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Company Life Cycles In Electronic Retailing

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Abstract

Global technological advancements have led to the emergence of new products, markets, and trade insights. E-retailing companies emerged out of these developments and formed a large industry. In this rapidly developing industry with a consistently increasing organizational population, e-retailing companies extend their company life cycles through strategic targets and practices. These companies determine their strategic targets based on certain stages, i.e., start-up entry, plateauing growth or consolidation, maturation by fast growth, implementing change, or choosing growth and decline. With these strategies, e-retailing companies can timely react to the changing environment, prevent performance degradation, and increase survival chances. This study investigates the effects of information systems in e-retailing on company life cycles. Accordingly, the secondary internal data of IdeaSoft company from 2007 to 2018 were used. The findings demonstrated that although the studied active companies have high-level information systems, they fail to adequately utilize these information systems. Furthermore, the study shares stages and strategies for the e-retailing life cycle of the studied active and passive companies.

Keywords: E-commerce, e-retailing, company life cycle, e-retailing company life cycle

1. Introduction

Technology's impact on individuals and institutions is greater than ever today. Those who could not adapt to technological developments and keep up with the transformation have been left out of the social-economic system. Companies should manage this transformation properly. This transformation process has also led to new business models for companies. One of these new models is e-retailing. The longevity of e-retailing companies depends on the strategy they have created for the life cycle of a company. A strong association is believed to exist between e-retailing companies and information system management strategies they implement from their move into e-commerce to their growth and end of business life. The position of the companies in the industry, their industry age, information system management approach, and other factors may negatively or positively affect a company's lifespan.

Cloet et al. (2002) investigated the association between SMEs' technology acceptance and adoption and their company lifespans. Ashworth (2012) focused on the relation between company lifespans and the marketing and management practices of e-SMEs in the fashion industry. Dil's articles published between 2014 and 2016 conceptually and theoretically established longevity as an indicator of strategic success. Ghosh (2014) associated "longevity" with company success and investigated why the e-retailing market in India is still partly successful and partly failing.

This study investigates the effects of information systems in e-retailing on the life cycles of companies. Since this study is one of the first attempts to address the life cycle of companies operating in the electronic environment, it is expected to make significant contributions to the relevant industry and literature. Furthermore, this study is important in terms of demonstrating the performance of the e-retailing companies in Turkey and filling the gaps in this area. The study is conducted on companies who use IdeaSoft's information technologies for their e-retailing activities.

IdeaSoft represents more than 50% of the Turkish e-commerce market in this area.

2. Literature Review and Hypothesis Presentation

2.1. E-tailing and information systems

It would be useful to define retailing before moving on to explaining the e-retailing concept. Access to the products on the market has undergone various stages throughout history. Sales points evolved from street vendors to markets and permanent business centers. Distribution of consumer goods starts with the manufacturer, who is the first step of the distribution channel, and ends with the consumer. One of the complementary elements of this process is the retailer (Aydın, 2013: 1-8). Any organization that sells to the end consumers (manufacturer, wholesaler, or retailer) is a retailer (Levy et al., 2001: 8). By contrast, e-tailing is defined as the sale of goods and services through the Internet or other electronic channels to meet the personal needs of consumers (Dennis, 2004: 2). E-tailing means selling to the end consumer via the Internet. IdeaSoft (2015) defined e-retailing as the marketing of goods/services to customers using electronic media tools and Internet technologies. E-retailing and e-commerce depend on the scope of the provided services; e-retailing is the service through which the customers can purchase goods and services, and e-commerce includes several services such as fund transfers, online marketing, and online data processing(Dili, 2017).

E-retailing management has a multidimensional structure. This structure is created through e-retailing information systems. E-stores manage their e-retailing through brand communication with the customers, creating successful purchasing processes, reducing imperfections in the aftersales services, and thereby increasing their company lifespans.

2.2. The life cycle concept

The life cycle concept is a useful method for predicting and explaining organizational movements. Detailed analyses using the life cycle concept can give the managers a perspective on the magnitude and direction of the future evolutionary processes (Davidson et al., 1976: 90). The life cycle, also referred to as the life curve, is a concept used in all scientific fields from humanities to technical sciences. The life cycle concept is used in studies on economy (Hall, 1978), biology (Seghetta vd., 2017), environmental sciences (Mohammadi vd., 2013), automotive and energy (Mayyas vd., 2017), and medicine (Reñé vd., 2017).

A product life cycle usually reveals the functional relation between the sales of a product, which is the dependent variable, and time, which is the independent variable. Time is usually limited to the product’s entry into the market and the manufacturer's termination of sale. This time is called the “life” of the product, and this is where the expression of life cycle derives from (Brockhoff, 1967: 472).

It is a well-known fact that individual products, mechanical designs, and even cells have a certain time span throughout which they develop and mature, and those that can renew themselves transition into new life forms while the unsuccessful forms disappear. The concept of life cycle has been studied in different scientific fields and defined in several resources in literature. This section investigates the different approaches to the concept of life cycle in marketing.

The different types of life cycles can be classified into product, international, technological, company, and retail. Brockhoff (1967), Kotler (1997), Grewal et al. (2013), Er (2014), and Arsham’s (2017) product life cycle concepts; Vernon (1966) and Mutlu’s (2005) international product life cycle concepts; Taylor and Taylor (2012), Çetindamar et al. (2016), and Şeker’s (2017) technological life cycle concepts; Grabowski and Mueller (1975), Miller and Friesen (1984), Anthony and Ramesh (1992), Ervin L. Black (1998), Yonpae and Chen (2006), and Dickinson’s (2011) company life cycle concepts, and Davidson et al. (1976), Dunne, and Lusch and Carver’s (2008) retailing life cycle concepts have been studied within the scope of life cycle. The advancement of technology has transformed retailing companies into e-retailing companies.

Davidson et al. (1976) and Dunne et al. (2008) explained the retailing life cycle with profitability, market share, and time difference parameters. Davidson et al. (1976) defined the retailing life cycle stages as “innovation, accelerating growth, maturity, and decline.” Dunne et al. (2008) defined these stages as “introduction, growth, maturity, and decline.” As for the e-retailing life cycle approaches, Cenfetelli and Benbasat (2002) addressed the “e-commerce customer service life cycle approach.” Whelan and McGrath (2002) addressed the “e-retailing life cycle cost approach.” Weber et al. (2009) addressed the “e-retailing life cycle approach.” Ashworth (2011) addressed the “e-retailing life span approach.” Stacey (2016) examined the “e-retailing life cycle.”

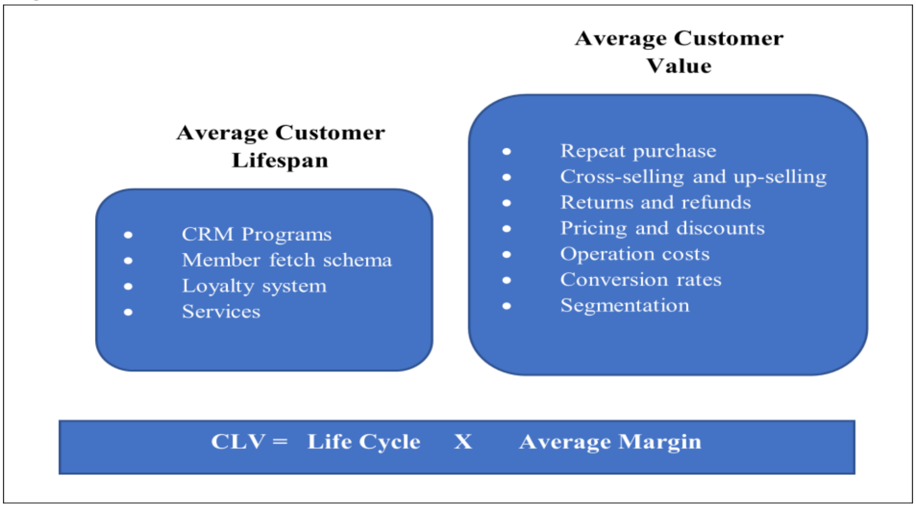
Woodall (2017) addressed the "e-commerce life cycle model." SmartInsights (2018) addressed the "e-retailing life cycle approach." E-retailing customer lifetime value variables have been determined with the help of the variables in the referenced studies in the literature, and the relevant analysis methods have been explained.

A review of all these studies reveals that the e-retailing life cycle is associated with the customer lifetime value (CLV) in the time dimension.

CLV can be defined as the value or profit attributed to a customer over his/her entire life cycle. Calculating this value may be relatively easier for some businesses, while it can be incredibly complex for others. Cost per acquisition (CPA) measurement system is used in marketing. Two variables are required for calculating the CLV using the simple method. These variables (Kingsnorth, 2017: 20) are the number of periods that a customer remains with the company (for the customer lifetime) and the average margin per customer in a period. Many formulas used in digital marketing are based on "CLV = lifetime x average margin" formula. The commonly used models are CPA and cost per click (Kingsnorth, 2017:22). There are also cost per mille (or cost per impression) (Kong et al., 2018:83), cost per action (Dunham et al., 2002), and customer acquisition cost (Lewis, 2006) models.

The average margin variables in CLV e-retailing life cycle (repeat purchase behaviors, cross-selling and up-selling, etc.), depicted in Figure 1, can have a lifelong effect. This effect may be related to the duration, type, and number of the services. In this study, these variables will be referred to as the "average margin."

Figure 1: Customer Lifetime Value (CLV)



Source: Kingsnorth, 2017:22

3. Study Method

This study investigates the e-retailing company life cycles in general and industry-specific basis and identifies strategies for each step based on the e-retailing activity. It also calculates the life cycles of electronic commerce businesses in the e-retail industry, examines the reasons for the end of life of e-retail businesses, and determines e-retailing life cycle by calculating the amount of time in which the e-retailing companies are in a relationship with the customers and the "average margin"[1] per customer. Furthermore, this study analyzes how the successful e-retailing companies achieved this success in the industry, identifies why unsuccessful companies ended their operations, and investigates the e-retailing industry in Turkey. Moreover, it offers useful findings and suggestions to e-retailing companies that are operating under extensive local and global competition.

4. Scope and Study Limitations

This study includes e-retailing companies that make online sales using e-retailing information systems. One of the limitations of the study is the inability to reach all e-retailing companies. Therefore, reaching a certain number of e-retailing businesses is a limitation. E-commerce sites such as Hepsiburada, N11, and Gittigidiyor, which operate with a large transaction volume in the Turkish e-retailing market, were excluded from the study. This led to another limitation in the study on the life cycle of the e-retailing companies.

This study used secondary data and evaluated the sales numbers from IdeaSoft database, excluding the cash data, as well as information systems. The previous life cycle studies, including the ones conducted by Aharony et al. (2006), Anthony and Ramesh (1992), Yonpae and Chen (2006), and Güleç (2017), used financial indicators. However, using the financial indicators within the scope of this study was found inappropriate by IdeaSoft. Furthermore, other companies providing e-retailing infrastructures refused to share this data. These are other limitations.

4.1. Study questions and hypotheses

The first hypothesis of the study addresses the following question:

- Do e-retailing information systems affect differentiating the life cycle of companies depending on the number of products sold and industry?

Predicting the changes in customer trends would only be possible by closely following new technology and channel strategies as well as realigning the goals of the business (Woodall, 2017). Kumar et al. (2008) addressed the association between the total number of purchases by the customer with different retailing channels and the diversity of technology in the calculation of the CLV in the technology industry. Tsai et al. (2013:18) investigated the e-retailing companies' decisions regarding the necessary information systems and technological resources, which aimed to increase the market share and become profitable in a highly competitive environment.

A review of the studies in the literature suggests that using information systems affects the life cycles of the companies. In that context, it is assumed that the information systems used by the companies could impact the life cycle of the companies depending on the number of products sold and the relevant industry. Therefore, the following two hypotheses have been included in the study:

Hypothesis 1a: In e-retailing practices, a statistically significant relationship exists in terms of the number of products sold between the use of information systems and the life cycle of companies.

Hypothesis 1b: In e-retailing practices, a statistically significant relationship exists in terms of the number of products sold between the use of industry-specific information systems and the life cycle of companies.

The second hypothesis of the study addresses the following question:

- Does purchasing and selling products via desktop or mobile platforms affect the life cycle of the companies in e-retailing applications?

Arsham (2017) stated that an e-retailing entrepreneur who designs a website and introduces the product to the market initially will often have a period of monopoly until competitors start to copy and/or improve the product If the new product is successful, sales will start to grow (Arsham, 2017). Mobile and web sales channels are expected to maximize customer access and increase sales at consumer access points, thereby positively affecting the life cycle of the company. In the literature, the transformation of e-retailing companies to m-retailing has been investigated based on the types of retailers and their performance (Chou and Shao, 2020).

When considering the e-retailing company life cycles, it is believed that the visitors of desktop and mobile platforms of e-retailing companies differ based on platforms, and these platforms may impact the life cycles of the e-retailing companies. Therefore, the following hypotheses have been included in the study:

Hypothesis 2a: In e-retailing practices, a statistically significant difference exists in terms of company life cycles between ordering products from desktop platforms and ordering products from mobile platforms.

Hypothesis 2b: In e-retailing practices, a statistically significant relationship exists in terms of company life cycles between the number of sales via viewing a desktop webpage and the number of sales via viewing a mobile webpage.

The third hypothesis of the study addresses the following question:

- Do time and average margin impact the life cycles of the e-retailing companies?

Hackl et al. (2014) investigated the impact of dynamic pricing on the product cycle by focusing on the e-retailing market performance and market structure. Furthermore, the authors assessed the adequacy of obsolete technologies with respect to the brand innovations of the companies and their competitors.

Vysotska et al. (2016) demonstrated that the positive use of information systems increases the sales to the target audience and potential customers, and this depends on the content created within the life cycle. They provided a detailed analysis and classification of e-content creation business processes (Vysotska et al., 2016).

It is assumed that the use of information systems such as the number of sales, personal theme usage, virtual POS usage, AdWords usage, Google Analytics usage, desktop, and mobile webpage views will affect the life cycle of companies in the e-retailing life cycle. Therefore, the following hypothesis has been included in the study:

Hypothesis 3: In the e-retail life cycle, a statistically significant relationship exists between time and average margin (number of sales, personal theme usage, virtual POS usage, AdWords usage, Google Analytics usage, desktop, and mobile webpage views).

4.2. Study population and sample

Thousands of e-retailing companies are engaged in e-commerce in Turkey and the global market. The share of online retailers in the e-commerce industry alone is 70 percent (KPMG, 2018). The study population is the e-retailing companies that receive services from technology companies that offer e-retailing information systems in Turkey. A judgmental (purposive) sampling method has been used in this study. Gegez (2015) defined judgmental sampling as a method in which researchers identify individuals who will be included in the sample according to their own judgment, which they consider to be representatives of the population (Gegez, 2015: 267). IdeaSoft, the company with the largest market share, has been chosen as the sample. According to the 2019 statistics, the number of sites registered in the Electronic Trade Information System (ETBIS) established by the Ministry of Commerce is 21,515 (EBP, 2021). IdeaSoft provides services to more than 8000 active and passive e-retailing companies, corresponding to more than 50% of the market's e-retailing entrepreneurial customers; thus, this company can represent the industry with its services compared with similar companies. This study investigates the life cycles of e-retailing companies, and it includes companies that have been operating between 2007 and 2018 using IdeaSoft software. Ideasoft is Turkey's leading e-commerce infrastructure provider, offering web- and mobile-based software solutions since 2005. This study examines the customer purchasing statistics to conduct the relevant analyses. These examinations analyze monthly and annual changes. The total number of active and passive companies investigated within the scope of the study between the dates of 02.04.2007-15.10.2018 were 10863. Active companies continue their sales operations, and passive companies have suspended their contracts and have ceased their sales activities. The number of companies with available variable data was 10615. Further, 8314 of these companies have sales contract start and end dates. Of these, 8289 companies have an account code and 25 companies do not have an account code (it appears to be null). Moreover, 8125 companies with monthly transactions, variables, contract dates, and common data available were deemed suitable for examination. The monthly data of these companies from 01.01.2016 to 15.10.2018, which go back to 2007, have been examined.

4.3. Study method

Secondary internal data of Ideasoft company for 2007–2018 were used in this study. These data comprised companies' activity status (active and passive), industry information, information system packages, mobile and desktop sales and order figures, mobile and desktop page views, personal theme usage, Google Analytics, and Google AdWords statistics. As with the exploratory studies, previously collected data can be used in descriptive and causal studies. Secondary data have previously been collected for other studies. Secondary data sources can be divided into internal and external. Internal secondary data sources have been created in the institution where the study is conducted. External secondary data have been created by external sources (Gegez, 2015: 89). EViews-10-Demo and SPSS (trial version) were used for analysis of the data. Microsoft SQL Server Express 2017 database management system was used. Least squares method regression analysis (Panel-DOLS), Pearson's correlation test, Shapiro–Wilk normality tests, Mann–Whitney test, and Spearman's rank correlation test were performed.

5. Study Findings

E-commerce companies included in the study were divided into five groups according to the information system packages they used. There were 15 information systems in Segment A, 24 in Segment B, 30 in Segment C, 34 in Segment D, and 43 in Segment E. Companies in Segment A did not have a virtual POS package or a credit card module. Instead, they used cash on delivery and remittance packages. Companies in Segment B did not have integration modules. Companies in Segment C had mobile e-commerce sites, cart/order fulfillment, and Google integrations. Companies in Segment D had additional modules such as product comparison modules, smart filter/product options, and product personalization. Companies in Segment E had all information systems. Table 24 presents the information systems used by the companies, the groups these companies belong to, and whether they are active. There were 43 information systems.

The companies included in the study operated across 45 different industries. Table 25 presents the industries and segments of these companies. Furthermore, 4334 of the 8125 companies used Segment A information system packages. Segment A had the highest number of companies. Further, 485 companies used Segment E information system package, and this segment had the least number of companies.

Table 1 presents the distribution of the top three industries by information systems package segment choice of companies.

Table 1. Top Three Industries by Segments

	A	B	C	D	E
1	Food	Food	Hardware and Construction Supplies	Other	Other
2	Multiproduct	Other	Automotive and Spare Parts	Food	Food
3	Other	Hardware and Construction Supplies	Other	Textile and Clothing	Textile and Clothing

Source: IdeaSoft, 2016.

5.1. Descriptive statistics by growth rates of e-retailing companies

Aharony et al. (2006), Anthony and Ramesh (1992), and Yonpae and Chen (2006) studied the sales growth of companies and used the change in capital expenditures, annual dividend payout ratio, and company age variables to calculate total composite scores and classify the companies.

Anthony and Ramesh (1992) classified the life cycle stages by examining company-year observations according to univariate and multivariate ranking procedures. Accordingly, four classification variables were determined: annual dividend payout ratio (DP), sales growth (SGR), capital expenditure (CEX), and company age (AGE). Anthony and Ramesh (1992) identified the life cycle determinants as growth, maturity, and decline. They also made classifications as low, medium, and high based on the dividend rate, sales growth rate, and capital expenditures as well as classifications as young, mature, and old based on the company age. The life stages equation, which Anthony and Ramesh (1992) created using the sales growth variables for calculating the determinants of life cycle stages, is as follows:

$$MonthlySGR_t = (MonthlySALES_t - MonthlySALES_{t-1}) / (MonthlySALES_{t-1}) \times 100$$

$$AnnualSGR_t = (AnnualSALES_t - AnnualSALES_{t-12}) / (AnnualSALES_{t-12}) \times 100$$

It is considered that businesses with different sales growth rates are in different stages based on their sales rates.

The companies' activity status (active and passive), mobile and desktop sales and order figures, mobile and desktop page views, personal theme usage, and annual and monthly sales numbers obtained from Google Analytics and Google AdWords statistics were identified as observations in the study. Accordingly, the number of observations in the single monthly criteria classification procedure were divided into equal quantiles as in the literature. Those in the upper quantiles were assigned to the growth stage, those in the middle quantile were assigned to the maturity stage, and those in the lower quantile were assigned to the decline stage.

The growth in SALES is expressed in two different ways:

Monthly = monthly growth [t and t-1]

Annual = annual growth [t and t-12]

The growth in sales (MonthlySGR, AnnualSGR) was observed as ACTIVE/PASSIVE SALES GROWTH and ANNUAL/MONTHLY GROWTHS.

Active sales growth observations were based on the companies that continue to engage in e-commerce. Passive companies were previously engaged in e-retailing activities but then stopped their e-commerce operations.

According to the descriptive statistics in Table 2, annual growth was observed in 35,512 active companies. The average annual growth rate of these companies was 523.7938%. Monthly growth was observed in 66,553 active companies. The average monthly growth rate of these companies was 157.3495%.

Table 2. Monthly and Annual Growth of Active E-Retailing Companies

Variable (Number)	**Number of Observations**	**Average**	**Standard Deviation**	**Smallest**	**Largest**
Annual Sales	35,512	523.7938	13002.040	-100	1154263
Monthly Sales	66,553	157.3495	4426.111	-100	816500

According to Table 3, annual growth was observed in 4,387 passive companies. The average annual growth rate of these companies was 2199.734%. Monthly growth was observed in 10,821 passive companies. The average monthly growth rate of these companies was 250.1069%.

Table 3. Monthly and Annual Growth of Passive E-Retailing Companies

Variable (Number)	**Number of Observations**	**Average**	**Standard Deviation**	**Smallest**	**Largest**
Annual Sales	4,387	2199.734	90049.75	-100	5754800
Monthly Sales	10,821	250.1069	685.287	-100	505333.3

According to the average sales growth rates in the active industries, annual growth was observed in 2442 active companies in the “Food” industry and the average growth rate was 305.6573%. Since the annual growth rate was 523.7938%, it was established that the growth rate of the companies in the food industry was below the overall average annual growth rate. The annual growth rates of the companies in “hunting, camping and outdoor,” “computer,” “security products,” “hardware and construction supplies,” “heating and cooling,” “books and publishers,” “games and hobby products,” “pet shop,” “promotional advertising products,” “health and medical products,” “multiproduct,” and “occupational safety” industries were higher than the overall average annual growth rate.

These industries demonstrated a very high growth in the monthly and annual “Smallest” and “Largest” sales values compared with the passive industries. This is because when we look at the growth in sales, whether we use a monthly comparison or a 12-monthly comparison, the average sales values are always positive even though there are also negative values (downsizing).

Annual sales growth is calculated with the $Sales_t/Sales_{t-12}$ formula. Accordingly, when we look at the calculated “Sales Growth” values, which are based on the annual data, we can see a decrease in the number of observations. This is because:

- The period covered was “36” months; however, some companies did not have data available for the entirety of this period.

• Furthermore, when we calculated the growth over years, a 12-month lag was taken into consideration; therefore, there was at least a 12-month loss in the observations for each company.

All companies were ranked from smallest to largest according to the AnnualSGR$_t$ value and divided into 5 equal quantiles. Accordingly, the companies in the first 20% quantile were called Quantile1, the companies in the 20% to 40% quantile were called Quantile2, the companies in the 40% to 60% quantile were called Quantile3, the companies in the 60% to 80% quantile were called Quantile4, and the companies in the 80% to 100% quantile were called Quantile5.

The distribution of all companies by their annual growth in the number of sales is presented in Table 4, the distribution of active companies by their annual growth in the number of sales is indicated in Table 5, and the distribution of passive companies by their annual growth in the number of sales is indicated in Table 6.

Table 4. Annual Growth in Number of Sales for All Companies

5 Annual Number of Sales Quintiles	Frequency	Applicable Percentage
Quantile1	8,433	21.14
Quantile2	7,527	18.87
Quantile3	8,673	21.74
Quantile4	7,537	18.89
Quantile5	7,729	19.37
Total	39,899	100

Table 5. Annual Growth in Number of Sales for Active Companies

5 Annual Number of Sales Quantiles	Frequency	Applicable Percentage
Quantile1	7,103	20.00
Quantile2	7,119	20.05
Quantile3	7,086	19.95
Quantile4	7,104	20.00
Quantile5	7,100	19.99
Total	35,512	100

Table 6. Annual Growth in Number of Sales for Passive Companies

5 Annual Number of Sales Quantiles	Frequency	Applicable Percentage
Quantile1	2,089	47.62
Quantile3	544	12.40
Quantile4	878	20.01
Quantile5	876	19.97
Total	4,387	100

Anthony and Ramesh (1992) used the company age variable as a company age control variable in determining the life cycle stages. The formula is as follows:

AGE = Number of Years from the Establishment of the Company to Current Year

The calculated version of the company age (AGE) distribution values, which are based on the annual data, is indicated in Table 7 for all companies, Table 8 for active companies, and Table 9 for passive companies. According to Table 7, the companies in Quantile1 are the youngest and constitute 29.18%. This is followed by the companies in Quantile2, which constitute 21.05%. Quantile5 contains the oldest companies, constituting 19.18%. The number of observations in Quantile1 is 48,318.

Table 7. Age Quantiles for All Companies

5 Quantiles by Age	Frequency	Applicable Percentage
Quantile1	48,318	29.18
Quantile2	34,870	21.05

Quantile3	22,361	13.5
Quantile4	28,303	17.09
Quantile5	31,762	19.18
Total	165,614	100

According to Table 8, active companies in Quantile1 are the youngest companies, constituting 37.18%. This is followed by the companies in Quantile2, constituting 16.5%. Quantile5 consists of the oldest companies, constituting 17.54%. The number of observations in Quantile1 is 45,191.

Table 8. Age Quantiles for Active Companies

5 Quantiles by Age	Frequency	Applicable Percentage
Quantile1	45,191	37.18
Quantile2	20,054	16.5
Quantile3	16,497	13.57
Quantile4	18,471	15.2
Quantile5	21,321	17.54
Total	121,530	100

According to Table 9, passive companies in Quantile1 are the youngest companies, which represent 68.93%. The number of observations in Quantile1 is 30,384.

Table 9. Age Quantiles for Passive Companies

5 Quantiles by Age	Frequency	Applicable Percentage
Quantile1	30,384	68.93
Quantile4	7,613	17.27
Quantile5	6,083	13.8
Total	44,080	100

Table 10 presents 13 years of observations for calculated company age (AGE) distribution values, which are based on annual data. According to Table 10, the highest number of observations is 48,279, which are in Quantile1 and represent 1-year-old companies. The number of observations for the companies younger than 12 months old are 39 in Quantile1, and these companies are classified under Quantile1 as 0 years old. The lowest number of observations is 33; these are under Quantile5 and aged 13 years old. The number of observations in Quantile5 is 31,762. The number of observations in Quantile5 decreases over the years. The companies in Quantile1 are the youngest companies, and the ones in Quantile5 are the oldest companies.

Table 10. Distribution Quantile by Years

Age	Number of Observations in 5 Quantiles by Company Age					Total
	Quantile1	Quantile2	Quantile3	Quantile4	Quantile5	
0	39	-	-	-	-	39

1	48,279	-	-	-	-	48,279
2	-	34,870	-	-	-	34,870
3	-	-	22,361	-	-	22,361
4	-	-	-	17,502	-	17,502
5	-	-	-	10,801	-	10,801
6	-	-	-	-	9,437	9,437
7	-	-	-	-	7,318	7,318
8	-	-	-	-	5,225	5,225
9	-	-	-	-	5,054	5,054
10	-	-	-	-	2,520	2,520
11	-	-	-	-	1,780	1,780
12	-	-	-	-	395	395
13	-	-	-	-	33	33
Total	48,318	34,870	22,361	28,303	31,762	165,614

5.2. Testing study hypotheses

Before testing the study hypotheses, it is determined that businesses with different sales growth rates are in different stages based on their sales rates. Accordingly, Hypothesis 1a's relationship analyses of all active and passive companies were performed in SPSS, and chi-square analyzes were conducted.

Hypothesis 1a: "In e-retailing practices, a statistically significant relationship exists in terms of the number of products sold between the use of information systems and the life cycle of companies."

Table 11 demonstrates the entire data (including active and passive) categorized into 5 quantiles based on the annual sales numbers of the companies. Accordingly, the total sales number observations for companies are 39,899. Table 11 demonstrates that the highest value observed for companies in segment A is 7,018. Furthermore, 7,018 companies in segment A are categorized in Quantile3 based on their annual sales numbers. The sales numbers observed for the companies in Segment E, which relies on information systems heavily, is 296. The highest value observed for companies in Segment E is 127, and they are categorized under Quantile1.

Table 11 evaluates the relation between the retailing information systems and the number of products sold based on 5 quantiles determined according to the annual sales rates of all companies. The chi-square value calculated based on Table 11 is 1400, and the significance value is 0.000 ($X^2 = 1400$ p: $0.000 < 0.05$). According to these results, in all data segments, a statistically significant relationship exists between the use of retail information systems and the retail company life cycle in terms of the number of products sold ($p < 0.05$).

Table 11. Entire Data (Active and Passive Companies) Segments

5 Annual Sales Number Quantiles	**SEGMENTS**					
	A	**B**	**C**	**D**	**E**	**Total**
Quantile1	5,496	1,541	913	356	127	8,433
Quantile2	5,911	974	492	102	48	7,527
Quantile3	7,018	1,001	526	96	32	8,673
Quantile4	6,357	718	364	63	35	7,537
Quantile5	6,460	726	427	62	54	7,729
Total	31,242	4,960	2,722	679	296	39,899
Pearson chi2(16)		= 1400		Pr=0.000		

Table 12 evaluates whether a relationship exists between retailing information systems use and the number of products sold using chi-square test for active companies categorized in 5 Quantiles based on their annual sales. Table 12 demonstrates that the calculated chi-square value is 920,8771 and the significance value is 0.000 (X^2 = 920,8771 p:0.000 < 0.05). According to these findings, a statistically significant relationship exists between the use of retailing information systems and the company life cycles in terms of the number of products sold for companies in active group data segments ($p < 0.05$).

Table 12. Active Segments

5 Annual Sales Number Quantiles	**SEGMENTS**					
	A	**B**	**C**	**D**	**E**	**Total**
Quantile1	4,930	1,136	763	262	12	7,103
Quantile2	5,670	896	459	92	2	7,119
Quantile3	5,833	798	391	62	2	7,086
Quantile4	6,055	659	327	56	7	7,104
Quantile5	6,009	657	373	50	11	7,100
Total	28,497	4,146	2,313	522	34	35,512
Pearson chi2(16)		= 920,8771		Pr=0.000		

Table 13 evaluates a relationship exists between retailing information systems use and the number of products sold using chi-square test for passive companies categorized into 5 quantiles based on their annual sales. Table 13 demonstrates that the calculated chi-square value is 132.3547 and that the significance value is 0.000 (X^2 = 132.3547 p:0.000 < 0.05). According to these findings, a statistically significant relationship exists between the use of information systems and company life cycles in terms of the number of products sold for companies in passive group data segments ($p < 0.05$).

Table 13. Passive Segments

5 Annual Sales Number Quantiles	**SEGMENTS**					
	A	**B**	**C**	**D**	**E**	**Total**
Quantile1	1,160	504	207	103	115	2,089
Quantile3	394	64	45	15	26	544
Quantile4	595	135	74	21	53	878
Quantile5	596	111	83	18	68	876
Total	2,745	814	409	157	262	4,387
Pearson chi2(16)		= 132.3547		Pr= 0.000		

To answer the question “Do e-retailing information systems impact differentiating the life cycle of companies depending on the number of products sold and industry?,” Hypothesis 1b’s (H1b) relationship analyses of all companies, active companies, and passive companies were performed in SPSS, and chi-square tests were conducted. H1b can be expressed as follows:

Hypothesis 1b (H1b): “In e-retailing practices, a statistically significant relationship exists in terms of the number of products sold between the use of industry-specific information systems and the life cycle of companies.”

According to the chi-square test result of all company data,

- The calculated chi-square value for “Shoe” industry was 22,9697, and the significance value was 0.000 (X^2 = 22,9697 p: 0.115 > 0.05). According to these findings, it can be said that no statistically significant relationship exists in terms of the number of products sold between the use of retailing information systems and the company life cycle in the “shoe” industry ($p < 0.05$).
- The calculated chi-square value for “Industrial products” industry was 11,3660, and the significance value was 0.182 (X^2 = 11,3660 p: 0.182 > 0.05). According to these findings, it can be said that no statistically significant relationship exists in terms of the number of products sold between the use of retailing information systems and the company life cycle in the “industrial products” industry ($p < 0.05$).
- The calculated chi-square value for “concept designs” industry was 12,7003, and the significance value was 0.123 (X^2 = 12,7003 p: 0.123 > 0.05). According to these findings, it can be said that no statistically significant relationship exists in terms of the number of products sold between the use of retailing information systems and the company life cycle in the “concept designs” industry ($p < 0.05$).
- The calculated chi-square value for the “Watches and Optical Goods” industry was 63,447, and the significance value was 0.609 (X^2 = 63,447 p: 0.609 < 0.05). According to these findings, it can be said that no statistically significant relationship exists in terms of the number of products sold between the use of retailing information systems and the company life cycle in the “watches and optical goods” industry ($p < 0.05$).
- The calculated chi-square value for “Sports and sports equipment” industry was 14.3071, and the significance value was 0.282 (X^2 = 14.3071 p: 0.282 > 0.05). According to these findings, it can be said that no statistically significant relationship exists in terms of the number of products sold between the use of retailing information systems and the company life cycle in the “sports and sports equipment” industry ($p < 0.05$).
- The calculated chi-square value for “Underwear” industry was 18.9189, and the significance value was 0.091 (X^2 = 18.9189 p: 0.091 > 0.05). According to these findings, it can be said that no statistically significant relationship exists in terms of the number of products sold between the use of retailing information systems and company life cycle in the “underwear” industry ($p < 0.05$).

The calculated chi-square value in all industries except the industries listed above was significantly low ($p < 0.05$). According to these findings, a statistically significant relationship exists between the use of retailing information systems and the company life cycles in terms of the number of products sold industries except for the aforementioned industries ($p < 0.05$). The hypotheses are interpreted in Table 44.

Table 14 demonstrates the chi-square test results for Hypothesis 1b by all companies, active companies, and passive companies. In this table, a statistically significant relationship exists in terms of the number of products sold between the use of retailing information systems and the company life cycles in the industries for which the H1b hypothesis was rejected ($p < 0.05$).

Table 14. Evaluating Hypothesis 1b

	ENTIRE DATA			**ACTIVE**			**PASSIVE**		
Industry	**Chi-square (12)**	**p**	**H1b (when α=0.05)**	**Chi-square (12)**	**P**	**H1b (when α=0.05)**	**Chi-square (12)**	**p**	**H1b (when α=0.05)**
Hunting, Camping and Outdoor	53.2815	0.000	Accepted	27.9873	0.000	Accepted	29.4723	0.001	Accepted
Shoes	22.9697	0.115	Rejected	16.9271	0.152	Rejected	15.8484	0.198	Rejected

Baby and Child	88.6387	0.000	Accepted	25.8324	0.011	Accepted	57.0911	0.000	Accepted
White Goods and Home Appliances	60.5443	0.000	Accepted	46.7274	0.000	Accepted	18.7089	0.028	Accepted
Computer	70.5281	0.000	Accepted	34.1834	0.000	Accepted	27.1324	0.001	Accepted
Cell Phone	52.5321	0.000	Accepted	44.7585	0.000	Accepted	11.5286	0.484	Rejected
Other	186.2046	0.000	Accepted	118.4147	0.000	Accepted	39.8938	0.000	Accepted
Electric	33.2178	0.007	Accepted	31.1776	0.013	Accepted	8.9630	0.441	Rejected
Electronics	500.963	0.000	Accepted	31.6215	0.002	Accepted	30.8961	0.002	Accepted
Industrial Products	11.3660	0.182	Rejected	2.9084	0.573	Rejected	NA		
Home and Decoration	30.0145	0.003	Accepted	29.1674	0.004	Accepted	7.6526	0.265	Accepted
Home Textiles	30.1280	0.000	Accepted	8.4314	0.393	Rejected	15.5984	0.016	Accepted
Security Products	55.8632	0.000	Accepted	47.7739	0.000	Accepted	7.2471	0.611	Rejected
Food	74.3345	0.000	Accepted	56.5009	0.000	Accepted	18.4210	0.103	Accepted
Souvenirs and Accessories	84.5738	0.000	Accepted	49.6722	0.000	Accepted	20.7641	0.014	Accepted
Hardware and Construction Supplies	100.1706	0.000	Accepted	92.5005	0.000	Accepted	31.8436	0.001	Accepted
Heating and Cooling	53.4906	0.000	Accepted	41.0762	0.000	Accepted	1.8750	0.759	Rejected
Books and Publishers	111.3090	0.000	Accepted	56.9808	0.000	Accepted	10.9053	0.282	Rejected

Table 14. (Continued) Evaluating Hypothesis 1b

	ENTIRE DATA			**ACTIVE**			**PASSIVE**		
Industry	**Chi-square (12)**	**p**	**H1b (when α=0.05)**	**Industry**	**Chi-square (12)**	**p**	**H1b (when α=0.05)**	**Industry**	**Chi-square (12)**
Personal Care & Cosmetics	55,5701	0.000	Accepted	19,4122	0.079	Rejected	25,2639	0.003	Accepted
Concept Designs	12,7003	0.123	Rejected	12,1800	0.016	Accepted	0.5455	0.460	Rejected
Furniture	57,1657	0.000	Accepted	20.8572	0.008	Accepted	13,0544	0.042	Accepted

Motorcycle Equipment	21.8461	0.005	Accepted	11.9492	0.153	Rejected	17.6847	0.007	Accepted
Music and Musical Instruments	56.4386	0.000	Accepted	49.7017	0.000	Accepted	13.7193	0.003	Accepted
Office and Stationery	97.8308	0.000	Accepted	65.2036	0.000	Accepted	35.0311	0.000	Accepted
Automotive and Spare Parts	136.6532	0.000	Accepted	124.8787	0.000	Accepted	44.6861	0.000	Accepted
Game and Hobby Products	59.5083	0.000	Accepted	61.6698	0.000	Accepted	33.1567	0.000	Accepted
Toys	64.3187	0.000	Accepted	39.9405	0.000	Accepted	10.8746	0.092	Rejected
Pet Shop	81.4815	0.000	Accepted	65.8161	0.000	Accepted	15.3535	0.082	Rejected
Promotional Advertising Products	NA	NA			NA		NA	NA	
Watches and Optical Goods	63.447	0.609	Rejected	7.9385	0.440	Rejected	0.5868	0.899	Rejected
Consumables	NA	NA			NA		NA	NA	
Healthcare and Medical Products	151.4911	0.000	Accepted	122.6420	0.000	Accepted	20.5567	0.057	Rejected
Sports and Sports Equipment	14.3071	0.282	Rejected	8.9788	0.705	Rejected	10.8565	0.093	Rejected
Jewelry	59.7685	0.000	Accepted	36.2685	0.003	Accepted	4.9419	0.839	Rejected
Agriculture and Organic Products	82.5153	0.000	Accepted	66.0349	0.000	Accepted	16.7551	0.053	Rejected
Textile and Clothing	125.5835	0.000	Accepted	53.4399	0.000	Accepted	78.1773	0.000	Accepted
Cleaning Products	45.1012	0.000	Accepted	53.6712	0.000	Accepted	13.1605	0.155	Rejected
Conservative Clothing	35.0674	0.000	Accepted	25.0140	0.002	Accepted	15.6173	0.075	Rejected
Glassware	NA	NA		NA	NA		NA	NA	
Purse	22.3564	0.004	Accepted	17.8721	0.022	Accepted	10.1343	0.119	Rejected
Household Goods and Glassware	87.5686	0.000	Accepted	67.7400	0.000	Accepted	15.0857	0.089	Rejected
Flower Shops	NA	NA		NA	NA		NA	NA	
Multiproduct	90.4551	0.000	Accepted	60.1394	0.000	Accepted	37.0968	0.000	Accepted
Underwear	18.9189	0.091	Rejected	15.7511	0.203	Rejected	18.0248	0.006	Accepted
Work Safety	NA		NA	NA	NA		NA	NA	
NA: No data									

Webpage views, page traffic information, redirected pages, operating systems, visit locations, search robots, and activity conversion information were evaluated by analysis tools (Bruceclay, 2020). In this context, secondary data were used, and they were evaluated by calculating the total activities. It is believed that in company life cycle, the total sum of values attributed to four variables that determine the retailing information systems can be calculated as the total sum of net activities. The variables created for this purpose are as follows:

ET: Total of Activities

KTK: Personal Theme Usage

SPK: Virtual POS Usage

AK: AdWords Usage

GAK: Google Analytics Usage

ET=KTK+SPK+AK+GAK

NET: Net Activities Total

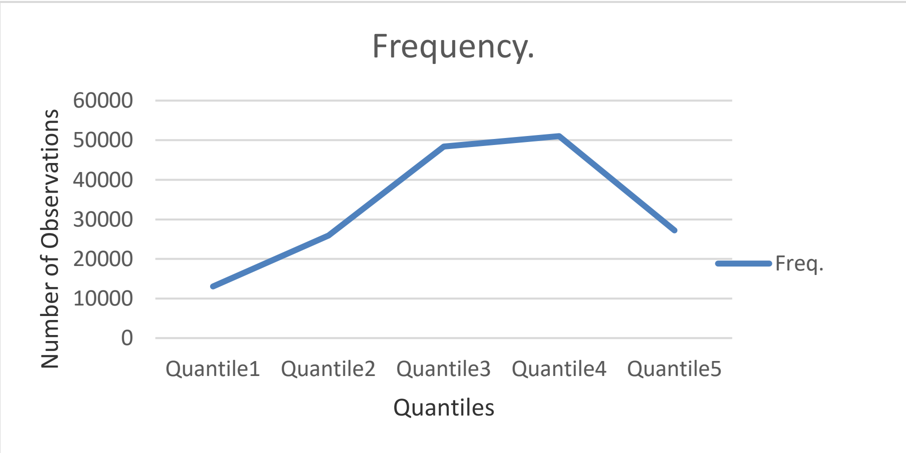
According to Table 15, the total number of observations included in the panel data is 165,614. Accordingly, these four activities (KTK, SPK, AK, GAK) in 5 quantiles were evaluated according to the predetermined years. The rate of companies using three activities was the highest in Quantile4 with 30.81%. The rate of observed activities was lowest in Quantile1 with 7.88%.

Table 15. Net Activities Total

Quantiles	Frequency	Applicable Percentage
Quantile1	13,049	7.88
Quantile2	25,921	15.65
Quantile3	48,403	29.23
Quantile4	51,026	30.81
Quantile5	27,215	16.43
Total	165,614	100

Figure 2 depicts the distribution of the net activities total by segments.

Figure 2. Distribution of Net Activities Total by Quantiles



The null hypothesis was that the relevant series has a “normal” distribution, and the alternative hypothesis was that the relevant series “does not have a normal distribution.” Several tests have been developed in the literature to test whether a series has a normal distribution. Some of those included Chi-Square Goodness of Fit Test, Kolmogorov–Smirnov Test, Lilliefors Test, Anderson-Darling Test, Skewness Test, Kurtosis Test, D'Agostino-Pearson Test, Jarque–Bera Test, Shapiro–Wilk Test, and so on.

The Shapiro–Wilk test was used to determine whether the series had a normal distribution for Hypothesis 2a. The Shapiro–Wilk test is a non-parametric normality test. It tests the null hypothesis that a sample data series (i.e., x_1, …, x_n series) came from a normally distributed population (Shapiro and Wilk, 1965: 593).

It aims to test “Hypothesis 2a (H2a): In e-retailing practices, a statistically significant difference exists in terms of company life cycles between the number of orders from desktop platforms and the number of orders from mobile platforms." hypothesis. Accordingly, the Shapiro–Wilk test was conducted to determine whether a parametric or non-parametric test should be used. One of the basic assumptions in parametric tests is that the "one or more series" have a normal distribution. If one or more series do not have a normal distribution, conducting the relevant hypothesis test through non-parametric tests would yield more reliable results.

H_0: The relevant series has a normal distribution.

H_A: The relevant series does not have a normal distribution.

When we look at the p-values for Table 16, Table 17, and Table 18, if the p-value is lower than 0.05, the distribution is not normal. These tables reveal that none of the variables have a normal distribution. Therefore, the non-parametric Mann–Whitney U test was used to test the hypotheses.

Table 16. Shapiro–Wilk Test for All Data (Active and Passive Companies)

Variable (Number)	**N**	**W**	**V**	**Z**	**P>z**
Number of Orders from Desktop	165,614	0.18634	3.50000	29,473	0.00000
Number of Orders from Mobile	165,614	0.14694	3.60000	29,606	0.00000

Table 17. Shapiro–Wilk Normality Test for Active Companies

Variable (Number)	**N**	**W**	**V**	**Z**	**Prob>z**
Number of Orders from Desktop	121,534	0.19984	2.80000	28,758	0.00000
Number of Orders from Mobile	121,534	0.15930	2.90000	28,897	0.00000

Table 18. Shapiro–Wilk Normality Test for Passive Companies

Variable (Number)	**N**	**W'**	**V'**	**Z**	**Prob>z**
Number of Orders from Desktop	44.08	0.11992	1.50000	26.569	0.00000
Number of Orders from Mobile	44.08	0.08065	1.50000	26.690	0.00000

Non-parametric tests are generally used in any of the following situations (Shao, 1999 as cited **in** Gegez, 2015: 356):

- When it is assumed that the population distribution is not normal.
- When it is known that the population distribution is not normal.
- When ordinal data are used.
- When nominal data are used.

The non-parametric tests used in the study can be explained as follows (Gegez, 2015: 356-375):

- Chi-square test investigates whether a relationship exists between two nominal variables (fitness test) or whether they are independent of each other. It is also preferred in determining the differences between the variables. The chi-square test calculations are based on frequency distributions.
- The Mann–Whitney test assesses whether rank sequences from two groups are similar or different. In other words, it is an analysis method that uses ranked scores to test whether two independent data groups are different from each other.
- The sign test compares pairwise scores to test whether two series of observations differ significantly. Wilcoxon signed rank test (non-parametric test used with ordinal data) is used in dependent groups when the assumption of normality cannot be met or an ordinal scale is used.

The Wilcoxon test is a non-parametric test type that assesses whether the distribution of two variables is the same, considering the dimensions of the differences in paired groups (Altunışık et al., 2012: 187). The Wilcoxon signed rank test is based on the following assumptions (Hesse et al., 2007: 18):

- The sample available for analysis is a random sample of size n from a population.
- The variable of interest is measured on a continuous scale.
- The sampled population is symmetric.
- The scale of measurement is at least interval and independent.

The Mann–Whitney U test assesses whether a statistically significant difference exists between the number of orders from desktop platforms and the number of orders from mobile platforms.

If null and alternative hypotheses are defined to test the H2a hypothesis statistically,

H_0: There is no significant difference between the number of orders from desktop platforms and the number of orders from mobile platforms.

H_A: There is a significant difference between the number of orders from desktop platforms and the number of orders from mobile platforms.

The results of the Mann–Whitney U test on all companies by industries revealed that according to the mean ranks of the number of orders from desktop platforms and the number of orders from mobile platforms, no statistically significant difference exists between the number of orders from desktop platforms and the number of orders from mobile platforms in the “occupational safety” industry ($p = 0.46$). There is a statistically significant difference between the number of orders from desktop platforms and the number of orders from mobile platforms for companies other than the ones in the “occupational safety” industry ($p < 0.05$).

The results of the Mann–Whitney U test for active companies by industries revealed that there is no statistically significant difference between the number of orders from desktop platforms and the number of orders from mobile platforms for active companies in “conservative clothing” industry ($p = 0.4652$).

There is no statistically significant difference between the number of orders from desktop platforms and the number of orders from mobile platforms for the active companies in the “flower shop” industry ($p = 0.17$).

There is no statistically significant difference between the number of orders from desktop platforms and the number of orders from mobile platforms for the active companies in the “occupational safety” industry ($p = 0.3295$).

There is a statistically significant difference between the number of orders from desktop platforms and the number of orders from mobile platforms for active companies other than the ones in the “conservative clothing,” “flower shop,” and “occupational safety” industries.

The results of the Mann–Whitney U test for passive companies by industries revealed that there is no statistically significant difference between the number of orders from desktop platforms and the number of orders from mobile platforms for passive companies in “shoe” industry ($p = 0.3551$).

There is no statistically significant difference between the number of orders from desktop platforms and the number of orders from mobile platforms for the passive companies in the “concept designs” industry ($p = 0.1218$).

The passive companies in the “glassware” and “occupational safety” industries were excluded from the evaluation.

There is a statistically significant difference between the number of orders from desktop platforms and the number of orders from mobile platforms for passive companies except for the companies in the “shoes,” “concept designs,” “glassware,” and “occupational safety” industries. There are both parametric and non-parametric correlation tests in the literature. For instance, the Pearson product moment correlation coefficient test is a parametric method and assumes that the two variables whose relationship is investigated should be continuous and show a normal distribution. As stated while testing the previous hypothesis, if the assumption of normal distribution is not met, investigating the relationships with the help of tests that do not use the assumption of normal distribution will reveal more reliable results. Unlike the parametric tests, non-parametric tests are used when normal distribution cannot be assumed for the population distribution and when ordinal and nominal data are used. When the variables do not have a normal distribution and two variables are ordinal variables, the non-parametric Spearman correlation (rank correlation coefficient) coefficient test is preferred (Gegez, 2015: 344-356).

Before testing the “Hypothesis 2b (H2b): In e-retailing practices, a statistically significant relationship exists in terms of company life cycles between the number of sales via viewing a desktop webpage and the number of sales via viewing a mobile webpage.,” a normality test was conducted for the variables focused in this test. The results obtained using the Shapiro–Wilk test of normality are indicated in Table 19.

The null and alternative hypotheses in the Shapiro–Wilk test of normality are as follows:

H_0: The relevant series has a normal distribution.

H_A: The relevant series does not have a normal distribution.

Table 19. Shapiro–Wilk Test Results

Variable	Group	N	W	V	Z	Prob>z
Number of Products Sold	Entire Data	155847	0.06805	4.000000	29.855	0.000
Mobile Webpage Views	Entire Data	155847	0.12613	3.600000	29.546	0.000
Desktop Webpage Views	Entire Data	155847	0.17568	3.400000	29.381	0.000
Number of Products Sold	Active	115906	0.07592	3.200000	29.162	0.000
	Passive	39941	0.04899	1.600000	26.783	0.000
Mobile Webpage Views	Active	115906	0.14045	2.900000	28.853	0.000
	Passive	39941	0.05737	1.500000	26.501	0.000
Desktop Webpage Views	Active	115906	0.192	2.700000	28.679	0.000
	Passive	39941	0.09781	1.400000	26.38	0.000

When we look at the p-values of the test statistics presented in Table 19, we can see that these values are below the threshold value of 0.05 (0.000). The null hypothesis "The relevant series has a normal distribution" is rejected both for the entire data set and for the active and passive groups separately. Therefore, the variables of number of products sold, mobile webpage views, and desktop webpage views are not normally distributed. As a result, the non-parametric "Spearman's rank correlation" test was preferred to test the hypothesis "In e-retailing practices, a statistically significant relationship exists in terms of company life cycles between the number of sales via viewing a desktop webpage and the number of sales via viewing a mobile webpage."

According to the Spearman's rank correlation test results presented in Table 20; the correlation coefficient between the variable "number of products sold" and "mobile webpage views," for example, is positive and calculated as $r = 0.4707$. The statistical significance level of this correlation coefficient is 0.00 ($p = 0.00 < 0.05$); therefore, it demonstrates a significant relationship between the "number of products sold" and "mobile webpage views."

Table 20. Spearman's Rank Correlation Tests

Variables [X&Y]	Group	Spearman's Rho	N	Prob> |t|
Number of Products Sold and Mobile Webpage Views	Entire Data	0.4707	155847	0.000
Number of Products Sold and Desktop Webpage Views	Entire Data	0.4783	155847	0.000
Number of Products Sold and Mobile Webpage Views	Active	0.4473	115906	0.000
	Passive	0.4322	39941	0.000
Number of Products Sold and Desktop Webpage Views	Active	0.4582	115906	0.000
	Passive	0.4324	39941	0.000

Similarly, the correlation coefficient between the variable "number of products sold" and "desktop webpage views" is positive and calculated as $r = 0.4783$. This correlation coefficient is also statistically significant ($p = 0.00 < 0.05$). Therefore, there is a positive and significant relationship between "number of products sold" and "desktop webpage views." When the Spearman's rank correlation test is performed separately for the "active" and "passive" groups, the result does not change statistically even though the calculated correlation coefficients change. Therefore, a positive and significant relationship exists between “number of products sold” and “mobile webpage views” as well as “number of products sold” and “desktop webpage views” both in the “active” and “passive” company groups. Another remarkable finding in Table 20 is that the correlation coefficients for the “active” group are higher compared with those for the “passive” group. For example, the Spearman’s correlation coefficient, which measures the relationship between the “number of products sold” variable and “desktop webpage views,” was calculated as r = 0.4473 for the active group, while this value was calculated as r = 0.4322 for the “passive” group.

Accordingly, there is a positive and significant relationship between “number of products sold” and both “desktop webpage views” and “mobile webpage views” for the H2b hypothesis. This result does not change when the active groups and passive groups are evaluated separately.

The industries with the highest mobile webpage views are “computer,” “flower shops,” “electricity,” “electronics,” “security products,” “hardware and construction supplies,” “occupational safety,” “music and music instruments,” “games and hobby products,” “pet shop,” and “promotional advertising products.” Table 21 shows the industries in which the rate of orders through desktop or mobile webpage views is over 1% for the active and passive companies. Although the mobile activity increases, the level of sales is still not at the desired level. The low sales number rate in the passive companies can be explained by the fact that these companies have completed their life cycles.

Table 21. Industries in Which the Rate of Sales through Desktop and Mobile Webpage Views is Higher Than % (Number of Orders/Webpage Views)

ACTIVE COMPANIES		**PASSIVE COMPANIES**	
Number of Sales/Desktop Webpage Views	**Number of Sales/Mobile Webpage Views**	**Number of Sales/Desktop Webpage Views**	**Number of Sales/Mobile Webpage Views**
Books and Publishers	Personal Care and Cosmetics	Baby and Child	Personal Care & Cosmetics
Pet Shop	Books and Publishers	Flower Shops	Promotional Advertising Products
Healthcare and Medical Products	Pet Shop	Pet Shop	
Cleaning Products	Cleaning Products	Promotional Advertising Products	
		Healthcare and Medical Products	

Source**:** Created by the researcher according to Hypothesis 2b and Hypothesis 2a.

In econometric analyses, there are three types of data: time series, cross-sectional, and pooled panel, the combination of time series and section data. There are many benefits of using the panel data method instead of time series and cross-sectional methods in the estimation of growth models (Gülmez and Yardımcıoğlu, 2012: 341).

Data obtained from different units at a certain point in time are called cross-sectional data. “Different units” refer to economic units such as individuals, households, companies, industries, and countries. The panel data set is created by combining the cross-sectional data of different units such as individuals, households, companies, industries, and countries with time series data from different periods such as days, months, and years (Tatoğlu, 2018: 2).

The dynamic ordinary least squares (DOLS) estimator is used by calculating the difference between the “lag” variable (past value) and the future value of this variable (Kao and Chiang, 2001:187). Hypothesis 3 (H3) of this study was analyzed using the DOLS estimator as recommended by Stock and Watson (1993) as well as Kao and Chiang (2001).

The relationship between the number of sales in 2016-2017-2018 period and the average margin will be investigated using the DOLS estimator for "Hypothesis 3 (H3): In the e-retailing life cycle, a statistically significant relationship exists between time and average margin (number of sales, personal theme usage, virtual POS usage, AdWords usage, Google Analytics usage, desktop and mobile webpage views)." The following model is created for the panel data set:

$$Y=f(X)+u \qquad (1)$$

In this model, "Y" represents the dependent variable and "X" represents the explanatory variables on the right side of the model. The equation is represented as follows in the panel format:

$$Y_{it}=f(X_{it})+u_{it} \qquad (2).$$

Here, "i" represents the company size, and "t" represents time.

In this model, NUMBER OF PRODUCTS SOLD is the dependent variable. The independent (i.e., explanatory) variables are as follows:

S_i-NUMBER OF PRODUCTS SOLD (-1): This variable represents the number of sales in the previous period. That is, the number of products sold with a lag of one period.

T_i- TREND, TRENDSQUARE: These variables were included in the model to measure the linear and non-linear effects of time on sales.

A_i- AGE ENTIRE YEAR, AGE SQUARE: These variables were included in the model to measure both the linear and non-linear effects of "age," which represents the company's experience in the market, on sales.

Seg-A [Base], SB- SEGB, SC-SEGC, SD-SEGD, SE-SEGE: They are dummy variables that represent the segment. They were included in the model to measure the effect of the use of information systems on the number of sales.

KTEM -Personal theme usage, Spos -Virtual POS usage, Adw -AdWords usage, Ganalytics-Google Analytics usage: They were included in the model to measure the effect on the number of sales.

TmasMob- Total Desktop and Mobile Views: It was included in the model to measure the effect of total mobile and desktop views on the number of sales.

Panel DOLA-The equation estimated by regression analysis for all companies is as follows.

$$Y_{it}=f(X_{it})+u_{it}$$

$$S_{it}=f(S_{i,t-1},T_{it},{T_{it}}^2,A_{it},{A_{it}}^2,SB_{it},SC_{it},SD_{it},SE_{it},KTem_{it},$$
$$SPos_{it},Adw_{it},GAnalytic_{it},TMasMob_{it})$$

$$\begin{aligned}\hat{S}_{it} = 0.693S_{i,t-1} &+ 0.102T_{it} - 0.002{T_{it}}^2 + 1.043A_{it}\\ &+ 0.245{A_{it}}^2 + 2.34SB_{it} - 3.21SC_{it}\\ &- 2.57SD_{it} - 5.315SE_{it}\\ &+ 6.019KTem_{it} - 0.899SPos_{it}\\ &+ 6.707Adw_{it} + 1.152GAnalytic_{it}\\ &+ 0.001TMasMob_{it}\end{aligned}$$

Panel DOLB- The equation estimated by regression analysis for all companies is as follows.

$$Y_{it}=f(X_{it})+u_{it}$$

$$S_{it}=f(S_{i,t-1},T_{it},{T_{it}}^2,A_{it},{A_{it}}^2,SB_{it},SC_{it},SD_{it},$$
$$SE_{it},KTem_{it},SPos_{it},Adw_{it},GAnalytic_{it},TMasMob_{it})$$

$$\begin{aligned}\hat{S}_{it} = 0.689S_{i,t-1} &+ 0.136T_{it} - 0.003{T_{it}}^2 + 1.234A_{it}\\ &+ 0.297{A_{it}}^2 + 3.028SB_{it} - 3.959SC_{it}\\ &- 3.176SD_{it} - 6.553SE_{it} + 7.541KTem_{it}\\ &- 1.249SPos_{it} + 8.198Adw_{it}\\ &+ 1.446GAnalytic_{it}\\ &+ 0.0013TMasMob_{it}\end{aligned}$$

The sign of the independent variable in the above regression equation provides information about its relationship with the dependent variable. If the sign is positive, it indicates a positive relationship with the dependent variable, and if the sign is negative, it has a negative relationship with the dependent variable (Altunışık et al., 2012: 337).

Table 22 shows the findings of the model estimated by using Panel Data and Dynamic Least Squares method for all companies. Accordingly, the following comments can be made:

a) First, there is a same-direction relationship between the one period lagged value of the number of products sold and the number of products sold in the period associated with the dependent variable or in the current period. Therefore, for the companies included in the analysis, the “increase” in the amount of sales in the previous period has a positive effect in this period. Similarly, if the number of sales decreased in the previous period, the sales amount will decrease in this period as well.

b) When we look at the impact of the trend or time, we can say that there is a “quadratic trend” in the relevant model. The impact of time or trend on the dependent variable of “number of products sold” changes depending on the relevant time point, and there is a statistically significant and concave relationship between the trend and the number of products sold. The number of products sold shows a decreasing increase in response to the increase in the time variable (or depending on time).

c) When we look at the impact of the company age or experience on the number of products sold, we can say that there is a “quadratic age (experience)” effect in the relevant model. The impact of company age or experience on the dependent variable of “number of products sold” changes based on the age or experience level of the company. A statistically significant and convex relationship can be determined between the experience and the number of products sold. As the company’s market experience increases, so do the number of products sold. The effectiveness and accessibility of a website are among the critical success factors in electronic commerce, and it depends on how long the business have been engaging in electronic commerce. Similarly, Zengin (2018) demonstrated a significant relationship between the experience and age of the company and its sales (Zengin, 2018: 118).

d) When we look at the impact of “segment-dummy-variables,” which represent the information systems usage of the companies, we can say that information systems usage makes a significant contribution to the relevant model. “Segment-A,” which is used as the base in the model, has a statistically significant impact on all dummy variables that represent other segments; and while the coefficient of “Segment-B” is estimated to be positive, the coefficients of Segment C, D and E are estimated to be negative. Based on the results of these estimations, companies in Segment B have higher sales numbers compared to the companies in Segment-A, which is used as the base, while the companies in other segments (C, D and E) have lower sales numbers.

e) “Personal Theme Usage” has a positive and statistically significant impact on the number of products sold by the company. Therefore, companies using personal themes achieve higher sales numbers. “Virtual POS usage,” on the other hand, has a negative impact on the sales numbers of the analyzed companies even though the estimated coefficient is relatively low in absolute terms. The study investigated 8125 companies in total, and 53% of these companies (Segment-A) do not have a virtual POS information system. Therefore, although virtual POS usage is studied across all segments, the companies that use virtual POS have lower sales numbers compared to the ones that use virtual POS.

f) “AdWords usage” has a positive and statistically significant impact on the company’s sales numbers and this variable has the highest estimated coefficient in the group. Therefore, “companies that use AdWords” have higher sales numbers compared to “the companies that do not use AdWords.” Similarly, “companies that use Google Analytics" also have higher sales numbers than “companies that do not use Google Analytics.”

g) The final explanatory variable in the model is the total number of views (TmasMob). A positive coefficient was estimated for this variable, and it is statistically significant. Therefore, as expected, the "increase in the number of views" increases the sales numbers of companies by a statistically significant amount.

Table 22. Dynamic Least Squares Method by Using the Panel Data of All Companies Estimation Model for Time and Average Margin for E-retailing Life Cycle

	Panel DOLS A-Entire Data			**Panel DOLS B-Entire Data**		
	Coefficient	**Standard Error**	**p**	**Coefficient**	**Standard Error**	**P**

LAGGED NUMBER OF PRODUCTS SOLD	0.6932***	0.0017	0.0000	0.6895***	0.0017	0.0000
TREND	0.1019***	0.0368	0.0056	0.1363***	0.0399	0.0006
TREND SQUARE	-0.0019	0.0012	0.1238	-0.0028*	0.0013	0.0347
AGE ENTIRE YEAR	1.0427***	0.2134	0.0000	1.2342***	0.2333	0.0000
AGE SQUARE	0.2449***	0.0368	0.0000	0.2973***	0.0403	0.0000
Base Category: SEGA						
SEGB	2.3405***	0.4155	0.0000	3.0282***	0.4580	0.0000
SEGC	-3.2104***	0.2658	0.0000	-3.9595***	0.2941	0.0000
SEGD	-2.5690***	0.2745	0.0000	-3.1767***	0.3048	0.0000
SEGE	-5.3153***	0.3114	0.0000	-6.5531***	0.3467	0.0000
Personal Theme Usage	6.0192***	0.3117	0.0000	7.5416***	0.3465	0.0000
Virtual POS Usage	-0.8999***	0.2329	0.0001	-1.2496***	0.2579	0.0000
AdWords Usage	6.7046***	0.4161	0.0000	8.1982***	0.4591	0.0000
Google Analytics Usage	1.1528***	0.2315	0.0000	1.4460***	0.2572	0.0000
Total Desktop and Mobile Views	0.0013***	0.0000	0.0000	0.0013***	0.0000	0.0000
R-Square	0.732855			0.731427		
HKT	8.48E+11			8.53E+11		
Note: * indicates significance at 0.05, ** at 0.01, and *** at 0.001						

The R-Square coefficient ranges from 0 to 1; a higher value means a better model (Burns and Bush, 2015: 396). This coefficient represents the percentage of change in the dependent variable that can be explained by the independent variables.(Öztürk, 2021)

R^2= 0.7328 in Table 22. This could be explained by the following: The independent variables explain 73.28% of the change in the dependent variable (number of products sold). Since this number is close to 1, we can say that the model has a good estimation performance.

The equation estimated by regression analysis for panel DOLA-Active companies is as follows.

$$Y_{it} = f(X_{it}) + u_{it}$$

$$S_{it} = f(S_{i,t-1}, T_{it}, T_{it}{}^2, A_{it}, A_{it}{}^2, SB_{it}, SC_{it}, SD_{it}, SE_{it}, KTem_{it}, SPos_{it}, Adw_{it}, GAnalytic_{it}, TMasMob_{it})$$

$$\begin{aligned}\hat{S}_{it} = 0.71S_{i,t-1} + 0.347T_{it} - 0.01T_{it}{}^2 + 1.924A_{it} \\ + 0.033A_{it}{}^2 + 8.334SB_{it} - 6.344SC_{it} \\ - 5.321SD_{it} - 6.189SE_{it} \\ + +9.045KTem_{it} - 3.319SPos_{it} \\ + 11.59Adw_{it} + 2.81GAnalytic_{it} \\ + 0.0013TMasMob_{it}\end{aligned}$$

The equation estimated by regression analysis for panel DOLB-Active companies is as follows:

$$Y_{it} = f(X_{it}) + u_{it}$$

$$S_{it} = f(S_{i,t-1}, T_{it}, T_{it}{}^2, A_{it}, A_{it}{}^2, SB_{it}, SC_{it}, SD_{it}, SE_{it}, KTem_{it}, SPos_{it}, Adw_{it}, GAnalytic_{it}, TMasMob_{it})$$

$$\begin{aligned}\hat{S}_{it} = 0.707S_{i,t-1} + 0.408T_{it} - 0.012T_{it}{}^2 + 2.33A_{it} \\ + 0.041A_{it}{}^2 + 10.21SB_{it} - 7.698SC_{it} \\ - 6.482SD_{it} - 7.746SE_{it} \\ + +11.35KTem_{it} - 4.169SPos_{it} \\ + 13.955Adw_{it} + 3.525GAnalytic_{it} \\ + 0.0013TMasMob_{it}\end{aligned}$$

Table 23 demonstrates the model findings for active companies that were estimated by using the Panel Data and Dynamic Least Squares method. Accordingly, the comments for all companies (a, b, c, d, e, f, and g) apply to the active companies.

Table 23. Dynamic Least Squares Method for Active Companies by Using Panel Data Estimation Model for Time and Average Margin for E-retailing Life Cycle

	Panel DOLS A-Active Group			Panel DOLS B-Active Group		
	Coefficient	**Standard Error**	**p**	**Coefficient**	**Standard Error**	**p**
LAGGED NUMBER OF PRODUCTS SOLD	0.7103***	0.001835	0.0000	0.7070***	0.001822	0.0000
TREND	0.3478***	0.051957	0.0000	0.4086***	0.054792	0.0000
TREND SQUARE	-0.0100***	0.001622	0.0000	-0.0118***	0.001723	0.0000
AGE ENTIRE YEAR	1.9249***	0.277910	0.0000	2.3313***	0.301075	0.0000
AGE SQUARE	0.0331*	0.042886	0.4397	0.0414*	0.046745	0.3757
Base Category: SEGA						
SEGB	8.3341***	0.907323	0.0000	10.2082***	0.998736	0.0000
SEGC	-6.3440***	0.378374	0.0000	-7.6984***	0.413859	0.0000
SEGD	-5.3213***	0.410614	0.0000	-6.4829***	0.452930	0.0000
SEGE	-6.1896***	0.522508	0.0000	-7.7469***	0.569377	0.0000
Personal Theme Usage	9.0459***	0.478644	0.0000	11.3542***	0.528780	0.0000
Virtual POS Usage	-3.3198***	0.339153	0.0000	-4.1699***	0.371743	0.0000
AdWords Usage	11.5910***	0.717958	0.0000	13.9556***	0.779592	0.0000
Google Analytics Usage	2.8109***	0.337150	0.0000	3.5259***	0.370876	0.0000
Total Desktop and Mobile Views	0.0013***	1.87E-05	0.0000	0.0013***	1.84E-05	0.0000
R-Square	0.742536			0.74137		
HKT	8.02E+11			8.05E+11		
Note: * indicates significance at 0.05, ** at 0.01, and *** at 0.001						

$R^{2=}$ 0.7425 in Table 23. This could be explained by the following: The independent variables explain 74.25% of the change in the dependent variable (number of products sold). Since this number is close to 1, we can say that the model has a good estimation performance.

The equation estimated by regression analysis for panel DOLA-Passive companies is as follows:

$Y_{it} = f(X_{it}) + u_{it}$

$S_{it} = f(S_{i,t-1}, T_{it}, {T_{it}}^2, A_{it}, {A_{it}}^2, SB_{it}, SC_{it}, SD_{it},$

$SE_{it}, KTem_{it}, SPos_{it}, Adw_{it}, GAnalytic_{it}, TMasMob_{it})$

$$\hat{S}_{it} = 0.492S_{i,t-1} - 0.20T_{it} + 0.009{T_{it}}^2 + 0.546A_{it} - 0.053{A_{it}}^2 + 0.043SB_{it} - 0.205SC_{it} + 0.085SD_{it} + 0.381SE_{it} + 1.665KTem_{it} + 0.752SPos_{it} + 0.775Adw_{it} + 1.137GAnalytic_{it} + 0.0019TMasMob_{it}$$

The equation estimated by regression analysis for panel DOLB-Passive companies is as follows:

$Y_{it} = f(X_{it}) + u_{it}$

$S_{it} = f(S_{i,t-1}, T_{it}, {T_{it}}^2, A_{it}, {A_{it}}^2, SB_{it}, SC_{it}, SD_{it},$

$SE_{it}, KTem_{it}, SPos_{it}, dw_{it}, GAnalytic_{it}, TMasMob_{it})$

$$\hat{S}_{it} = 0.481S_{i,t-1} - 0.250T_{it} + 0.011{T_{it}}^2 + 0.69A_{it} - 0.071{A_{it}}^2 + 0.034SB_{it} - 0.233SC_{it} + 0.129SD_{it} + 0.545SE_{it} + 1.987KTem_{it} + 0.939SPos_{it} + 0.938Adw_{it} + 1.385GAnalytic_{it} + 0.002TMasMob_{it}$$

Table 24 demonstrates the model findings for passive companies that were estimated by using the Panel Data and Dynamic Least Squares method. Accordingly, the a, b, c, e, f, and g comments for all companies and active companies apply to the passive companies as well; additionally, the following comment is possible:

When we look at the impact of the "segment-dummy-variables," which represent the information systems usage of the company, it is not possible to conclude that information systems usage makes a significant contribution to the model. The p-values of the segment-related variables of the passive companies are above 0.05 (p=0.8989 [SEGB], p = 0.5150 [SEGC], p= 0.7612 [SEGD], p= 0.2168 [SEGE]). This means that these variables that represent the segment are not statistically significant in either of the "passive groups," i.e., the Panel DOLS A-Passive Group or the Panel DOLS B-Passive Group.

Table 24. Dynamic Least Squares Method for Passive Companies by Using Panel Data Estimation Model for Time and Average Margin for E-retailing Life Cycle

	Panel DOLS A-Passive Group			**Panel DOLS B-Passive Group**		
	Coefficient	**Standard Error**	**p**	**Coefficient**	**Standard Error**	**p**
LAGGED NUMBER OF PRODUCTS SOLD	0.4923***	0.006315	0.0000	0.4816***	0.006332	0.0000
TREND	-0.2001***	0.051177	0.0001	-0.2502***	0.056606	0.0000
TREND SQUARE	0.0092***	0.002052	0.0000	0.0114***	0.002256	0.0000
AGE ENTIRE YEAR	0.5464**	0.212222	0.0100	0.6908***	0.234764	0.0033
AGE SQUARE	-0.0532**	0.0303	0.0793	-0.071**	0.033339	0.0335
Base Category: SEGA						
SEGB	0.0436	0.342822	0.8989	0.0341	0.38696	0.9298
SEGC	-0.2057	0.315983	0.5150	-0.2332	0.354144	0.5103
SEGD	0.0851	0.280059	0.7612	0.1291	0.314005	0.6810

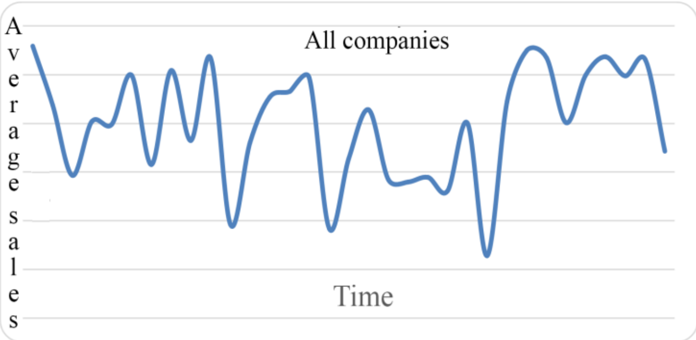
Table 24. (Continued) Dynamic Least Squares Method for Passive Companies by Using Panel DataEstimation Model for Time and Average Margin for E-retailing Life Cycle

	Panel DOLS A-Passive Group			**Panel DOLS B-Passive Group**		
	Coefficient	**Standard Error**	**p**	**Coefficient**	**Standard Error**	**p**
SEGE	0.3813	0.308681	0.2168	0.5453	0.345276	0.1143
Personal Theme Usage	1.6659***	0.330841	0.0000	1.9870***	0.371344	0.0000
Virtual POS Usage	0.7522***	0.282496	0.0078	0.9392***	0.320566	0.0034
AdWords Usage	0.7758***	0.277387	0.0052	0.9385***	0.307989	0.0023
Google Analytics Usage	1.1376***	0.281873	0.0001	1.3854***	0.316803	0.0000
Total Desktop and Mobile Views	0.0019***	6.17E-05	0.0000	0.0021***	6.55E-05	0.0000
R-Square	0.483553			0.479098		
HKT	2.84E+10			2.86E+10		
Note: * indicates significance at 0.05, ** at 0.01, and *** at 0.001						

$R^2 = 0.4835$ in Table 24. This could be explained by the following: The independent variables explain 48.35% of the change in the dependent variable (number of products sold).

Figure 3 was created based on the estimated values of the dependent variable of the model for “all companies,” which was estimated using the DOLS Panel Data model. The average values for each period are calculated separately. This calculation was performed for each period included in the analysis.

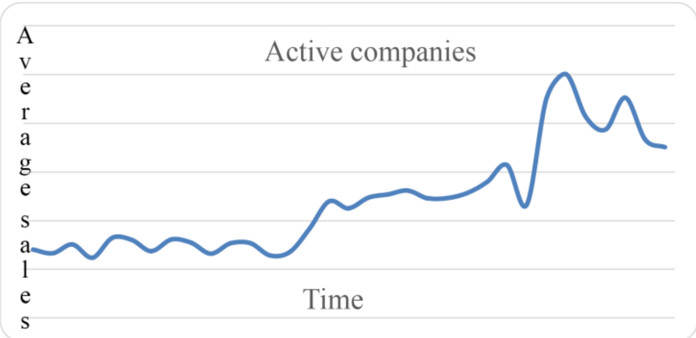
Figure 3. Life Course of All Companies



Source: Developed by the researcher based on Hypothesis 3.

Figure 4 was created based on the estimated values of the dependent variable of the model for “active companies,” which was estimated using the DOLS Panel Data model. This calculation was performed with “active group” equations. Since the estimation values demonstrate the overall movement or course over time, the “active companies” are observed to go through a “stagnant” period initially, which is followed by “increase,” “sudden increase,” and “decrease” periods.

Figure 4. E-Retailing Life Courses of Active Companies

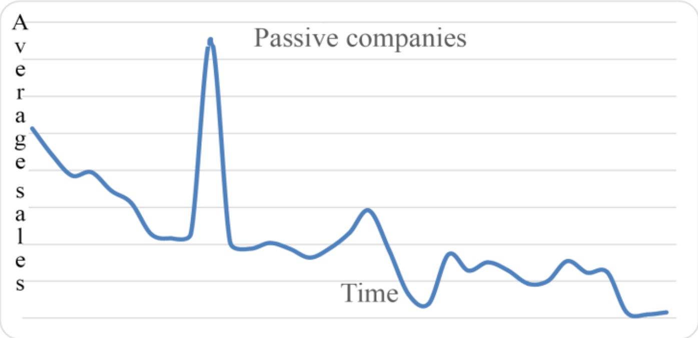


Source: Developed by the researcher based on Hypothesis 3.

Woodall’s (2017) e-commerce life cycle model, which defined the stages e-commerce businesses go through and which are necessary to maintain lasting growth with strategic solutions, consists of three stages. These are Stage 1. Start-up and fast growth, Stage 2. Plateauing growth or consolidation, and Stage 3. Renewed growth by implementing change (new platforms, features, resources/people or strategies). We can argue that the e-retailing life cycles of the active companies in this study are in line with Woodall’s (2017) approach. This approach is depicted in Figure 6.

Figure 5 was created based on the estimated value of the dependent variable of the model for “passive companies,” which was estimated using the DOLS Panel Data model. This calculation was performed with “passive group” equations. Based on the estimated values, the e-retailing life cycle of the passive companies was observed to decline as shown in Figure 7. The "decline trend" can be clearly seen in the passive companies except for "one period."

Figure 5. E-Retailing Life Course of Passive Companies



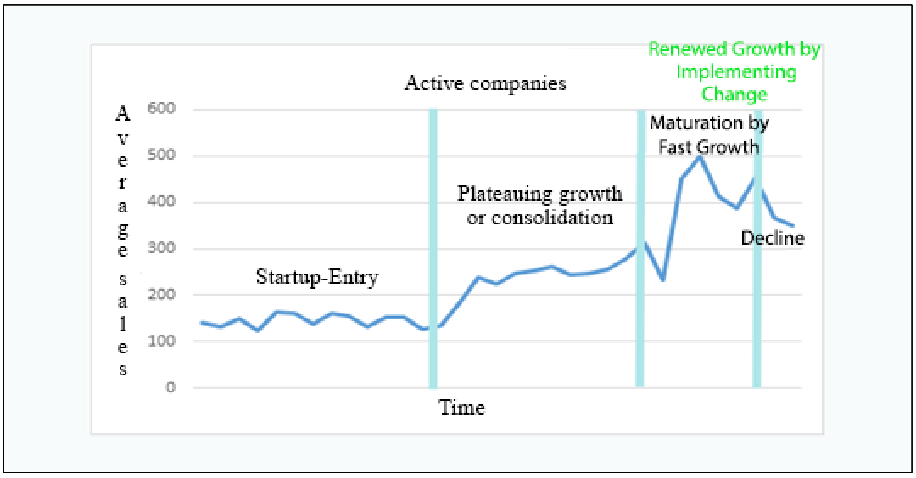
Source: Developed by the researcher based on Hypothesis 3.

Whelan and Mcgrath (2002) stated that e-retailing companies should go through a "withdrawal" phase when web-based technologies can no longer meet their needs and decide to implement a new system. When we look into the decline trend of the passive companies in this study, we can see that the average values decrease and the companies cease information systems usage entirely. Therefore, we can argue that this is in line with Whelan and Mcgrath's (2002) "withdrawal" approach.

5.3. Findings on e-retailing life cycle

This study calculated the monthly sales number frequencies from 2016 to 2018. Accordingly, the stages of active and passive e-retailing companies' life cycles (demonstrated in Figure 4 and Figure 5) can be explained as follows:

Figure 6. Life Cycles of E-retailing Companies



Source: Developed by the researcher based on Hypothesis 3.

Stage 1 (Start-Up Entry): It has been determined that the Start-Up Entry phase of the e-retailing companies takes a long time. During this period, the companies define their products and categories, update their webpages, activate online advertising, and generate their analysis figures. Woodall (2017) stated that e-commerce companies go through a rapid and, in some cases, unexpected initial growth in this period. However, the growth period was longer in this study. It is believed this is generally related to the market demand or the popularity of the product that the companies sell. In addition, since the data belong to the Turkish market, it can be said that geographical location as well as cultural and social habits impact the results.

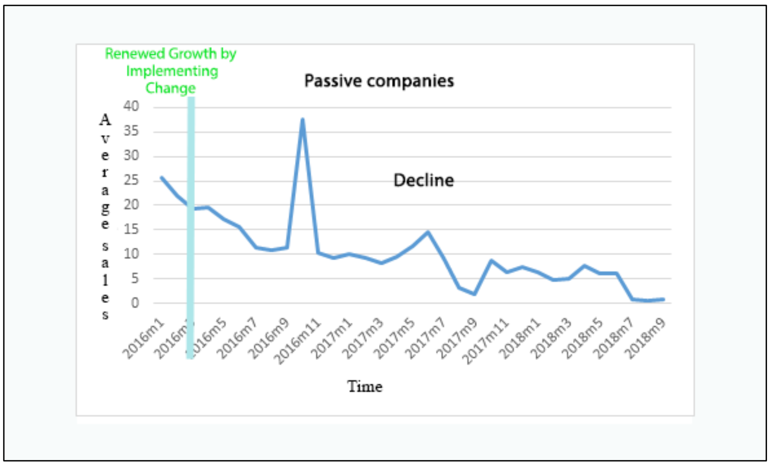
Stage 2 (Plateauing Growth or Consolidation): In the plateauing growth or consolidation phase, the webpage view numbers of the e-commerce companies increase and they start making sales. This period generates data through which the sales can be analyzed. It can be expected that these data are used to develop new marketing strategies to increase sales. According to Woodall (2017), many businesses reaching this second stage of the life cycle tend to panic and look for solutions to issues. The business enters the targeted market. Furthermore, after the company builds brand awareness and creates the initial growth momentum, web data (page-related variables, social media analyses, content, uptake variables, search engine analyses, organic and inbound link variables, user experience and tag management) are analyzed and basic results are obtained about where the visitors come from and what they do. These results can be leveraged to make measured and strategic changes to the e-retailing websites and marketing strategies as well as to review the progress. E-commerce managers can devote resources and ample time to systematic analysis and strategic research to move to the next stage and initiate renewed growth. This period is similar to the one defined in Woodall's (2017) study.

Stage 3 (Maturation by Fast Growth): It has been observed that the sales rate of e-retailing companies increase during this period. Online information system usage in marketing efforts of the e-retailing companies positively impacts growth. Woodall (2017) suggested that rapid growth may be achieved in this stage by changing customer trends, closely following the new technology and channel strategies, and realigning business goals.

Stage 4 (Renewed Growth by Implementing Change): This study did not have any data to be able to observe this stage. Renewed growth in the e-retailing industry may be achieved through acquisitions during the decline stage or growth phase. Woodall (2017) stated that companies should focus on reviewing and renewing their e-commerce strategies regularly to be able to have a long life cycle in the active process of e-commerce.

Stage 5 (Decline): Figure 7 demonstrates the termination or suspension of the e-retailing life cycle of the observed passive companies. E-commerce companies employing the services of IdeaSoft may terminate their systems due to internal or external factors in the industry. Companies that reach the decline stage still continue their sales. Terminating the information system usage is a strategic decision. The improvement of the market conditions of the industry can lead to the revival of the business. According to Dunne et al. (2014), when a retailing organization loses its competitive advantage and starts to decline, the company must decide whether to continue its operations in the market. At this stage, the growth rate is negative, profitability drops further, and overheads are high.

Figure 7. Life Cycles of the Declining E-retailing Companies



Source: Developed by the researcher according to Hypothesis 3.

6. Discussion

The aim of this study is to determine the e-retailing life cycle of the electronic commerce businesses. This study also aims to contribute to the literature as the literature review for this subject did not yield any results about any other studies that investigated the life cycle of e-retailing companies from the information systems management point of view.

It is assumed that the complete life cycle of the companies in the e-retailing industry is directly related to the customer lifetime values. Kingsnorth (2017) argued that page-related variables used in web analytics, social media analytics, contents, uptake variables, search engine analytics, organic and inbound link variables, variables from user experience, and tag management are effective in successfully retaining customers. According to Kingsnorth (2017), Bruceclay (2020), and Nash (2018), the control of variables obtained with management information systems can yield significant results for the life cycle of e-retailing companies.

Thus, relevant variables have been created for retailing information system usage in e-retailing practices, their effectiveness by industries, orders from desktop or mobile platforms, and the impact of desktop or mobile page views on sales.

The top three industries in Segment A are “food,” “multiproduct,” and “other”; the top three industries in Segment B are “food,” “other,” and “hardware and construction supplies”; the top three industries in Segment C are “hardware and construction supplies,” “automotive and spare parts,” and “other”; the top three industries in Segment D are “other,” “food,” and “textile and clothing”; and the top three industries in Segment E are “other,” “food,” and “textile and clothing.”

The annual growth rate of the active companies in “food” industry is below average. This may be because the companies in the food industry do not use their information systems efficiently. The annual growth rate of the active companies in “hunting, camping and outdoor,” “computer,” “security products,” “hardware and construction supplies,” “heating and cooling,” “books and publishers,” “games and hobby products,” “pet shop,” “promotional advertising products,” "health and medical products,” and “multiproduct" and "occupational safety” industries are above average. We could argue that information systems usage in all of these companies positively impact the growth of these industries.

“Hypothesis 1a (H1a): In e-retailing practices, a statistically significant relationship exists in terms of the number of products sold between the use of information systems and the life cycle of companies.” is accepted when the active companies that have an ongoing life cycle and passive companies that have terminated their life cycles are evaluated together and separately. When all (active and passive) company data are evaluated for H1a hypothesis, we can see that information system usage in e-retailing practices has a positive and significant impact on company life cycles. Accordingly, the use of information systems in e-retailing practices can increase sales, which could have a positive impact on the life cycles of companies. Otherwise, the company may be adversely affected and its life cycle may be shorter. Petter et al. (2013) argued that information systems have a positive impact on organizations but suggested further research in this area.

“Hypothesis 1b (H1b): In e-retailing practices, a statistically significant relationship exists in terms of the number of products sold between the use of industry-specific information systems and the life cycle of companies.” is rejected as the chi-square value for “shoes,” “industrial products,” “concept designs,” “watches and optical goods,” and “underwear” industries is $p > 0.05$. It is demonstrated that there is no significant relationship between the retailing information system usage and the number of products sold with regards to the retailing company life cycles of “shoes,” “industrial products,” “concept designs,” “watches and optical goods,” and “underwear” industries. The study demonstrated that except for the aforementioned industries, there is a statistically significant relationship in terms of the number of products sold between retailing information systems usage and company life cycles ($p < 0.05$).

“Hypothesis 2a (H2a): In e-retailing practices, a statistically significant difference exists in terms of company life cycles between the number of orders from desktop platforms and the number of orders from mobile platforms.” hypothesis is tested for all companies (active and passive), for active companies and for passive companies. When the data for all companies are evaluated, this hypothesis is rejected for the “occupational safety” industry ($p = 0.46$). In other words, there is no statistically significant difference between the number of product orders via desktop platforms and the number of product orders via mobile platforms in the “occupational safety” industry as opposed to all other companies. When the data for all companies are evaluated, the H2a hypothesis is accepted for companies except for the “occupational safety” industry ($p < 0.05$). In other words, there is a significant difference between the number of product orders via desktop platforms and the number of product orders via mobile platforms in the “occupational safety” industry as opposed to all other companies. When the data for active companies are evaluated, H2a hypothesis is rejected for “conservative clothing," "flower shops," and "occupational safety" ($p = 0.4652 > 0.05$; $p = 0.17 > 0.05$; $p = 0.3295 > 0.05$, respectively). In other words, there is no statistically significant difference between the number of product orders via desktop platforms and the number of product orders via mobile platforms in the "conservative clothing," "flower shops," and "occupational safety" industries. When the data for active companies are evaluated, the H2a hypothesis is accepted for "other" companies ($p < 0.05$). When the H2a hypothesis is evaluated for these companies, there is a significant difference between the number of product orders via desktop platforms and the number of product orders via mobile platforms. When we look at the observed number of product orders in the active companies, we can see that "conservative clothing," "textile-clothing," "home textiles," and "baby and child clothing" industries prefer mobile platforms. When the data for passive companies is evaluated, the H2a hypothesis is accepted for companies except for the "glassware," "concept designs," "shoes," and "occupational safety" industries ($p < 0.05$). When the H2a hypothesis is evaluated for these companies, there is a significant difference between the number of product orders via desktop platforms and the number of product orders via mobile platforms.

When "Hypothesis 2b (H2b): In e-retailing practices, a statistically significant relationship in terms of company life cycles between the number of sales via viewing a desktop webpage and the number of sales via viewing a mobile webpage." is evaluated for all active and passive companies, a Shapiro–Wilk test is conducted and normal distribution of collected data is rejected for all data. Since the data did not have a normal distribution, non-parametric Spearman's rank correlation test was performed. According to the results of this test, there is a positive and statistically significant relationship in terms of company life cycles between the number of sales via viewing a desktop webpage and number of sales via viewing a mobile webpage in e-retailing practices of active, passive and all (active and passive) companies. Although the correlation coefficient results of the Spearman's rank correlation test are close as values, they are different statistically. The coefficient ratios of the passive companies that completed their life cycles in terms of mobile and desktop e-retailing webpage views are lower compared with those of the active companies. This is an expected result for passive companies.

The technological advances and extensive use of mobile applications direct sales to mobile platforms. It is expected that active e-retailing companies can extend their lifespans by focusing on mobile-friendly web interface designs or mobile advertisements. In this study, the active companies with high mobile webpage view rates are "computer," "flower shops," "electricity," "electronics," "security products," "hardware and construction supplies," "occupational safety," "heating and cooling," "music and music instruments," "games and hobby products," "pet shop," and "promotional advertising products" industries.

When the H2a and H2b hypotheses are evaluated for all active and passive companies, it has been observed that the rate of conversion of webpage views from desktop platforms and webpage views of mobile platforms into orders is below 1% in some industries and above 1% in others. Although mobile efficiency has increased, the desired level of order has not been achieved. The low mobile sales numbers of the passive companies may be one of the reasons as to why these companies are already ending their life spans.

"Hypothesis 3 (H3): In the e-retailing life cycle, a statistically significant relationship exists between time and average margin (number of sales, webpage views, personal theme usage, virtual POS usage, AdWords usage, Google Analytics usage, desktop, and mobile webpage views)." is investigated using the DOLS estimator. It is demonstrated that the lifespans and success of e-retailing companies are dependent on their information system usage status. When we look at the impact on the number of sales, H3 hypothesis for the information systems usage is accepted for the relevant model, and we can argue that the information systems usage makes a positive and significant contribution to the number of sales. The coefficients of Segment A and Segment B were estimated as positive, while the coefficients of Segment C, Segment D, and Segment E were estimated as negative. Based on the estimation results, the number of sales for the companies in Segment A (base) and Segment B are higher compared with those for the companies in Segment C, Segment D and Segment E.

This study aims to understand the impact of information systems on the life cycle of e-retailing companies. The dependent variable (number of products sold) that was estimated with the regression analysis is explained by independent variables for all (active and passive) companies at 73.28%, for active companies at 74.25% and for passive companies at 48%. In this context, Table 22 is created for “entire data,” Table 23 is created for “active group,” and Table 24 is created for “passive group” using the estimated values of the model-dependent variable with Panel Data model DOLS. When we look at the general movement or course in time, the “active” companies are observed to go through a “stagnant” period initially, which is followed by “increase,” “sudden increase,” and finally “decrease” period. The passive group, on the other hand, clearly demonstrates a “decrease” trend except for one period. The average values for each period are calculated separately. This calculation is performed individually for all periods included in the analysis. A similar calculation is performed for “active” and “passive” groups using different equations.

The study classified different stages based on the monthly sales frequencies between 2016 to 2018:

- Stage 1 (start-up or entry)
- Stage 2 (plateauing growth or consolidation)
- Stage 3 (Maturation by Fast Growth):
- Stage 4 (implementing change or choosing growth)
- Stage 5 (decline)

Woodall (2017) studied the e-retailing life cycle in 3 stages, and Ashworth (2011) studied it in 6 stages. This study, on the other hand, identified 5 stages. Some of these stages are in agreement with the results of previous studies.

The longevity of e-retailing companies depends on successfully going through the stages of their life cycle. Using the available information systems in the most efficient way can be an important factor in the success of e-retailing companies. This could lead to increasing the number of customers and sales. It can be argued that correct use of information systems has a positive and significant effect on the life cycle of e-commerce companies.

The results of this study demonstrated that active companies that participated in the study have high-level information systems, but they do not utilize these information systems adequately. The findings of the study also revealed that information systems usage has a positive impact on the life cycles of e-retailing companies in terms of the number of products sold. Petter et al. (2013:43) argued that the success of information systems mostly depends on the acceptance of technology. Tsai et al. (2013) suggested that the companies experienced in the e-retailing industry mostly consist of companies with a large information systems capacity, and this has a positive impact on their growth. The results of this study suggest that having information systems or using information systems leads to different results.

The study demonstrated that when e-retailing companies differentiate their web interfaces with personal themes compatible with desktop or mobile webpages according to the needs of their customers, they see a positive impact on their sales. Companies that use personal themes achieve higher sales numbers. It can be argued that when e-retailing companies design their websites in an original and authentic way, this leads to a positive impact on their sales numbers. Chou and Shao (2020) demonstrated that the impact of mobile platforms on sales depends on the vendor types and performance indicators. Accordingly, the rate of transition to m-retailing is higher for e-retailing companies, and the high accessibility of mobile sales channels increase the possibility of purchase. The results of this study are in agreement with Chou and Shao’s (2020) findings.

It can be argued that offering different payment methods may have a positive impact on the sales of the e-retailing companies. However, the results of this study revealed that companies that offer virtual POS as an alternative payment method have lower sales numbers. Using virtual POS is not a sufficient means to increase sales. The number of companies that do not use virtual POS is high in this study; therefore, this may have led to this result. Additionally, cash on delivery and remittance methods were preferred instead of online POS payments in the years that this study covers, i.e., 2016-2018, which may have contributed to the low sales numbers. The fact that the cash on delivery and remittance rate was 833 million (61%) and the credit card payment rate was 532 million (39%) in Turkey in 2019 supports the results of this study (EBP, 2021). Virtual POS usage rates are growing year by year as reliability increases (Paynet, 2021).

The results of this study revealed that AdWords usage is the most important variable that has a positive impact on the sales numbers of e-retailing companies, and the companies that used AdWords achieved higher numbers of sales. Significant differences were observed in the sales numbers of companies using this tool.

The results of the analysis performed via tools such as Google Analytics revealed that remarketing may have a positive impact on company growth. E-retailing companies may need to use information systems effectively to assess the situation and recreate their marketing strategies. The findings of this study revealed that e-commerce companies using Google Analytics achieve higher sales numbers. E-retailing companies that use Google Analytics can evaluate the data they collected from this program to get to know their customers better and achieve success in their marketing strategies. Vysotska et al. (2016) demonstrated that the effective use of information systems in the life cycle of the company depends on creating the right content for the target audience, and it can increase sales to potential customers.

Evaluation of webpage view rates and the number of sales is important for e-retailing companies. If the webpage views are high but the sales numbers are still low, this could be a problem. This could mean that the company is failing to sell to the customers that are attracted through advertisements. Webpage views serving only advertising purposes may have a negative impact on the company lifespan. Alan et al. (2018: 89) state that the possibility of customers adapting and using mobile shopping technologies quickly is very high. Therefore, consumers can be encouraged to buy faster with mobile channels. This study investigated the conversion rate of mobile and desktop page views to sales in e-retailing companies and found that the conversion rate of mobile page views to sales is higher.

This study also identified life cycle stages of e-retailing companies. The following stages have been identified in the study:

- Stage 1 (start-up or entry): This is the period in which product and categories are defined, webpages are updated, online advertisements are activated and analysis figures are generated. This stage is usually associated with market demand or popularity of the product rather than e-commerce platform practices. This period can be shortened with original webpage designs and online advertisements. Balyemez et al. (2005:84) states that the entry stage is, at the same time, when the product gets the chance to be recognized across the target market, and at this stage the sales growth is slow, the profit rate is low, and the unit costs are high. The findings of the study reveal similar results with the literature in the sense that it takes a long time for e-retailing companies to enter the market.
- Stage 2 (plateauing growth or consolidation): This is the stage when the number of webpage views increases, sales start to pick up, and data is generated for sales analyses. At this stage, remarketing strategies are expected to increase the sales. It is important for business owners to dedicate sufficient resources and time to move to the next stage and initiate renewed growth. Ashworth (2011: 179-184) named the Stage 2 as “talent and initial growth,” and stated that as the companies gain more talent and experience, they can improve service dimensions such as functionality through leveraging their own experiences. This study also revealed similar results about the improvement of companies that gained experience.
- Stage 3 (maturation by fast growth): This is the stage where the sales numbers of the e-retailing companies increase rapidly. In this stage, the use of online information systems in marketing has a positive impact on the growth of e-retailing companies. The e-retailing company is well-known in the market at this stage. It is expected that in this stage, the number of competitors increases while the profitability decreases; therefore, the companies need to implement digital marketing strategies that will create and maintain customer satisfaction. Woodall (2017) argues that most companies go through this process in stage 1.
- Stage 4 (implementing change or choosing growth): This is when the companies change hands or change the way they operate in the e-retailing industry during their maturation by fast growth or decline stages. This observation data could not be obtained in this study. However, this stage was added by using the changes seen in mature or discontinued e-commerce initiatives (Trendyol, Modagram Çiçeksepeti, Kliksa etc.) and Woodall's (2017) study. It would be beneficial for e-commerce companies to review their growth strategies

and focus on renewal in order to have a longer life cycle in Stage 4.

- Stage 5 (decline): This is the stage where the e-retailing process ended or suspended. The declining companies continue to exist in information systems as passive companies. Dunne et al. (2014) stated that in the decline stage, companies lose their competitive advantage and must decide whether to continue in the market.

In conclusion, it is not possible to suggest that all e-retailing companies investing in information systems can increase their sales numbers. Therefore, investing in all information systems would not be a correct strategy. The companies should make accurate decisions on which information systems would be beneficial. Accordingly, the most suitable information system packages should be preferred. At the same time, qualified workforce should be leveraged in information systems management.

For future studies:

Future studies on e-retailing life cycles may perform broader analyses using available methods or other methods that could identify new stages. The studies should not be limited to retailing technology companies; they could also investigate e-retailing companies in online marketplaces such as N11, Hepsiburada, or Gittigidiyor.

Furthermore, the e-retailing life cycle can also be investigated by taking into account financial data, without depending on certain sales quantity variables.

REFERENCES

1. Aharony, J., Falk, H., & Yehuda, N. (2006). Corporate life cycle and the relative value-relevance of cash flow versus accrual financial information. Working paper.Citeseer.
2. Alan, A. K., Kabadayi, E. T., & Erişke, T. (2018). İletişimin Yeni Yüzü: Dijital Pazarlama Ve Sosyal Medya Pazarlaması. Elektronik Sosyal Bilimler Dergisi, 493-504.
3. Altunışık, R., Coşkun, R., Bayraktaroğlu, S., & Yıldırım, E. (2012). Sosyal Bilimlerde Araştırma Yöntemleri SPSS Uygulamalı. Adapazarı: Sakarya Yayıncılık.
4. Altunışık, R., Özdemir, Ş., & Torlak, Ö. (2014). Pazarlama İlkeleri ve Yönetimi. İstanbul: Beta Yayınları.
5. Anthony, J. H., & Ramesh, K. (1992). Association between accounting performance measures and stock prices : A test of the life cycle hypothesis. Journal of Accounting and Economics, 203-227.
6. Arsham, H. (2017, 05 24). Baltimore Üniversitesi. 05 24, 2017 tarihinde Time Series Analysis for Business Forecasting: http://home.ubalt.edu/ntsbarsh/stat-data/Forecast.htm#rLifeCyscle adresinden alındı
7. Ashworth, C. (2011). Marketing and Organisational Development in e-SMEs: Understanding Survival and Sustainability in Growth-oriented and Comfort-zone pure-play Enterprises in the Fashion Retail Industry. Marketing and Retail Division, 8(2), 165-201.
8. Aydın, K. (2013). Perakende Yönetiminin Temelleri. Ankara: Nobel Yayınları.
9. Balyemez, F., İldem Develi, E., & Bayazıt Şahinoğlu, Z. (2005). Ürün Yaşamı Sürecinde Üretimin Yeniden Yapılandırılması. V. Ulusal Üretim Araştırmaları Sempozyumu (s. 83-87). İstanbul: İstanbul Ticaret Üniversitesi.
10. Black, E. L. (1998). Life-cycle impacts on the incremental value-relevance of earnings and cash flow measures.. Journal of Financial Statement Analysis, 40-57.
11. Brockhoff, K. (1967). A test for the product life cycle. Econometrica, Journal of the Econometric Society,, 472-484.
12. Bruceclay. (2020). Bruceclay. 09 01, 2020 tarihinde https://www.bruceclay.com/analytics/logfiles/ adresinden alındı
13. Burns, A. C., & Bush, R. F. (2015). Pazarlama Araştırması. Ankara: Nobel.
14. Cenfetelli, R., & Benbasat, I. (2002). Measuring The E-Commerce Customer Service Life Cycle. Poland,Gdansk: Proceedings of the 10th European Conference on Information Systems, Information Systems and the Future of the Digital Economy, ECIS 2002.
15. Chou, Y.-C., & Shao, B. B. (2020). Adoption and Performance of Mobile Sales Channel for e-Retailers: Fit with M-Retail Characteristics and Dependency on e-Retailing. Information

Systems Frontiers, 1(1), 1-14. doi: https://doi.org/10.1007/s10796-020-09989-0

16. Cloete, E., Courtney, S., & Fintz, J. (2002). EJISDC: The Electronic Journal on Information Systems in Developing Countries, 10(3).

17. Çetindamar, D., Phaal, R., & Probert, D. (2016). Technology Management: Activities and Tools (2 b.). London: Palgrave.

18. Davidson, W. R., Bates, A. D., & Bass, S. J. (1976). The retail life cycle. Retailing: The evolution and development of retailing. Harvard Business Review, 89-96.

19. Dennis, C., Fenech, T., Pantano, E., Gerlach, S., & Merrilees, B. (2004). E-retailing. London: Routledge.

20. Dickinson, V. (2011). Cash flow patterns as a proxy for firm life cycle. The Accounting Review,, 1969-1994.

21. Dil, E. (2014). Stratejik Başarı Göstergesi Olarak Örgütsel Uzun Ömürlülük: Kavramsal Ve Kuramsal Bir Tartışma. Bilgi Ekonomisi ve Yönetimi Dergisi, 15-24.

22. Dil, E. (2016). Türkiye'de Uzun Ömürlü İşletmeler: Kim? Nerede? Ne Yapıyor?. Istanbul University Journal of the School of Business, 49-69.

23. Dili, D. (2017). www.differencebetween.com/. 06 28, 2019 tarihinde https://www.differencebetween.com/difference-between-e-tailing-and-vs-e-commerce/ adresinden alındı

24. Dunham, C., Trzcinko, A., McCarthy, B., & Beriker, J. (2002). USA Patent No. US20030216930A1.

25. Dunne, P. M., Lusch, R. F., & Carver, J. R. (2014). Retailing. USA: South-Western Cengage Learning.

26. EBP. (2021, 06 01). E-ticaret Bilgi Platformu: https://www.eticaret.gov.tr/istatistikler# adresinden alındı

27. Ellison, B., & Boyd, M. D. (2013). Sociality Through Social Network Sites. Oxford: Oxford University Press.

28. Er, İ. (2014). Yeni Ürün Geliştirme. B. Z. Erdoğan, & Z. B. Erdoğan (Dü.) içinde, Pazarlama İlkeler ve Yönetim (s. 332). Bursa: Ekin Yayınevi.

29. Eticaret. (2021, 6 1). EBP: https://www.eticaret.gov.tr/istatistikler adresinden alındı

30. Euromsg. (2016, Mayıs 11). Üyelerinizi Yaşam Döngülerinin Doğru Aşamasında Yakalayın!. Ocak 17, 2018 tarihinde Blog Euromsg: http://blog.euromsg.com/uyelerinizi-yasam-dongulerinin-dogru-asamasinda-yakalayin/ adresinden alındı

31. Gegez, A. (2015). Pazarlama Araştırmaları (5. b.). İstanbul: Beta.

32. Google. (2018). Adwords Yardım. 04 01, 2018 tarihinde https://support.google.com/adwords/answer/2497836?hl=tr adresinden alındı

33. Google. (2019). Ayarlar ve Başlangıç: Sözlük. 10 29, 2019 tarihinde https://support.google.com/google-ads/topic/3121777?hl=tr&ref_topic=3119071 adresinden alındı

34. Google. (2019). Google Ads Mobil Uygulaması:Anahtar Kelimeleri Yönetme. 10 29, 2019 tarihinde https://support.google.com/google-ads/answer/7454124?hl=tr adresinden alındı

35. GoogleAds. (2020). Google Video Reklam Biçimleri. 09 15, 2020 tarihinde https://support.google.com/google-ads/answer/2375464?hl=tr&_ga=2.1075379.380268229.1600454652-692463040.1600454652 adresinden alındı

36. Gökşin, E. (2017). Dijital Pazarlama Temelleri (1 b.). İstanbul: Abaküs.

37. Grabowski, H. G., & Mueller, D. C. (1975). Life-Cycle Effects on Corporate Returns on Retentions. The Review of Economics and Statistics, 4(57), 400-409.

38. Grewal, D., Levy, M., Persaud, A., & Lichti, S. (2013). Marketing, 2ce. Hill.

39. Güleç, Ö. F. (2017). Muhasebe Performansı İle Firma Yaşam Eğrisi Kavramı Arasındaki İlişki: Borsa İstanbul Uygulaması. Ankara: Hacettepe Üniversitesi Sosyal Bilimler Enstitüsü.

40. Güleç, Ö. F., & Karacaer, S. (2017). Corporate Life Cycle Methods in Emerging Markets: Evidence From Turkey. Journal of Economics, Finance and Accounting, 4(3), 224-236.

41. Gülmez, A., & Yardımcıoğlu, F. (2012). OECD Ülkelerinde AR-GE Harcamaları ve Ekonomik Büyüme İlişkisi: Panel Eşbütünleşme ve Panel Nedensellik Analizi(1990-2010). Maliye Dergisi, 0(163), 341.

42. Hackl, F., Kummer, M. l., Winter-Ebmer, R., & Zulehner, C. (2014). Market structure and market performance in E-commerce. European EconomicReview(68), 199-218.

43. Hall, R. (1978). Stochastic Implications of the Life Cycle--Permanent Income Hypothesis: Theory and Evidence. Journal Of Political Economy,, Business Source Complete, EBSCOhost,, 971.

44. Hesse, C. A., Nortey, E., & Ofosu, J. B. (2017). Introduction To Nonparametric Statistical Methods. Akrong Publicatıons Limited, 1-46.

45. İdeasoft. (2015, 03 02). E-perakendecilik nedir? IdeaSoft E-ticaret Blog. 08 30, 2017 tarihinde İdeasoft: https://www.eticaret.com/blog/e-perakendecilik-nedir/ adresinden alındı

46. İdeasoft. (2016). Eticaret Çözüm Merkezi: ERP-CRM-Muhasebe Entegrasyonları. 04 01, 2018 tarihinde https://www.ideasoft.com.tr/konu/cikti-sistemi/idea-output-cikti-sistemi/ adresinden alındı

47. Kao, C., & Min-Hsien, C. (2001). On the estimation and inference of a cointegrated regression in panel data. Advances in Econometrics, 15, 179-222.

48. Kingsnorth, S. (2017). Dijital pazarlama Stratejisi (1 b.). Ankara: Nobel Akademi.

49. Kong, D., Shmakov, K., & Yang, J. (2018). Demystifying Advertising Campaign for CPA Goal Optimization. Lyon: International World Wide Web Conferences Steering Committee.

50. Kotler, P. (1997). Marketing Management (9 b.). New Jersey: Prentice Hall.

51. KPMG. (2018). Perakende Sektorel Bakis-2018. İstanbul: KPMG.

52. Kumar, V., Venkatesan, R., Bohling, T., & Beckmann, D. (2008). The Power of CLV: Managing Customer Lifetime Value at IBM. Marketing Science, 4(585-599), 27.

53. Levy, M., & Weitz, B. (2001). Retailing Management. New York: McGraw-Hill Companies.

54. Lewis, M. (2006). The effect of shipping fees on customer acquisition, customer retention, and purchase quantities. Journal of Retailing, 82(1), 13-23.

55. Mayyas, A., Omar, M., Hayajneh, M., & Mayyas, A. (2017). Vehicle's lightweight design vs. electrification from life cycle assessment perspective. Journal Of Cleaner Production, 687-701.

56. Miller, D., & Friesen, P. H. (1984). A Longitudinal Study of the Corporate Life Cycle. Management Science, 1161-1183.

57. Mohammadi, A., Rafiee, S., Jafari, A., Dalgaard, T., Knudsen, M., Keyhani, A.,... Hermansen, J. (2013). Potential greenhouse gas emission reductions in soybean farming: a combined use of Life Cycle Assessment and Data Envelopment Analysis'. Journal Of Cleaner Production, 89-100.

58. Mueller, D. C. (1972). A Life Cycle Theory Of The Firm. The Journal of Industrial Economics, 199-219.

59. Mutlu, E. C. (2005). Uluslararası işletmecilik: Teori ve Uygulama. İstanbul: Beta Basım Yayım Dağıtım.

60. Nash, B. (2018). Buyer Blog What is Tag Management – and Why TMS is Important for Your Marketing Stack. 09 01, 2020 tarihinde

https://www.trustradius.com/buyer-blog/what-is-tag-management adresinden alındı

61. Öztürk, E. E. (2021, 03 01). Veri Bilimi Okulu. VBO: https://www.veribilimiokulu.com/basit-dogrusal-regresyon/ adresinden alındı
62. Paynet. (2021, 06 01). Türkiye'nin Son 3 Yıla Ait Sanal Pos Kullanım İstatistikleri. https://www.paynet.com.tr: https://www.paynet.com.tr/blog/turkiye-nin-son-3-yila-ait-sanal-pos-kullanim-istatistikleri adresinden alındı
63. Petter, S., DeLone, W., & McLean, E. (2013). Information Systems Success: The Quest for the Independent Variables. Journal of Management Information Systems, 29(4), 7-61.
64. Reñé, A., Alacid, E., Figueroa, R., Rodríguez, F., & Garcés, E. (2017). 'Life-cycle, ultrastructure, and phylogeny of Parvilucifera corolla sp. nov. (Alveolata, Perkinsozoa), a parasitoid of dinoflagellates. European Journal Of Protistology, 9-25.
65. Seghetta, M., Romeo, D., D'Este, M., Alvarado-Morales, M., Angelidaki, I., Bastianoni, S., & Thomsen, M. (2017). Seaweed as innovative feedstock for energy and feed - Evaluating the impacts through a Life Cycle Assessment. Journal Of Cleaner Production, 150.
66. Shapiro, S.,., & Wilk, M. B. (1965). An Analysis of Variance Test for Normality (Complete Samples). Biometrika, 32(3-4), 591-611.
67. Stacey, H. (2016, Ağustos 5). An Introduction to the Ecommerce Customer Lifecycle. Ocak 1, 2018 tarihinde Ometria: https://blog.ometria.com/ecommerce-customer-lifecycle adresinden alındı
68. Stock, J. H., & Watson, M. W. (1993). A Simple Estimator of Cointegrating Vectors in Higher Order Integrated Systems. Econometrica, 61(4), 783-820.
69. Şeker, Ş. E. (2017). Teknoloji Hayat Döngüsü (Technology Life Cycle). 07 05, 2017 tarihinde Sadi Evren Şeker: http://mis.sadievrenseker.com/2014/05/teknoloji-hayat-dongusu-technology-life-cycle/ adresinden alındı
70. Tafesse, W., & Wien, A. (2018). Implementing social media marketing. Journal of Marketing Management, 34(9-10), 732-749.
71. Tatoğlu, F. Y. (2018). Panel Veri Ekonometrisi / Stata Uygulamalı (4 b.). İstanbul: Beta Yayınları.
72. Taylor, M., & Taylor, A. (2012). The technology life cycle: Conceptualization and managerial implications. International Journal of Production Economics, 541-553.
73. Tsai, J. Y., Raghu, T., & Shao, B. B. (2013). Information systems and technology sourcing strategies of e-Retailers for value chain enablement. Journal of Operations Management, 31(6), 345-362.
74. Vernon, R. (1966). International Investment and International Trade in the Product Cycle. The Quarterly Journal of Economics, 80(2), 190-207. http://www.jstor.org/stable/1880689 adresinden alındı
75. Vysotska, V., Chyrun, L., & Kozlov, P. (2016). Analysis of business processes in electronic content-commerce systems. ECONTECHMOD : an international quarterly journal on economics of technology and modelling processes., 5(1), 111-115.
76. Weber, C., Hendrickson, C., Matthews, H., Nagengast, A., Nealer, R., & Jaramillo, P. (2009). Life cycle comparison of traditional retail and e-commerce logistics for electronic products: A case study of buy.com. 2009 IEEE International Symposium on Sustainable Systems and Technology, Sustainable Systems and Technology,. USA: IEEE Xplore Digital Library.
77. Whelan, E., & McGrath, F. (2002). A study of the total life cycle costs of an E-Commerce investment. A research in progress. Evaluation and Program Planning, 25(2), 191-196.

78. Woodall, J. (2017). The ecommerce lifecycle and the three stages of growth. 02 01, 2018 tarihinde https://www.space48.com/blog/ecommerce/ecommerce-lifecycle-three-stages-growth adresinden alındı

79. Yonpae, P., & Chen, K. (2006). The effect of accounting conservatism and life. Journal of Applied Business Research, 22(3), 75-92.