	1	0.247
6-Digital Domestic COO	Pearson Sig. (2-tailed)	0.186	0.222	0.286	0.208	0.247	1

Results of the factor analysis of data from the survey are summarized in table 11. As it can be seen in table, items assigned on each dimension have high loadings on only one of five factors ignoring few exceptions. Relatively low inter-correlation between five factors supports the distinctiveness of the scale's five dimensions.

Table 11. Factor Loading Matrices Following Oblique Rotation

	FACTOR LOADINGS				
Items	F1	F2	F3	F4	F5
Q1	0.27				
Q2	0.628				
Q3	0.067				
Q4	0.156				
Q5	0.64				
Q6		0.813			
Q7		0.278			
Q8		0.79			
Q9		0.689			
Q10		0.231			
Q11		0.173			
Q12		0.147			
Q13			0.415		
Q14			0.642		
Q15			0.678		
Q16			0.81		
Q17			0.637		
Q18			0.827		
Q19			0.197		
Q20			0.763		
Q21			0.825		
Q22			0.802		
Q23			0.618		
Q24			0.671		
Q25			0.436		
Q26			0.597		
Q27				0.514	
Q28				0.507	
Q29				0.669	
Q30				0.025	
Q31				0.052	
Q32					0.11
Q33					0.106
Q34					0.787
Q35					0.786
Q36					0.802
Q37					0.466

5.3.3 Descriptive Statistics

Descriptive statistics shows mean, median, mode, minimum, maximum and standard deviation values of participants' answers about hardware influence, software production influence, digitalization platform influence, IT outsource influence, producer influence and digital domestic COO. According to mean and median values shown in table 12, in average, respondents favored producer influence and digitalization platform influence as the most useful criteria for domestic COO evaluation.

Table 12. Descriptive Statistics

Indicator	Mean	Median	Mode	Min	Max	SD
Hardware Influence	3.18	3.2	3	1.8	4.4	0.54
Software Production Influence	3.27	3.43	3.43	1.71	4.43	0.6
Digitalization Platforms Influence	3.43	3.46	3.43	1.93	4.5	0.54
IT Outsource Influence	3.32	3.4	4	1.6	4.4	0.68
Producer Influence	3.46	3.58	4	2	4.5	0.62
Digital Domestic COO	2.96	2.75	2.75	1.75	4.5	0.51

5.4 Hypothesis Testing

In order to test the hypotheses, Regression Analysis method was used in this research. Regression tests are common method for research applications when both independent and dependent variables are interval/ordinal/categorical.

The hypotheses were modeled into five groups as hardware influence, software production influence, digitalization platforms influence, IT outsource influence and producer influence. The hypotheses were tested in order to find whether independent variables have significant influence on domestic COO evaluation. %95 significance level was used for this research and because of that any significance value above 0.05 was not accepted as significant. Figure 5 illustrate the

results on digital domestic COO and its relationship with other influence variables in the research.

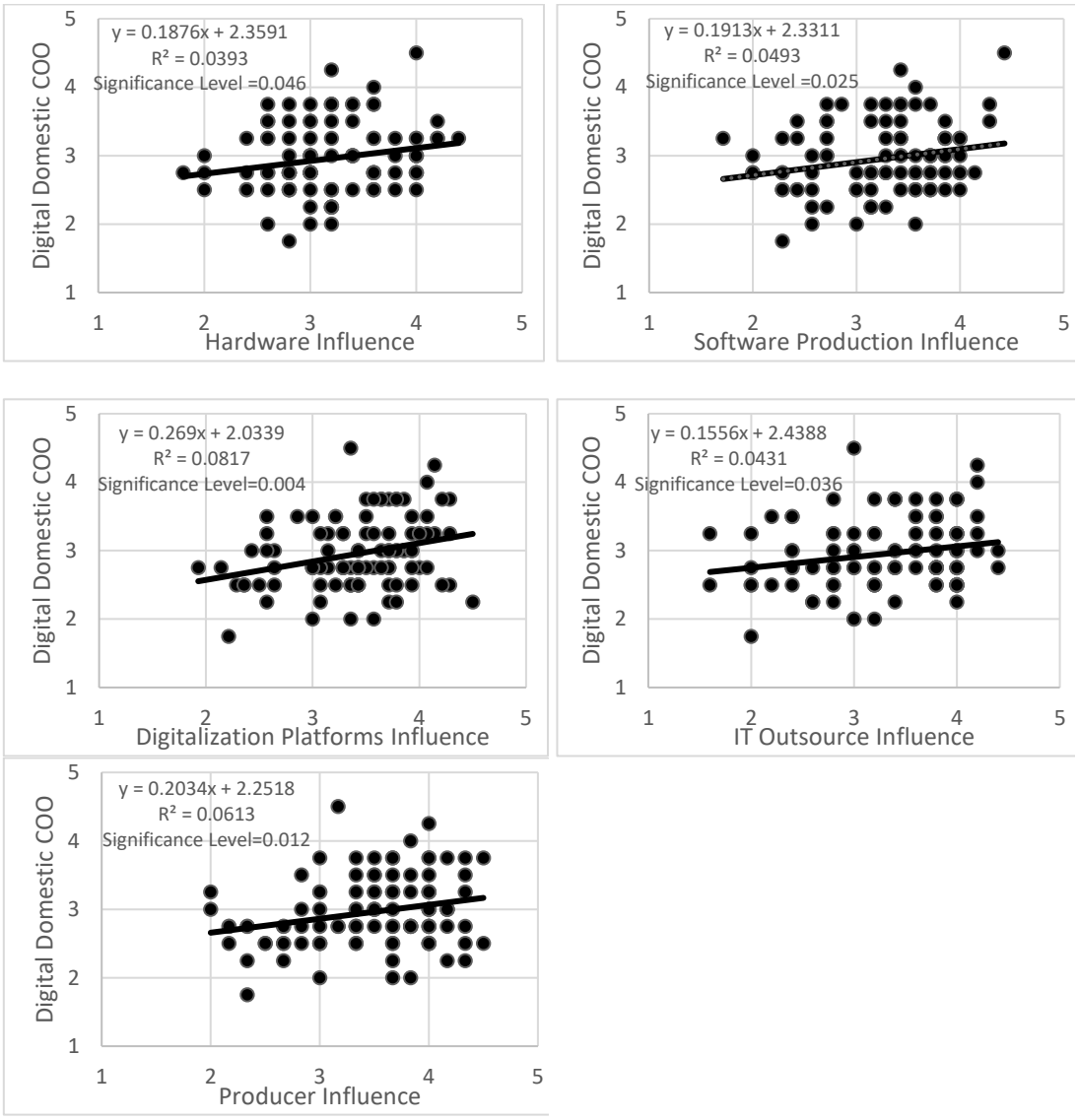

Figure 5. Regression results of independent variables

The comprehensive analysis of regression model fitting shown in tables indicates the relationships between digital domestic COO evaluation and hardware influence, software production influence, digital platforms influence, IT outsource influence and producer influence.

H1: Hardware and infrastructure products influence is positively correlated with Digital COO Evaluation

The variables of hardware and infrastructure influence means were taken, and a regression analysis was done in order to check whether the variables significantly affect digital domestic COO evaluation. In the figure 5, it is seen that the variables significantly affect digital domestic COO evaluation with a value of 0.046 ($p < 0.05$). The strength of relationship is 0.0393 (R^2). The detailed analysis can be found in Appendix E.

H2: Software production influence is positively correlated with Digital COO Evaluation

The variables of software production influence means were taken, and a regression analysis was done in order to check whether the variables significantly affect digital domestic COO evaluation. In the figure 5, it is seen that the variables significantly affect digital domestic COO evaluation with a value of 0.025 ($p < 0.05$). The strength of relationship is 0.0493 (R^2). The detailed analysis can be found in Appendix E.

H3: Digitalization platforms influence is positively correlated with Digital COO Evaluation.

The variables of digitalization platforms influence means were taken, and a regression analysis was done in order to check whether the variables significantly affect digital domestic COO evaluation. In the figure 5, it is seen that the variables significantly affect digital domestic COO evaluation with a value of 0.004 ($p < 0.05$). The strength of relationship is 0.0817 (R^2). The detailed analysis can be found in Appendix E.

H4: IT outsource attributes and characteristics influence is positively correlated with Digital COO Evaluation

The variables of IT outsource influence means were taken, and a regression analysis was done in order to check whether the variables significantly affect digital domestic COO evaluation. In the figure 5, it is seen that the variables significantly affect digital domestic COO evaluation with a value of 0.036 ($p < 0.05$). The strength of relationship is 0.0431 (R^2). The detailed analysis can be found in Appendix E.

H5: Producer attributes and characteristics influence is positively correlated with Digital COO Evaluation

The variables of producer influence means were taken, and a regression analysis was done in order to check whether the variables significantly affect digital domestic COO evaluation. In the figure 5, it is seen that the variables significantly affect digital domestic COO evaluation with a value of 0.012 ($p < 0.05$). The strength of relationship is 0.0613 (R^2). The detailed analysis can be found in Appendix E.

H6: There is a significant difference in different municipality departments in terms of domestic COO evaluation.

The table 13 reveals the result of ANOVA test between municipality departments and digital domestic COO. Since, its significance level exceeds the threshold level ($p<0.05$) with a value of 0.244, the hypothesis was rejected.

Table 13. ANOVA Results of Municipality Departments with Digital Domestic COO

ANOVA					
	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	1.764	5	.353	1.366	.244
Within Groups	24.787	96	.258		
Total	26.551	101			

A summary of hypothesis testing results can be found in table 14. According to the table first five hypothesis were accepted with a significance value less than 0.05. However, last hypothesis was rejected because of a significance value more than 0.05.

Table 14. Results of Domestic COO

Hypotheses	Dependent	Independent	Accepted	Significance
H1	Domestic COO	Hardware Influence	Yes	0.046
H2	Domestic COO	Software Production Influence	Yes	0.025
H3	Domestic COO	Digitalization Platforms Influence	Yes	0.004
H4	Domestic COO	IT Outsource Influence	Yes	0.036
H5	Domestic COO	Producer Influence	Yes	0.012
H6	Domestic COO	Municipality Department	No	0.244

The relative importance between five dimensions of digital domestic COO evaluation can be found in table 15. The standardized coefficient values according to coefficients table in multiple regression analysis reveal that, digitalization platforms influence is the most important predictor for determining digital domestic COO. On the other hand, hardware influence has the lowest value for determining the digital domestic COO.

Table 15. Standardized Coefficients Values

Model	Standardized Coefficients (Beta)
(Constant)	
Hardware Influence	.144
Software Production Influence	.158
Digitalization Platforms Influence	.304
IT Outsource Influence	.169
Producer Influence	.228

CHAPTER 6

CONCLUSION

In an era of todays' globalizing world, corporates and organizations make strategic alliances, mergers and acquisitions and supplier-retailer relationship in a widespread area of the world regardless of its country. This causes a confusion and ambiguity especially when it comes to international tariff and duty charges for the products which have multinational identity. In addition, a national identity labeling and COO determination for product is worthy information for ethnocentric sensitive customers. Furthermore, governmental agencies and public sector needs domestic COO products especially when it comes to technologic goods in order to preserve safety and privacy of the national assets.

The purpose for this master thesis is to examine the type of information criteria that may be used for digital domestic COO evaluation. Although some insights can be gained with this theory, the various hypotheses derived from the theory are confirmed by the results. Therefore, it is prudent to consider other theoretical perspectives and visions.

6.1 Limitations

This study is implemented only in one region of municipalities in Turkey. There may be different results when considering other parts of Turkey as a whole. It is also important to note that, there is a different result in terms of a department in municipalities. Thus, although the indicators can be applicable to both organizations and department, the domestic COO evaluation parameters should be specific to department and its possible conditions.

6.2 Implications

During this study, the main evaluation tools and criteria of digital domestic COO have been analyzed. In order to develop measuring criteria, a series of interviews with experts from municipalities and industry were implemented and the most useful and realistic parameters were determined. Parameters were selected both from literature review and expert opinions.

This thesis results that according to experts there are 37 vital parameters that can be adopted to assess digital domestic COO evaluation. However, because of the common traits and characteristics of parameters the whole list divided into five influence dimensions according to factor analysis. The influence dimensions are listed as hardware influence, software production influence, digitalization platforms influence, IT outsource influence and producer influence.

The research shows that there are 5 parameters for hardware influence of digital domestic COO which can be listed as hardware production place, hardware assembly place, raw materials and spare parts origin, strategic part origin and energy source origin for product. In addition, hardware influence has the lowest regression for the digital domestic COO which results that hardware has the lowest influence for the determination of domestic COO evaluation.

Software production influence has 7 parameters which are software production place, software producer citizenship, government or related public institutions approved projects, capability of software development based on new technology, software capability of sales in international market, compliance with international standards for exportable produced software and software library origin. The factor analysis for the parameters can be seen in table 10. The regression strength for software influence with digital domestic COO is low.

Digitalization platforms influence evolved of 14 parameters which are development platform origin, data store location, open source code ratio, openness rate, community support availability, open source database availability, patented software design, communication infrastructure origin, document format origin, open architecture ratio, operating system origin, web server origin, protocol origin and hardware related operating system origin. The variable has a significant relationship with domestic COO evaluation. The regression analysis results the highest with this influence which means it has the highest influence for the determination of domestic COO evaluation.

IT outsource influence was determined by 5 parameters as supplier production place, supplier headquarter place, configurated software/operating system, source code analysis origin and security test maintenance citizenship.

In the research, producer influence has been assessed by 6 parameters as headquarter location, domestic capital rate, tax payment to domestic country, investment rate in domestic country, employment contribution and R&D spending rate. The regression and factor analysis results reveal that there is a significant relationship between producer influence and domestic COO.

The research also measures the relative importance of five dimensions for digital domestic COO evaluation. According to standardized beta coefficient values, digitalization platforms influence is the most important predictor for determining the digital domestic COO. On the other hand, hardware influence gives the lowest contribution for the dependent variable among all other independent variables.

Lastly, the research studied if the domestic COO has a difference in terms of departments. It results that there is not significant difference between different

municipality units which means the domestic COO evaluation does not need to be sector specific.

6.3 Further Research

In the research, some parameters need to be investigated more deeply such as investment rate origin, raw material origin. These parameters themselves must be measured by additional criteria and formulas. Furthermore, the outputs of this study and model can be used for further research studies. More specific and comprehensive frameworks can be developed on this research area.

APPENDIX A

SAMPLES OF SEMI-STRUCTURED INTERVIEW QUESTIONS

Provided below are the questions used to frame each expert interview (typical duration 1 hour).

1. What do you consider to be the most appropriate metrics to evaluate the COO of a product or company?
2. Which type of products would you identify as the world's most domestic COO product in your expertise area?
3. Which products or companies, from across the world, would you consider as having more percentage of ratio as domestic product/company despite the globalizing environment?
4. Could you recommend any other individuals whom you feel should be consulted as part of this study?

APPENDIX B

QUESTIONNAIRE

1. Please choose domesticity rate for below product according to you.

   Vestel Venus Z30
   https://www.vestel.com.tr/vestel-venus-z30-azur-mavisi

   - 0%-20%
   - 20.1%-40%
   - 40.1%-60%
   - 60.1%-80%
   - 80.1%-100%

   Please choose domesticity rate for below product according to you.

   Siemens Home Connect Ankastre Kahve Makinesi
   https://www.siemens-home.bsh-group.com/tr/urun-listesi/kahve-makineleri/ankastre-tam-otomatik-kahve-makineleri/CT636LES6?breadcrumb=coffeemachinescoffeemachineswithhomeconnect

   - 0%-20%
   - 20.1%-40%
   - 40.1%-60%
   - 60.1%-80%
   - 80.1%-100%

2. Please answer the below questions.
   Hardware Products
   (1: Strongly Disagree, 5: Strongly Agree)

   - Hardware production location has an effect to be count as a domestic product
   - Assembly place location has an effect to be count as a domestic product
   - Supplying strategic and unique hardware materials (chip, engine etc.) from inside the country has an effect to be count as a domestic product
   - Providing necessary energy that is needed to run the product from inside the country has an effect to be count as a domestic product
   - Supplying raw materials and spare parts from inside the country does not have an effect to be count a domestic product

3. Please answer the below questions.
   Software Production
   (1: Strongly Disagree, 5: Strongly Agree)

   - Software production location has an effect to be count as a domestic product
   - Existence of public sector approved project has an effect to be count as a domestic product
   - Producer citizenship has an effect to be count as a domestic product
   - The software update team citizenship has an effect to be count as a domestic product
   - The software export performance has an effect to be count as a domestic product
   - The software compliance with international standards has an effect to be count as a domestic product
   - The software library origin has an effect to be count as a domestic product

4. Please answer the below questions.
   Digitalization Platforms
   (1: Strongly Disagree, 5: Strongly Agree)

   - Data center location does not have an effect to be count as a domestic product
   - Software production platform origin has an effect to be count as a domestic product
   - Open source software rate against commercial software base has an effect to be count as a domestic product
   - Openness rate for software has an effect to be count as a domestic product
   - Community support for open source software has an effect to be count as a domestic product
   - Open source database usage has an effect to be count as a domestic product
   - Patented software design ownership has an effect to be count as a domestic product
   - Communication infrastructure origin for digital transformation products has an effect to be count as a domestic product
   - The software allowance for open document format has an effect to be count as a domestic product
   - Open architecture in software has an effect to be count as a domestic product
   - Web server origin has an effect to be count as a domestic product
   - Communication protocol origin for embedded systems has an effect to be count as a domestic product

- Hardware related operating systems origin has an effect to be count as a domestic product
- Operating system origin and the state of being an open source operating system does not have an effect to be count as a domestic product

5. Please answer the below questions.
   IT Outsource
   (1: Strongly Disagree, 5: Strongly Agree)

   - The company production location for purchased software products has an effect to be count as a domestic product
   - The company headquarter location for purchased software products has an effect to be count as a domestic product
   - The state of being configurable for purchased software products has an effect to be count as a domestic product
   - The source code origin for purchased software products has an effect to be count as a domestic product
   - The security test maintenance citizenship has an effect to be count as a domestic product

6. Please answer the below questions.
   Producer Influence
   (1: Strongly Disagree, 5: Strongly Agree)

   - Producer headquarter location has an effect to be count as a domestic product
   - Producer capital origin does not have an effect to be count as a domestic product
   - Producer tax payment to the country it operates has an effect to be count as a domestic product
   - Producer investment to the country it operates has an effect to be count as a domestic product
   - Producer employment contribution to the country it operates has an effect to be count as a domestic product
   - Producer R&D operations instead of technology purchasing has an effect to be count as a domestic product

7. Please choose domesticity rate for same product, which is also given some product features, considering questionnaire questions.

   Product Name: Vestel Venus Z30
   Production Location: Manisa – Turkey
   Export Total: 2,000,000,000 $
   Operating System: Android
   Producer Domestic Capital Rate: 100%

Producer Headquarter Location: Istanbul – Turkey
Product Link: https://www.vestel.com.tr/vestel-venus-z30-azur-mavisi

- 0%-20%
- 20.1%-40%
- 40.1%-60%
- 60.1%-80%
- 80.1%-100%

Please choose domesticity rate for same product which is also given some product features considering questionnaire questions.

Product Name: Siemens Home Connect Ankastre Kahve Makinesi
Production Location: Tekirdag – Turkey
Export Total: 850,000,000 $
Operating System: Android -iOS
Producer Domestic Capital Rate: 0.04%
Producer Headquarter Location: Istanbul – Turkey
Product Link: https://www.siemens-home.bsh-group.com/tr/urun-listesi/kahve-makineleri/ankastre-tam-otomatik-kahve-makineleri/CT636LES6?breadcrumb=coffeemachinescoffeemachineswithhomeconnect

- 0%-20%
- 20.1%-40%
- 40.1%-60%
- 60.1%-80%
- 80.1%-100%

8. Please indicate total work experience

- Less than one year
- 1-5 years
- 6-10 years
- 11-15 years
- More than 15 years

9. Please indicate your department

- IT
- R&D
- Environment
- Human Resources
- Engineering
- Wastewater Treatment

- Finance
- Other

10. Please indicate annual total expense for your institution

- Less than 100,000 TL
- Between 100,000 TL and 250,000 TL
- Between 250,001 TL and 500,000 TL
- Between 500,001 TL and 1,000,000 TL
- More than 1,000,000 TL

APPENDIX C

QUESTIONNAIRE (TURKISH)

Boğaziçi Üniversitesi Yönetim Bilişim Sistemleri Bölümü Yüksek Lisans Tez Araştırması

0 %

Bu yüksek lisans tez araştırması, belediyelerin dijital dönüşümde kullandığı ürünlerin menşei ülkesinin belirlenmesini ve yerli olma oranının hesaplanmasını sağlayan değerlendirme sistemini oluşturmak amacıyla Boğaziçi Üniversitesi Yönetim Bilişim Sistemleri Bölümü yüksek lisans öğrencisi Serkan Özdemir tarafından Doç. Dr. Bilgin Metin yönetiminde yürütülmektedir. Yanıtlarınız anonim olarak derlenecek ve yalnızca akademik amaçlar için kullanılacaktır.
Anket yaklaşık 10 dk sürmektedir. Katılımınız için teşekkür ederiz.

Lütfen aşağıda belirlenen ürün için size göre yerlilik oranını seçiniz *

Vestel Venus Z30
https://www.vestel.com.tr/vestel-venus-z30-azur-mavisi

- %0 - %20
- %20,1 - %40
- %40,1 - %60
- %60,1 - %80
- %80,1 - %100

Lütfen aşağıda belirlenen ürün için size göre yerlilik oranını seçiniz *

Siemens Home Connect Ankastre Kahve Makinesi
https://www.siemens-home.bsh-group.com/tr/urun-listesi/kahve-makineleri/ankastre-tam-otomatik-kahve-makineleri/CT636LES6?breadcrumb=coffeemachinescoffeemachineswithhomeconnect

- %0 - %20
- %20,1 - %40
- %40,1 - %60
- %60,1 - %80
- %80,1 - %100

Lütfen aşağıdaki soruları yanıtlayınız *

Donanım Ürünleri

	Kesinlikle katılmıyorum	Katılmıyorum	Kararsızım	Katılıyorum	Kesinlikle katılıyorum
Donanım üretim yeri lokasyonu yerli ürün sayılmasında etkilidir	◯	◯	◯	◯	◯
Parça birleştirme yeri lokasyonu yerli ürün sayılmasında etkilidir	◯	◯	◯	◯	◯
Katma değer sağlayan stratejik ve özgün donanım parçalarının (çip, motor vb.) ülke içinden temin edilmesi yerli ürün sayılmasında etkilidir	◯	◯	◯	◯	◯
Ürünün çalışması için gerekli enerjinin ülke içerisinden temin edilebiliyor olması yerli ürün sayılmasında etkilidir	◯	◯	◯	◯	◯
Hammadde ve yedek parçanın ülke içinden temin edilmesi yerli ürün olarak belirlenmesinde etkili değildir	◯	◯	◯	◯	◯

Lütfen aşağıdaki soruları cevaplayınız *

Yazılım Üretimi

	Kesinlikle katılmıyorum	Katılmıyorum	Kararsızım	Katılıyorum	Kesinlikle katılıyorum
Yazılım üretim yeri lokasyonu yerli ürün sayılmasında etkilidir	◯	◯	◯	◯	◯
Kamu kurumu onaylı projenin var olması yerli ürün sayılmasında etkilidir	◯	◯	◯	◯	◯
Yazılımcının vatandaşlığı yerli ürün sayılmasında etkilidir.	◯	◯	◯	◯	◯
Yazılım güncellemelerini yapacak ekibin vatandaşlığı yerli ürün sayılmasında etkilidir	◯	◯	◯	◯	◯
Yazılımın yurtdışı ihracat performansı yerli ürün sayılmasında etkilidir	◯	◯	◯	◯	◯
Yazılımın ihracat için uluslararası standartlara uygun olması yerli ürün sayılmasında etkilidir	◯	◯	◯	◯	◯
Yazılımın kullanıldığı kütüphanenin menşei yerli ürün sayılmasında etkilidir	◯	◯	◯	◯	◯

Lütfen aşağıdaki soruları yanıtlayınız *

Dijitalizasyon Platformları

	Kesinlikle katılmıyorum	Katılmıyorum	Kararsızım	Katılıyorum	Kesinlikle katılıyorum
Verilerin saklandığı lokasyon yerli ürün olarak belirlenmesinde etkili bir kriter değildir	○	○	○	○	○
Yazılımın üretildiği platformun menşei yerli ürün sayılmasında etkilidir	○	○	○	○	○
Ticari yerine açık kaynak kod tabanlı yazılım oranının fazla olması yerli ürün sayılmasında etkilidir	○	○	○	○	○
Açık kaynak olma oranının fazla olması yerli ürün sayılmasında etkilidir	○	○	○	○	○
Açık kaynak kod yazılıma verilen editör desteği yerli ürün sayılmasında etkilidir	○	○	○	○	○
Açık kaynak veritabanı kullanılması yerli ürün sayılmasında etkilidir	○	○	○	○	○
Patentli yazılım dizaynına sahip olması yerli ürün sayılmasında etkilidir	○	○	○	○	○
Ürünler için kullanılacak iletişim altyapısının menşei yerli ürün sayılmasında etkilidir	○	○	○	○	○
Yazılımın açık belge formatına izin vermesi yerli ürün sayılmasında etkilidir	○	○	○	○	○
Yazılımda açık mimari kullanılması yerli ürün sayılmasında etkilidir	○	○	○	○	○
Web sunucusunun menşei yerli ürün sayılmasında etkilidir	○	○	○	○	○
Gömülü sistemler iletişim protokollerinin menşei yerli ürün sayılmasında etkilidir	○	○	○	○	○
Donanıma bağlı işletim sistemlerinin menşei yerli ürün sayılmasında etkilidir	○	○	○	○	○
İşletim sistemi menşei ve açık kaynak olması yerli ürün olarak belirlenmesinde etkili bir kriter değildir	○	○	○	○	○

Lütfen aşağıdaki soruları yanıtlayınız. *

BT temini

	Kesinlikle katılmıyorum	Katılmıyorum	Kararsızım	Katılıyorum	Kesinlikle katılıyorum
Satın alınan yazılım ürünlerinin firma üretim yeri yerli ürün sayılmasında etkilidir	○	○	○	○	○
Satın alınan yazılım ürünlerinin firma ana bina lokasyonu yerli ürün sayılmasında etkilidir	○	○	○	○	○
Satın alınan yazılım ürünlerinin konfigüre edilebilir olması yerli ürün sayılmasında etkilidir	○	○	○	○	○
Satın alınan yazılım ürünlerinin kaynak kodu menşei yerli ürün sayılmasında etkilidir	○	○	○	○	○
Yazılım ürünlerinin güvenlik testi bakım ekibinin vatandaşlığı yerli ürün sayılmasında etkilidir	○	○	○	○	○

Lütfen aşağıdaki soruları yanıtlayınız *

Üretici etkisi

	Kesinlikle katılmıyorum	Katılmıyorum	Kararsızım	Katılıyorum	Kesinlikle katılıyorum
Üretici kuruluşun ana bina lokasyonu yerli ürün sayılmasında etkilidir	○	○	○	○	○
Üretici kuruluşun sermaye oranı menşei yerli ürün olarak belirlenmesinde etkili bir kriter değildir	○	○	○	○	○
Üretici kuruluşun üretim yaptığı ülkeye vergi vermesi yerli ürün sayılmasında etkilidir	○	○	○	○	○
Üretici kuruluşun üretim yaptığı ülkeye ayrıca yatırım yerli ürün sayılmasında etkilidir	○	○	○	○	○
Üreticinin ülke içi istihdama yaptığı katkı yerli ürün sayılmasında etkilidir	○	○	○	○	○
Üreticinin teknoloji satın alma yerine AR&GE faaliyetlerine yatırım yapması yerli ürün sayılmasında etkilidir	○	○	○	○	○

Lütfen aşağıda bazı özellikleri de verilen aynı ürün için ankette yer alan soruları da dikkate alarak uygun olan yerlilik oranını seçiniz *

Ürün Adı: Vestel Venus Z30
Üretim Yeri: Manisa - Türkiye
İhracat Miktarı: 2.000.000.000 $
İşletim Sistemi: Android
Üretici Yerli Sermaye Oranı: %100
Üretici Ana bina Lokasyonu: İstanbul - Türkiye
Ürün Linki: https://www.vestel.com.tr/vestel-venus-z30-azur-mavisi

- ○ %0 - %20
- ○ %20,1 - %40
- ○ %40,1 - %60
- ○ %60,1 - %80
- ○ %80,1 - %100

Lütfen aşağıda bazı özellikleri de verilen aynı ürün için ankette yer alan soruları da dikkate alarak uygun olan yerlilik oranını seçiniz *

Ürün Adı: Home Connect Ankastre Kahve Makinesi
Üretim Yeri: Tekirdağ - Türkiye
İhracat Miktarı: 850.000.000 $
İşletim Sistemi: Android - iOS
Üretici Yerli Sermaye Oranı: %0,04
Üretici Ana bina Lokasyonu: İstanbul - Türkiye
Ürün Linki: https://www.siemens-home.bsh-group.com/tr/urun-listesi/kahve-makineleri/ankastre-tam-otomatik-kahve-makineleri/CT636LES6?breadcrumb=coffeemachinescoffeemachineswithhomeconnect

- ○ %0 - %20
- ○ %20,1 - %40
- ○ %40,1 - %60
- ○ %60,1 - %80
- ○ %80,1 - %100

Toplam iş tecrübenizi belirtiniz *

- ◯ 1 yıldan az
- ◯ 1-5 yıl
- ◯ 5-10 yıl
- ◯ 10-15 yıl
- ◯ 15 yıldan fazla

Lütfen çalıştığınız departmanı belirtiniz *

- ◯ Bilgi İşlem
- ◯ AR&GE
- ◯ Çevre
- ◯ İnsan Kaynakları
- ◯ Mühendislik
- ◯ Su ve Kanalizasyon
- ◯ Finans
- ◯ Diğer

Bulunduğunuz kurumun yıllık toplam harcama miktarını belirtiniz *

- ◯ 100.000 TL'den az
- ◯ 100.000-250.000 TL arası
- ◯ 250.001-500.000 TL arası
- ◯ 500.001-1.000.000 TL arası
- ◯ 1.000.000 TL'den fazla

APPENDIX D

RELIABILITY TEST

Table D 1. Reliability Statistics of Hardware Influence

Cronbach's Alpha	N of Items
.714	5

Table D 2. Item-Total Statistics of Hardware Influence

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
H1	13.5196	5.440	.552	.641
H2	14.0490	5.255	.544	.639
H4	13.4118	5.393	.532	.646
H5	13.9608	5.325	.488	.660
H3R	13.5686	5.178	.324	.751

Table D 3. Reliability Statistics of Software Production Influence

Cronbach's Alpha	N of Items
.710	7

Table D 4. Item-Total Statistics of Software Production Influence

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
SP1	19.5196	14.510	.221	.721
SP2	19.9706	12.880	.393	.684
SP3	19.9020	12.010	.487	.658
SP4	20.0882	11.131	.687	.601
SP5	20.2843	12.602	.475	.662
SP6	20.1275	13.380	.383	.685
SP7	19.9314	14.005	.293	.706

Table D 5. Reliability Statistics of Digitalization Platforms Influence

Cronbach's Alpha	N of Items
.849	14

Table D 6. Item-Total Statistics of Digitalization Platforms Influence

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
DP1	44.6471	52.646	.501	.839
DP2R	44.5000	55.480	.218	.856
DP3	45.1765	52.048	.541	.837
DP4	45.1176	50.976	.550	.836
DP5	44.9314	49.114	.719	.825
DP6	45.0588	51.383	.582	.834
DP7	44.5196	53.203	.408	.844
DP8	44.8235	52.345	.486	.840
DP9	45.2451	51.177	.548	.836
DP10	45.0784	50.251	.590	.833
DP11	45.1275	54.172	.358	.847
DP12	44.6765	51.350	.527	.837
DP13	44.4118	50.423	.631	.831
DP14R	44.6373	55.164	.258	.853

Table D 7. Reliability Statistics of IT Outsource Influence

Cronbach's Alpha	N of Items
.763	5

Table D 8. Item-Total Statistics of IT Outsource Influence

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
ITO1	13.2059	8.819	.529	.723
ITO2	13.6078	8.181	.617	.691
ITO3	13.6765	8.419	.491	.736
ITO4	13.0490	8.918	.483	.737
ITO5	13.5980	7.787	.554	.714

Table D 9. Reliability Statistics of Producer Influence

Cronbach's Alpha	N of Items
.705	6

Table D 10. Item-Total Statistics of Producer Influence

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
P1	17.6765	11.528	.320	.701
P2R	17.5784	13.256	.027	.792
P3	17.5784	10.207	.570	.624
P4	17.5882	9.868	.637	.602
P5	17.4706	9.559	.633	.599
P6	16.9608	10.276	.554	.629

Table D 11. Reliability Statistics of Total Scale

Cronbach's Alpha	N of Items
.902	37

Table D 12. Item-Total Statistics of Total Scale

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
H1	120.5392	292.687	.402	.900
H2	121.9314	298.421	.246	.903
H4	120.0784	297.043	.369	.901
H5	121.6961	299.837	.188	.904
SP1	120.3333	301.809	.196	.903
SP2	120.7843	293.597	.401	.900
SP3	120.8235	285.731	.534	.898
SP4	121.0000	285.663	.595	.897
SP5	121.2059	297.749	.288	.902
SP6	121.0588	295.303	.358	.901
SP7	120.7549	295.474	.384	.900
DP1	120.4608	293.835	.469	.899
DP3	121.0196	291.683	.514	.899
DP4	120.9804	289.267	.526	.898
DP5	120.7451	286.390	.654	.897
DP6	120.9216	290.766	.541	.898
DP7	120.3333	292.759	.449	.900
DP8	120.6569	293.178	.453	.900
DP9	121.1176	290.798	.486	.899
DP10	120.9510	287.988	.552	.898
DP11	120.9706	293.672	.428	.900
DP12	120.4804	290.925	.499	.899
DP13	120.2157	288.745	.596	.898
ITO1	120.5784	289.712	.564	.898
ITO2	120.9902	287.198	.615	.897
ITO3	121.0392	291.028	.466	.899
ITO4	120.3824	294.476	.421	.900
ITO5	120.9804	285.683	.560	.898
P1	120.9412	290.373	.462	.899
P3	120.7549	290.662	.496	.899
P4	120.7549	292.979	.432	.900
P5	120.6471	287.597	.560	.898
P6	120.1176	287.630	.593	.897
H3R	120.4608	300.944	.162	.904
DP2R	120.3431	298.564	.252	.902
DP14R	120.4706	300.747	.206	.903
P2R	120.7157	309.136	-.044	.907

APPENDIX E

REGRESSION ANALYSIS RESULTS

Table E 1. Variables Entered/Removed for Hardware Influence

Variables Entered/Removed[a]			
Model	Variables Entered	Variables Removed	Method
1	H_AVG[b]	.	Enter

a. Dependent Variable: DOM

b. All requested variables entered.

Table E 2. Model Summary for Hardware Influence

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.198[a]	.039	.030	.50505

a. Predictors: (Constant), H_AVG

Table E 3. ANOVA for Hardware Influence

ANOVA[a]						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	1.044	1	1.044	4.091	.046[b]
	Residual	25.508	100	.255		
	Total	26.551	101			

a. Dependent Variable: DOM

b. Predictors: (Constant), H_AVG

Table E 4. Coefficients for Hardware Influence

Coefficients[a]						
		Unstandardized Coefficients		Standardized Coefficients		
Model		B	Std. Error	Beta	t	Sig.
1	(Constant)	2.359	.299		7.884	.000
	H_AVG	.188	.093	.198	2.023	.046

a. Dependent Variable: DOM

Table E 5. Variables Entered/Removed for Software Production Influence

Variables Entered/Removed[a]			
Model	Variables Entered	Variables Removed	Method
1	SP_AVG[b]	.	Enter

a. Dependent Variable: DOM

b. All requested variables entered.

Table E 6. Model Summary for Software Production Influence

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.222[a]	.049	.040	.50242

a. Predictors: (Constant), SP_AVG

Table E 7. ANOVA for Software Production Influence

ANOVA[a]						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	1.309	1	1.309	5.184	.025[b]
	Residual	25.243	100	.252		
	Total	26.551	101			

a. Dependent Variable: DOM

b. Predictors: (Constant), SP_AVG

Table E 8. Coefficients for Software Production Influence

Coefficients[a]						
		Unstandardized Coefficients		Standardized Coefficients		
Model		B	Std. Error	Beta	t	Sig.
1	(Constant)	2.331	.279		8.358	.000
	SP_AVG	.191	.084	.222	2.277	.025

a. Dependent Variable: DOM

Table E 9. Variables Entered/Removed for Digitalization Platforms Influence

Variables Entered/Removed[a]			
Model	Variables Entered	Variables Removed	Method
1	DP_AVG[b]	.	Enter

a. Dependent Variable: DOM

b. All requested variables entered.

Table E 10. Model Summary for Digitalization Platforms Influence

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.286[a]	.082	.073	.49378

a. Predictors: (Constant), DP_AVG

Table E 11. ANOVA for Digitalization Platforms Influence

ANOVA[a]						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	2.170	1	2.170	8.899	.004[b]
	Residual	24.382	100	.244		
	Total	26.551	101			

a. Dependent Variable: DOM

b. Predictors: (Constant), DP_AVG

Table E 12. Variables Entered/Removed for Digitalization Platforms Influence

Coefficients[a]						
		Unstandardized Coefficients		Standardized Coefficients		
Model		B	Std. Error	Beta	t	Sig.
1	(Constant)	2.034	.313		6.500	.000
	DP_AVG	.269	.090	.286	2.983	.004

a. Dependent Variable: DOM

Table E 13. Variables Entered/Removed for IT Outsource Influence

Variables Entered/Removed[a]			
Model	Variables Entered	Variables Removed	Method
1	ITO_AVG[b]	.	Enter

a. Dependent Variable: DOM

b. All requested variables entered.

Table E 14. Model Summary for IT Outsource Influence

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.208[a]	.043	.034	.50405

a. Predictors: (Constant), ITO_AVG

Table E 15. ANOVA for IT Outsource Influence

ANOVA[a]						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	1.144	1	1.144	4.504	.036[b]
	Residual	25.407	100	.254		
	Total	26.551	101			

a. Dependent Variable: DOM

b. Predictors: (Constant), ITO_AVG

Table E 16. Coefficients for IT Outsource Influence

Coefficients[a]						
		Unstandardized Coefficients		Standardized Coefficients		
Model		B	Std. Error	Beta	t	Sig.
1	(Constant)	2.439	.249		9.807	.000
	ITO_AVG	.156	.073	.208	2.122	.036

a. Dependent Variable: DOM

Table E 17. Variables Entered/Removed for Producer Influence

Variables Entered/Removed[a]			
Model	Variables Entered	Variables Removed	Method
1	P_AVG[b]	.	Enter

a. Dependent Variable: DOM

b. All requested variables entered.

Table E 18. Model Summary for Producer Influence

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.247[a]	.061	.052	.49925

a. Predictors: (Constant), P_AVG

Table E 19. ANOVA for Producer Influence

ANOVA[a]						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	1.626	1	1.626	6.525	.012[b]
	Residual	24.925	100	.249		
	Total	26.551	101			

a. Dependent Variable: DOM

b. Predictors: (Constant), P_AVG

Table E 20. Coefficients for Producer Influence

Coefficients[a]						
		Unstandardized Coefficients		Standardized Coefficients		
Model		B	Std. Error	Beta	t	Sig.
1	(Constant)	2.252	.280		8.041	.000
	P_AVG	.203	.080	.247	2.554	.012

a. Dependent Variable: DOM

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